THINK IN OTHER TERMS

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

Yearbook

2018/19

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THE MISSION STATEMENT

To lead in human capital development for industrial and socio-economic transformation, with a bias towards science, technology, engineering and mathematics (STEM) based solutions.

THE VISION

To be a world class University in science, technology, innovation, entrepreneurship and business development, spearheading industrialisation locally and beyond.

CORE VALUES

➢ In the delivery of value to our clients, we pursue academic excellence with integrity, honesty and ethical behaviour.

➢ We are committed to responsible research and innovation that drives commercialisation and industrialisation.

➢ We thrive on mutual respect, teamwork and effective partnerships.

➢ We are driven by a passion to fulfil your dream.

INTERPRETATION OF LOGO

_____   _____

Colours   ### *Symbols*

_____   _____

- ❖ **White** – Facts and Figures
- ❖ **Red** – Intuition/ Gut Feeling
- ❖ **Green** – Creative Thinking
- ❖ **Yellow** – Positive Assessment
- ❖ **Blue** – Control of the thought Processes
- ❖ **Black** – Negative Assessment

- ❖ **Star**– Rising
- ❖ **Bird**– Zimbabwe
- ❖ **Scroll**– Programmes/ Qualifications
- ❖ **Cap**– Knowledge
- ❖ **Telescope**– Looking
- ❖ **Wall** – Industry
- ❖ **Shield** – Protection

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ADDRESSES

Main Campus:
Cnr Gwanda Road and Cecil Avenue, Bulawayo
Postal Address:
P. O. Box AC 939, Ascot
Bulawayo
+ 263 292 282842| www.nust.ac.zw

OTHER LOCATIONS

School of Medicine
Mpilo Central Hospital
Bulawayo

Institute of Development Studies (IDS)
Surburbs
Bulawayo

Centre for Continuing Education
55 Jason Moyo
Bulawayo
+263 292 88 75 48
+263 292 88 74 88

NUST Guest House
12 Kerr Road
Kumalo
Bulawayo

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Harare Office
Zimdef House 18572
Off Mother Patrick Avenue
Rotten Row
Harare
+263 242 251534/ Fax +263 242 794848

FACULTIES AND TEACHING DEPARTMENTS

Faculty of Applied Science

Department of Applied Biology and Biochemistry

Department of Applied Chemistry

Department of Applied Mathematics

Department of Applied Physics

Department of Computer Science

Department of Environmental Science and Health

Department of Forest Resources and Wildlife Management

Department of Radiography

Department of Statistics and Operations Research

Department of Sports Science and Coaching

Faculty of Commerce

Department of Accounting

Department of Banking

Department of Finance

Department of Business Management

Department of Marketing

Department of Insurance and Actuarial Science

Graduate School of Business

Institute of Development Studies

Faculty of Communication and Information Science

Department of Journalism and Media Studies

Department of Library and Information Science

Department of Records and Archives Management

Department of Publishing Studies

Faculty of Engineering

Department of Chemical Engineering

Department of Civil and Water Engineering

Department of Electronic Engineering

Department of Industrial and Manufacturing Engineering

Department of Fibre and Polymer Materials Engineering

Faculty of Medicine

Department of Anatomy & Physiology

Department of Pharmacology and Biochemistry

Department of Pathology

Department of Psychiatry and Social Behavioural Sciences

Department of Nursing and Midwifery Sciences

Department of Surgery and Anaesthestics

Department of Obstetrics and Gynaecology

Department of Paediatrics

Department of Medicine

Faculty of The Built Environment

Department of Architecture

Department of Quantity Surveying

Department of Landscape Architecture and Urban Design (LAUD)

Faculty of Science and Technology Education

Department of Art, Design and Technology Education

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PRINCIPAL OFFICERS OF THE UNIVERSITY

Chancellor
The President of the Republic of Zimbabwe,
His Excellency Cde Emmerson DambudzoMnangagwa
LLB, London; Hon. LLD, MSU; Hon. LLD, UZ; Hon. DPIR, GZU; LLB, LPI, UNZA

Vice-Chancellor
Professor Mqhele E. Dlodlo; PhD (Delft University of Technology, The Netherlands); MSEE (Kansas State University, USA); BSEE, BS- Mathematics and Engineering Management (Geneva College, USA)

Pro Vice-Chancellor (Acting): Academic, Research and Consultancy
Dr Nduduzo Phuthi; PhD (Ass & Quality Ass in HE & Training); Pretoria, (2012),MScEd (Science Education); Curtin, Australia (1998), PGradDip (Educational Technology) UZ; 1992,BEd (Biol); University of Zimbabwe(1988)

Pro Vice-Chancellor: Innovation and Business Development
Dr Gatsha Mazithulela; PhD (Genetic Engineering); University of East Anglia, John Innes Centre Norwich, UK (1998); MBA, Middlesex University Business School, London, UK (2002); B.ApSc Hons Biology and Biochemistry (1994)

Registrar
Mr Fidelis Mhlanga; TI Science, Z'bwe; Bed, Msc, UZ; MBA NUST, Z'bwe

Librarian
Ms Katherine Matsika; BA (Hons) Rhodesia, Dip.AdEd.Z'bwe, HDip. LibSci (UNISA)

Bursar
Dr F S Nkomo; B.B.S Z'bwe, MBA Finance, Stirling, C.I.S, Ex DBA (PSB)

Senior Proctor
Professor S. Dube; BSc, MSc Benin, (Nigeria); Grad CE (UZ)

UNIVERSITY COUNCIL

(As constituted in terms of Section 10 of the National University of Science and Technology ActChapter 25..13 (Formerly Act, 1990)

a) ***Ex officio*:**

Vice-Chancellor
Professor Mqhele E. Dlodlo; PhD (Delft University of Technology, The Netherlands); MSEE (Kansas State University, USA); BSEE, BS- Mathematics and Engineering Management (Geneva College, USA)

Pro-Vice-Chancellor: Innovation and Business Development
*Dr Gatsha Mazithulela;*PhD (Genetic Engineering); University of East Anglia, John Innes Centre Norwich, UK (1998); MBA, Middlesex University Business School, London, UK (2002); B.ApSc Hons Biology and Biochemistry NUST (1994)

Pro-Vice-Chancellor (Acting): Academic, Research and Consultancy
*Dr Nduduzo Phuthi;*PhD (Ass & Quality Ass in HE & Training); Pretoria, (2012),MSc Ed (Science Education); Curtin, Australia, (1998), PGradDip (Educational Technology) UZ; 1992,BEd (Biol); University of Zimbabwe (1988)

b) ***Appointed by the Minister of Higher and Tertiary Education, Science and Technology Development:***

Ambassador Zenzo Nsimbi; Msc Industrial Metallurgy and Management, Aston University , Higher National Diploma in Metallurgy, Certificate in Metallurgy, Professional Manager's Program, Professional Manager's Workshop, Mineral Project Management in Developing Countries, Finance for Non-Financial

Mrs Nomathemba Ndlovu; MSc Marketing NUST, BCom

Mr Job Sibanda; Bachelor of Laws Honours Degree

Mr Japhet Gwante Ndabeni–Ncube; M.A Economics, Post graduate Diploma, Financial Economics, B. A Economics

Mr Israel Ndlovu; Chartered Management Accountant (CIMA); B.Acc (UZ)

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Mrs Sithembinkosi Nyathi; Bachelor of Philosophy Honours in Marketing;Masters in Business Administration, Post Graduate Diploma in Management, Diploma in General Management, Diploma in Marketing Management

Ms Elizabeth Chikwanda; Master of Business Administration (MBA)

Mr Obert Sibanda; Masters of Business Administration, Executive Development Programme, HND Marketing Management, ND Marketing Management, NID in Business Studies, Diploma in Salesmanship, Diploma in SMEs Management & Development

Mr Stephen Nyambuya; Bachelor of Architecture

Engineer Simela Dube; Bachelor of Science Honours (Civic)

Mr Casper Ronney; Master of Business Administration Degree, Bachelor of Science Honours Degree In Accounting, Post graduate diploma in Management, Grad ICSA, Advanced diploma in Accounting and Business, Diploma in Secondary Education

Rev. Dr Rudo Lois Moyo; PhD in Theology, Master of Theology, Honours Bachelor of Theology in Biblical Studies, Certificate in Education

Engineer Todd G Nkiwane; Master of Science in Electrical Engineering, Programmable logic Controller and Mechano-electronics, Wiring Regulations, Portable Appliance Testing
Engineer Gratitude Charis; M Eng. Manufacturing Systems and Operations Management, Bachelor of Engineering Honours Degree in Chemical engineering

Mrs Kezinet Ndhlovu; Master of Business Administration Degree in Banking, Bachelor of Commerce Honours
Degree in banking, Diploma in Credit Management & Advanced Bank Credit Management, Business Systems & Training, Relationship Management, Selling Skills

Mr Chrispen Mugova; Bachelor of Commerce in Accounting

Pastor (Dr) Jefrety Sibanda; Doctor of Ministry in Leadership, Master of Arts in Theology, Bachelor of Education in Educational Administration and Policy Studies, Certificate in Education

Engineer Josephine Makuvara; BSc in Electrical Engineering

Dr Mbongeni Ndlovu; MB ChB, Mmed,

Mr Alois Muzvuwe; Master of Science in Finance and Actuaries, Bachelor of Commerce Honours Degree in Actuarial Science

Ms Bridget Chipungu; Master of Science in Telecommunication Engineering, Bachelor of science in Electrical Engineering, Certificate in Project Management

Engineer E Gwaze; Master of Business Administration, Bachelor of Science Honours Degree in Metallurgy

Ms Fiona Gandiwa Magaya; Certificate in Public Policy, Governance and Leadership, Post Graduate Diploma in law Conciliation and Arbitration, Certificate in Globalisation and Labour Rights, Certificate – Educators development Training, Certificate in Paralegal Training, Diploma in Business Studies accounting

Mr Godwin Zarura Manyonganise; Certificate in Management of Development Programme, Certificate in Post Harvesting and Processing of Certificate in Monitoring and Evaluation, Horticultural Crops, LCCI Diploma In Marketing, Diploma in Project Planning and Management; National Diploma in Agriculture

Mrs Mildred Mkandla; MSc Health Education, (University of London), BA Hons Applied Social Studies; Certificate in Health Visiting, Certificate in Neonatal Intensive Care, State Certified Neonatal Intensive Care, State certified Midwife's Certificate, State Registered Nurse, Primary Teacher's Certificate

c) ***Appointed by the Senate:***

   Engineer Dr A Chinyama
   Dr D J Hlatywayo
   Ms V Madiro
   Mr H Tshuma
   Dr P Nkala
   Professor P J Mundy
   Mr T Nyamande
   Mrs A Chivore
   Professor L Nkiwane
   Professor E O Enwerem
   Dr N Phuthi
   Dr C Mabhena
   Ambassador M Ngulani
   Mr M Mukawa

d) ***President of the Student' Union (Ex officio):***
   Mr D Mwashita

e)   **A distinguished Academic Appointed by the Council on the recommendation of Senate:**
Professor P J Mundy

f)   **A woman appointed by the Minister to represent women's interests:**
(Vacant)

g)   **Elected by the Non-Senate Members of the Academic Staff and approved by the Vice-Chancellor:**
Mr Alois Muzvuwe

h)   **Elected by the Administrative Staff and approved by the Vice-Chancellor:**
Mr Lawrence Ncube

i)   **Appointed by the Workers Committee and approved by the Vice-Chancellor:**
Mr R Dube

j)   **Appointed by the Minister from the Zimbabwe Congress of Trade Union (ZCTU):**
(Vacant)

k)   **Appointed by the Minister from a list of Associations or Organisations representing Lecturers/Teachers Associations:**
(Vacant)

l)   **Appointed by the Minister from a list of the Zimbabwe National Chamber of Commerce (ZNCC):**
(Vacant)

m)   **Appointed by the Minister from a list of the Confederation of Zimbabwe Industries (CZI):**
(Vacant)

n)   **Appointed by the Minister from a list of the Council of Zimbabwe Institution of Engineers:**
(Vacant)

o)   **Appointed by the Minister from a list of names of the Chamber of Mines of Zimbabwe:**
(Vacant)

p)   **Appointed by the Minister from a list of names of Farmers' Union:**
(Vacant)

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q)   **Appointed by the Minister from a list of Church Organisations:**
         (Vacant)

r)   **Appointed by the Minister from a list of Organisations representing the Youth Secretary:**
         The Registrar

ADMINISTRATIVE STAFF

Vice-Chancellor
Professor Mqhele E. Dlodlo; PhD (Delft University of Technology, The Netherlands); MSEE (Kansas State University, USA); BSEE, BS- Mathematics and Engineering Management (Geneva College, USA)

Communication and Marketing
Director –*Mr Felix F. Moyo*; MSc Marketing, BA Comm & Ind.Psy
Marketing-*Lindiwe Nyoni*; MSc Journalism & Media Studies, BSc Journalism & Media Studies

Pro-Vice-Chancellor (Acting): Academic, Research and Consultancy
Dr Nduduzo Phuthi; PhD (Ass & Quality Ass in HE & Training); Pretoria, (2012),MSc Ed (Science Education); Curtin, Australia, (1998), PGradDip (Educational Technology) UZ; 1992,BEd (Biol); University of Zimbabwe (1988)

Research and Innovation Office
Director- *Y S Naik;* BSc (Univ of Bombay), MSc (Univ of Bombay), PhD (Univ Zim)
Chief Research Officer- *P Makoni*; BSc (Hons) (UZ), MSc (UZ), PhD (Univ of Copenhagen)
Research Administrator- *Cinderella Dube*; Cert in Education, (UZ), Cert in Env. Edu., (Rhodes), B.A., (UNISA), M.ED. (EAPPS), (ZOU), MBA, (NUST)

Centre for Continuing Education
Professor S Mpofu; B Admin, MSc RUP (Rhodesia), PhD Michigan State

Senior Assistant Registrar/AVU Learning Centre Manager
Mr V A Mkandla; BA GRAD C.E MPhil, UZ. Diploma Personnel Mgt and Industrial Relation CTC, UK

Administrative Assistant
Buhlebenkosi Bumhira; B.Com (UNISA), MBL *Pending* (UNISA)

Pro-Vice-Chancellor: Innovation and Business Development
Dr Gatsha Mazithulela; PhD (Genetic Engineering); University of East Anglia, John Innes Centre Norwich, UK (1998); MBA, Middlesex University Business School, London, UK (2002); B.ApSc Hons Biology and Biochemistry NUST (1994)

Innovation and Business Development Operations Manager (Acting)
Arnold Moyo; Bachelor of Textile Technology, Master of Science in Marketing

Alumni Affairs Officer
Concillia Mpofu; Bsc Hons. Journalism and Media Studies – NUST, PGDIP - Management in Marketing – University of Cape Town

Innovation, Product and Service Development
Acting Director
Mr A Ncube; BA, Media Studies, MSc. Information Science, MIP. (Masters in Intellectual Property)

Physical Planning Works and Estate
Acting Director
Mr. M. Maphosa; BQS (Hons) in Quantity Surveying, NUST

Administrative Officer
Mr R. Moyo; BA (Gen), PGDE, UZ; MBA, MSc Mktng, NUST

Information and Communications Technology Services
Director
CC L Sibanda; BSc (Hons) Comp Science NUST Z'bwe; MSc Elect Eng (Telecoms), UCT

Managers
Mr Z E Ndlovu; BSC Computer Science, MSc Information Systems
Ms Novuyo N T Bobo; BBA Computer and Management Information Systems, MSc Computer Science, Diploma in ICT and Pedagogical Development.
H Tsokodayi, BSc (Hons) Comp. Science NUST Z'bwe

Engineers
Mr Alan Ntini; BSc (Hons) Computer Science, MBA
Ndlovu Thulani; BEng (Hons) Electronic Engineering (NUST) Reading MSc in Communication Engineering (UZ)

Webmaster
Ngqabutho B Nhlabano; BSc Computer Science, MSc Information Systems

Chief Technician
Tiese D Maseko; BSc (Hons) Computer Science (NUST)

Registrar
Mr Fidelis Mhlanga; TI Science, Z'bwe; Bed, Msc, UZ; MBA NUST, Z'bwe

Deputy Registrar, Academic
Mr E Phiri; BSc (Hons) Pol Admin, UZ, MBA NUST Z'bwe

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Senior Assistant Registrar: Admissions and Student Records
Mr L J Hadebe; Med (ZOU), BEd (UZ), Cert in Edn (Gwanda Zintec)

Administrative Assistant : Admissions and Student Records
Mrs Shorayi Manjeru; MBA (Executive) (NUST), B Mgt Human Resources, ND Secretarial Studies

Administrative Assistant:Admissions and Student Records
Mrs D Dengu; BEd, Bristol, Dip Ed, MED, UZ, IPMZ fellow

Senior Assistant Registrar: Examinations
Mrs J Nyathi; JEB TIP Diploma in Typing, Pitman UK, BA English and Communication ZOU, MBA NUST Z'bwe

Administrative Assistant - Examinations
Ms Ndlelenhle Mpala; MSc RAM, BSc(Hons) RAM NUST

Deputy Registrar, Administration
Ms V R Dube; Cert Tng & Dev. (IPMZ), Dip. Pers. Mgt (IPMZ) BSc Home Economics Messiah USA, MBA NUST

Senior Assistant Registrar: Human Resources – Academic Section
Mr T Moyo; BA, Grad CE (UZ); MBA NUST; Dip Training Mgt; Higher Dip HR

Senior Assistant Registrar: Human Resources– Non -Academic Section
(Vacant)

Senior Assistant Registrar: Human Resources – Training and Staff Development Section
Mrs Nonsikelelo Ndlovu; BBA, Solusi; MBA, NUST

Administrative Assistant: Human Resources
Mrs Faith Ndlovu; B Com (Hons) HR, HND in Secretarial

Central Services: **Acting Assistant Registrar**
Mrs Monicah Matema; B. Management Human Resources (ZOU), MSc Marketing (NUST)

Security
Chief Security Officer
Mr C C Banda; MSc Aeronautical Eng, Hellenic Academy-Greece, City and Guilds, QA Psc. SqnLdr (rtd)

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Administrative Assistant
Mr L Mazhanyuro; EMBA (NUST), B Ad Edu (UZ), Dip in Ad Edu (UZ), Dip in Dev and Disaster Management (NUST), Soccer Referees' Certificate (ZiFA), InterAction Leadership Programme (British Council), Police Driving School Instructor's Certificate (Z R Police Driving School), Certificate of Achievement, Manager's Toolkit (Aura Factor), Certificate of Attendance (Human Rights and the Law) (Legal R/Foundation), Human Rights and the Law (ZiPAM), Basic Counselling and Communication (ZOU), Certificate in Internal Controls and Fraud detection (NUST), Certificate of Attendance, Communication (Rowa), Certificate in Basic Counselling Skills (ZOU), Certificate in Security, Human Rights and the Law (NUST CCE)

Security Officer
Abednico Dube; MSc Disaster Management, BSc (Hons) degree in Police and Security Studies (BUSE), Diploma in General Management (CACC), Certificate in Training Methods (UZ), Certificate in Basic Police Training, Certificate in Investigations

Student Affairs Division
Dean of Students
Sibongile Kamusoko; Doctorate in Educational Leadership (Ed.D) (Higher Education Administration)

Assistant Dean of Students
Stylish Magida; CE, (UCE); STC (Hillside); Dip Adult Edn, Bed, Med, MAdult Edn, UZ

Student Health Services- Medical Doctor
(*Vacant*)

Chief Nursing Sister
(*Vacant*)

Student Employment and Career Guidance
C. Ncube; Dip in Edn (Hillside Teachers College), Dip in French (University of Tampon, Reunion), BSc Hons Sociology (UZ), MA UNISA

Director Residences, Campus Life and Catering
Mr P Z Khumalo; Bachelor of Education (Bed) (Chem) (UZ)University Certificate in Education (CEd-Sc) UR, Master in Business Administration (MBA) (UZ)

Chaplain
Mr T Dube; BA Hons (UZ), Grad CE (UZ), Dip in Church Ministry (Calgary University, CA), MIIM (SIT, USA)

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Senior Administrative Assistant
(*Vacant*)

Sports Administrator
Judith Siziba; BSc (Hons) in Sports Science and Coaching (NUST), Master of Sports Science and Coaching (University of KwaZulu Natal)

Administrative Assistant (Sports)-
Sibonile Madhodha; Dip, Edu, UZ. BSc. Sports, ZOU

Student Counselor
Sibongile Munzara; Bsc (Hons) Counseling, MBA
Racheal Ndebele; MSc in Counseling, BSc (Hons) Psychology; Dip in Edn

Librarian
Ms Katherine Matsika; BA (Hons) Rhodesia, Dip.AdEd.Z'bwe, HDip. LibSci (UNISA)

Bursar
Dr F S Nkomo; Ex DBA (PSB), B.B.S Z'bwe, MBA Finance, Stirling, C.I.S

Deputy Bursar Accountancy & Systems Management
Ms T. Ncube; B Sc Economics(UR), ACMA (CIMA)

Deputy BursarFinance and Administration
R Noko; BCom(Hons) Accounting, MCom Accounting, CPA (Zim), RPAcc (Zim)

Principal Accountant
Mr Lawrence Ncube; Msc - Banking and Financial Services (NUST-Zimbabwe), Bcom (Honors) in Banking (NUST-Zimbabwe), Cert.in basics of Business University of South Africa (UNISA), Cert.in Retirement Funds Trusteeship Insurance Intitute of Zimbabwe (IIZ)

Mr C Ncube; B Com Accounting (ZOU), MBA (Banking and Finance) (UZ)

Nomathemba Moyo;   MBA Banking and Finance (NUST), BCom Hon in Accounting (MSU), HND Higher National Diploma in Accountancy (Byo Poly)

Procurement Manager(Acting)
Mrs T Ngwenya; BCom Hons Purchasing and Supply, HND Purchasing and Supply Mgt, PGDM in Mgt

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Assistant Accountants

Ms T Karikoga; HND (Bulawayo Polytechnic), B.Com Accounting (NUST) Master of Science in Finance and Investments (Nust)

Phendlinhlalo Nkomo; BBA -Accounting degree

HISTORICAL PERSPECTIVE

The idea of a Second University in Zimbabwe was first mooted in June 1982 in the Report of the University of Zimbabwe, Vice Chancellor's committee of Inquiry into the high failure rates which that University experienced in the years 1980 and 1981. The report observed that:

> "*It is estimated that the maximum number of students which the present campus can carry is about 6 000. From existing projections there will be about 5 000 students by 1985 and 6 000 in 1986 or 1987. This fact together with the already existing problem of applicants with minimum requirements failing to gain admission makes it imperative that plans should begin to be made for the establishment of a Second University Campus in Zimbabwe. The committee considered that the best and most cost effective way to do this is to set up another campus of the University of Zimbabwe which will grow towards specialisation in certain fields of study such as Education/and orScience and Technology. The campus could eventually grow into a College of the University of Zimbabwe and perhaps, into a Second University in the long run*".

Unfortunately, this recommendation was not taken seriously at the time. Government seemed to have considered the matter to be premature while the University of Zimbabwe thought it was largely a matter for the Government to decide upon.

It was not until late 1987, that the Vice Chancellor of the University of Zimbabwe, Professor W. J. Kamba, discussed with his colleagues the necessity of approaching Government about setting up a feasibility study of a second university/campus. As a result of this discussion a recommendation was made to the then Minister of Education, Dr Dzingai Mutumbuka, that a Commission be set up to look into the question of a second institution of higher education in Zimbabwe.

On the 15th of April 1988, His Excellency the President, Cde R. G. Mugabe appointed a Commission under Statutory Instrument 59A. Seven Commissioners were sworn in on April 25, 1988, by the Acting President, Cde S. V. Muzenda. The three remaining commissioners were sworn in by His Excellency the President himself on June 15, 1988.

The membership of the commission was as follows:

Mr P. R. Williams: (Chairman)
Dr S. Mahlahla
Professor R. J. Amonoo
Mr S. R. S. Dangarembwa
Mr M. F. Haddon
Professor Z. Krajina
Rev. G. Malaba
Mr S. C. Mumbengegwi

Professor E. A. Ngara
Dr G. G. Sikipa
Mr S. Q. Mphisa served as Commission Secretary

The commission was given comprehensive terms of reference, among which were:

- To investigate the need for and assess the feasibility of setting up a Second University/Campus bearing in mind the manpower requirements and development objectives of Zimbabwe.
- To make recommendations on whether the Second University/Campus should have a Science and Technology bias and or other alternative bias, taking into account the need for rapid technological and industrial development in Zimbabwe.

The Commission presented its report to His Excellency the President on the 1st of February 1989. Its major conclusion was that, on the basis of manpower requirements for economic growth as well as the increasing number of well qualified `A' level school leavers, University expansion *"is not only justified: it is also a necessity"*.

After considering the argument put to it for different possibilities in which University education could be expanded, such as: the creation of a new autonomous University; the establishment of a second major campus of the University of Zimbabwe; or starting several University Colleges or satellites in different parts of the country, the Commission opted for a new autonomous University.

It recommended that a *"Second University should be established with a Science and Technology bias"*, and that the University "*be located in Bulawayo and should admit its first students in 1993"*.

After considering the report of the Commission, the Government of Zimbabwe decided to accept all the recommendations contained therein, except the one relating to the timing of the first intake of students. Instead of 1993, the government decided that the University should open its "doors" to the first intake of students in May 1991.

However, there was a delay in taking steps for the actual implementation of the commission's report. It was not until late 1989 that a committee was formed by the Ministry of Higher Education to make a first draft of the new University's enabling legislation. The final draft Bill was presented to the Zimbabwe Parliament by the then Minister of Higher Education, Cde David Karimanzira on the 24th of October, 1990.

It was piloted through Parliament together with a Bill amending the 1982 University of Zimbabwe Act. The effect was to make the Acts of the two universities virtually identical. Some of the provisions of the two Bills were considered controversial by the University community. Students and staff demonstrations were held at the University of Zimbabwe against these provisions which were considered as significantly reducing the University's academic freedom and autonomy by shifting the power base towards the Government.

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In spite of the demonstrations, protests and protracted discussions which followed the publication of the Bills, they sailed through Parliament and have now become laws of Zimbabwe. The name "National University of Science and Technology (NUST)" was adopted for the New University in Bulawayo.

Meanwhile, even before the new University Bill was presented to Parliament the Minister of Higher Education had constituted the Foundation Committee of the then proposed National University of Science and Technology.

The membership of the Foundation Committee was as follows:-

Professor P. M. Makhurane (Chairman)
Professor C. J. Chetsanga (Vice-Chairman)
Dr F. Takawira
Professor G. L. Chavunduka
Dr E. J. Chanakira
Dr M. N. Mambo
Dr S. C. Mumbengegwi
Mr M. M. Ndubiwa
Mr A. Maboyi-Ncube
Mr W. Bako
Dr J. B. Dube
Mr F. Munezvenyu
Mr V. R. M. Nyathi
Dr S. Muchena
Mr N. Kudenga
Mr P. M. Kodzwa
Mrs S. D. Nyoni
Mr A. Read
Mr A. Moyo
Mr R. Chitrin
Mr P. S. Mahlangu
Eng. M. Grant
Mr N. Mabodoko
Mr E. W. Sansole
Mr Justice G. Chinengundu

The Foundation Committee was officially launched by the Minister of Higher Education in the Large City Hall in Bulawayo on the 17th of August 1990. It became a legal entity on the 21st of December 1990 when the National University of Science and Technology Act was published in the Government Gazette.

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By the time it was dissolved the Foundation Committee had met nine times. Most of its work was carried out by the Chairman who operated on a semi-full time basis having been kindly and informally seconded to NUST by the University of Zimbabwe.

In order to expedite its work, the Foundation Committee established several Sub-Committees including the following:-

the Executive Sub-Committee

the Academic Sub-Committee

the Planning/Building Sub-Committee

the Senior Non-Academic Staff Sub-Committee

the Staff Development Sub-Committee

Like the Foundation Committee, these Sub-Committees operated until the proper Council of the University had been constituted. The terms of reference of the Foundation Committee were set out in Section 30 of the Act (See Part VI).

In spite of numerous rather frustrating delays resulting from the launching of the Foundation Committee before the enabling Act had been promulgated, the long gap between the presentation of the Bill to Parliament in October 1990 and its Publication in December 1990, the lack of financial and budgetary provisions for the work of the Committee and the protracted negotiations with Treasury emanating from this, the Foundation Committee managed to meet the deadline set by the Minister of Higher Education at the launching ceremony.The Committee managed to arrange for the first intake of students into NUST to take place in April 1991.

The Committee further decided that for the 1991 academic year the University should offer first year teaching in the Faculties of Commerce, Industrial Technology and Applied Sciences. These were chosen mainly by virtue of the fact that they offered courses which were closest to those which were being offered by the University of Zimbabwe through its Bachelor of Technology (B. Tech.) programme at the Bulawayo Polytechnic. This made it possible for NUST to make use of the facilities at the Bulawayo Polytechnic for the benefit of its first year students. B. Tech. staff in Bulawayo were appointed by NUST and the transitional arrangements were satisfactory.

Meanwhile, the University of Zimbabwe decided to phase away the B. Tech. programme in the wake of the establishment of NUST. Thus there was no intake into the B. Tech. Programme in 1991.

However, the 2nd, 3rd and 4th year students on the B. Tech programme continued to be taught at both the Harare and Bulawayo Polytechnics. The academic staff were fully consulted on this and they were aware of the fact that for the next few years they would serve the interests of both Universities. A special honorarium was to be paid to them in recognition of this arrangement.

In appreciation, the Chairman of the Foundation Committee, Professor P.M. Makhurane, wrote,

> *"As former Chairman of the Foundation Committee I wish to express my great appreciation to all members of the Committee for their co-operation and assistance at all times. Although some of the meetings were called at very short notice we managed to achieve good attendance so that decisions could be taken. I also wish to extend my gratitude to all the people who were so ready to render their services either as members of the Sub-Committees or in other capacities. The then Permanent Secretary of Higher Education, Dr E. J. Chanakira, deserves special mention for his willingness to bend some of the rules in order to place facilities, equipment and personnel at the Foundation Committee's and my disposal. The principal of the Bulawayo Polytechnic, Mr A. Maboyi-Ncube, apart from being a member of the Foundation Committee also assisted the Committee tremendously in willingly allowing us to use his Board Room for all our meetings and for providing tea and some lavish meals. The then Acting Principal of the United College of Education, the late Mr G. T. Msengezi and the Principal Miss S. Chakanyuka were of invaluable service to me in that they provided the two offices and their Guest House to the National University of Science and Technology. After providing the offices and the Guest House, they continued to be very valued "neighbours" and they were untiring in offering help in all sorts of ways including some meals, teas and the collection of very heavy mail. I must express my appreciation for the services of Miss Ketiwe Dhliwayo who will go down in history as the first Secretary of the National University of Science and Technology. She was kindly seconded to me by the Secretary for Higher Education to assist with all the secretarial work. She discharged her duties with distinction and much patience. Later on she was joined briefly by Miss Thembinkosi Dube as a Temporary Clerical Assistant and more permanently by Miss Eureka Dube in the same capacity. I wish to express my personal hope that the National University of Science and Technology will grow to become a flourishing and reputable institution not only in Zimbabwe and in Southern Africa but also among the international fraternity of Universities. I hope and pray that it will achieve its Mission of, among other things, 'encouraging in all its members and in society those attitudes of fair mindedness, understanding, tolerance and respect for people and views which are essential for the attainment and maintenance of justice, peace and harmony at all times".*

Think in other terms

On the 8th of April 1991, NUST opened for the very first time with 270 students in the three Faculties mentioned above. The number of academic staff was 28.

On the 19th of May 1991, Professor P. M. Makhurane was appointed as the inaugural Vice-Chancellor of the University and soon after that Mr Lameck Sithole and Mr Michael Kariwo were appointed as the first Bursar and first Registrar respectively. Other staff followed and by the 1st of October 1991, the total number of people involved on a full-time basis with what was going on at NUST was as follows:-

       270 students

       28 academic staff

       41 administrators

       11 support staff

On the 28th of October 1991, the University organised a large public ceremony to install its first Chancellor, His Excellency Cde R. G. Mugabe, President of Zimbabwe and its first Vice-Chancellor, Professor Phinias Makhurane, as well as to lay the institution's Foundation stone. The ceremony was held at the University site where a large and colourful camp had been constructed for the purpose. A separate report on the installation and Foundation laying ceremony wasprepared and all the speeches delivered on that day are included in the report.

For the 1992/93 academic year the University admitted an additional 300 students into the first year in the three existing faculties viz. Commerce, Applied Science and Industrial Technology. Student numbers grew to over 1200 by 1995. During the same period Academic Staff in post grew to 85.

On Saturday 27 May 1995 the University held its first Graduation Ceremony at which the Doctor of Technology honorary degree was conferred upon the President and Chancellor, Cde R.G. Mugabe. Some 163 graduates from the Faculties of Commerce and Applied Sciences were capped. This was indeed a historical event.

On the 20th of July, 1996 the University held its second graduation ceremony, where 281 graduands were capped. The first cohort of graduates from the Faculty of Industrial Technology and the Department of Computer Science were conferred with degrees on that occasion.

The generous donation by the Bulawayo City Council of a site 160 hectares in size and provision of a capital budget by Government enabled the first construction phase to begin.

The Building programme was initially delayed by the shortage of water in Bulawayo. Work started in March 1992 when the first contract valued at Z$4,6m was awarded to A. P. Glendenning for the

Think in other terms

bulk earth works and civil engineering construction for roads. Briefs for the building were completed in May 1992. In July 1993 the construction programme started with the award of our first contract to Belmont Construction for the Administration Block. A year later, in September 1994 the second contractor, International Construction Zimbabwe started work on the Faculty of Commerce block. In November and December 1994 work also started on the departments of Chemistry and Chemical Engineering respectively. Construction of the first student hostel began a year later, in September, 1995. However, progress on the construction of this building has been hampered by cash flow problems. Work on the Library began in April 1998, followed by the Ceremonial Hall and the Student Services Centre in November of the same year.

The University moved to campus on the 1st of August, 1998, to occupy the Faculty of Commerce and Administration Buildings. The first lectures on campus took place in the Faculty of Commerce Building on the 17th of August, 1998.

THE NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY ACT, 1990 ARRANGEMENT OF SECTIONS

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY ACT CHAPTER 25.13
(FORMELY ACT, 1990)

ARRANGEMENT OF SECTIONS

Section

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30.   Appointment and Functions of Foundation Committee.

SCHEDULE: Statutes of the University

To establish the National University of Science and Technology and also to provide for matters connected therewith or incidental thereto.

ENACTED by the President and the Parliament of Zimbabwe.

Short title and Date   1.   (1)   This Act may be cited as National University of Science and
of Commencement   Technology Act Chapter 25..13 (formerly Act 1990).
                                 (2)   Sections two to twenty-nine shall come into operation on a date to
                                        be fixed by the President by statutory instrument.
                                 (3)   This section and section thirty shall come into effect on the date of
                                        publication of this Act.

Interpretation   2.   (a)   In this Act:-
                                        "Academic Staff" means all persons employed, whether full-time
                                        or part-time, by the University as –
                                        (a) professors, lecturers of any class or persons engaged in
                                             research; or
                                        (b) holders of posts declared by the Senate to be academic
                                             posts:
                                        "Administrative Staff" means all persons employed by the University
                                             who are categorized in terms of the Statutes as members of
                                             the administrative staff;
                                        "Bursar" means the person holding office as Bursar of the University
                                             in terms of Section Eighteen;
                                        "Chairman of Department" means a person appointed in terms of the
                                             Statutes to be chairman of a Teaching Department or head of
                                             an Institute or Centre controlled by the University;
                                        "Chairman of the Council" means the person elected to be chairman
                                             of the Council in terms of Section Twelve;
                                        "Chancellor" means the President in his capacity as Chancellor of the
                                             University in terms of Section Seven;
                                        "Council" means the University Council established in terms of
                                             Section Ten;
                                        "Faculty" means a Faculty of the University established in terms of the
                                             Statutes;

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"Institute" means an Institute established in terms of the Statutes;

"Librarian" means the person holding the office of Librarian of the University in terms of Section Nineteen;

"Minister" means the Minister of Higher and Tertiary Education, Science and Technology Development or any other Minister to whom the President; may from time to time assign the administration of this Act;

"Non-academic staff" means all persons employed by the University who are not members of the academic staff;

"Pro-Vice-Chancellor" means a person holding office as Pro-Vice-Chancellor in terms of Section Nine;

"Professor" means a professor of the University;

"Registrar" means the person holding office as Registrar of the University in terms of Section Seventeen;

"Regulations" means regulations made by the Senate under Section Twenty-eight;

"Senate" means the Senate established in terms of Section Fourteen;

"Senior," in relation to the staff of the University, means the Registrar, the Bursar and such other members of staff as the Council may determine from time to time;

"Statutes" means the Statutes of the University set out in the Schedule as amended from time to time or replaced in terms of Section Twenty-seven;

"Students' Union" means any association of students recognized by the Council as the Students Union;

"University" means the National University of Science and Technology constituted in terms of this Act;

"Vice-Chancellor" means the person holding the office of Vice-Chancellor in terms of Section Eight;

"Workers" means all persons employed by the University who are categorised in terms of the Statutes as workers.

Establishment of   3.   (1)   There is hereby constituted a university to be known as the

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the University		National University of Science and Technology.
	(2)	The University shall be a body corporate with perpetual succession and shall be capable of suing and being sued in its corporate name and subject to this Act, of performing all acts that bodies corporate may by law perform.

Objects and Powers of the University 4.

(1) The objects of the University are the advancement of knowledge with a special bias towards the diffusion and extension of science and technology through teaching, research and, so far as is consistent with these objects, the nurturing of the intellectual, aesthetic, social and moral growth of the students of the University.

(2) For the achievement of its objects, the University shall, subject to this Act, have the following powers:-

(a) to provide for research and courses of instruction, whether on a full-time or part-time basis, by correspondence or extramurally, and to take such other steps as may appear necessary and desirable for the advancement and dissemination of knowledge;

(b) to hold examinations and to confer degrees, including honorary degrees, diplomas, certificates and other awards, upon persons who have followed courses of study approved by the Senate and additionally, or alternatively, have satisfied such other requirements as may be determined by the Senate;

(c) to provide courses not leading to degrees, diplomas or certificates, including training for persons wishing to enter the University;

(d) to provide opportunities for staff and students and such other persons as the University may approve to engage in productive activity in the fields of science and technology and any other fields in which the University may from time to time be engaged;

(e) to promote research with emphasis on scientific, technological, industrial and developmental projects, with particular reference to the developmental needs of Zimbabwe;

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(f) to institute professorships, lectureships, research fellowships, staff development fellowships and other posts and offices and to make appointments thereto;

(g) to institute and award fellowships, bursaries, prize medals, exhibitions and other distinctions, awards and forms of assistance consistent with its objects;

(h) to erect, equip and maintain laboratories, offices, halls of residence, lecture halls, libraries, museums and other buildings and structures required for the promotion of its objects;

(i) to regulate and provide for the residence of its students and members of staff;

(j) to provide and maintain sports fields and other recreational facilities for its students and members of staff;

(k) to demand and receive such fees as may from time to time be prescribed by or in terms of the Statutes;

(l) to enter into such contracts and to establish such trusts and to appoint such staff as the University may require;

(m) to establish pension, superannuation or provident or other credit fund schemes for the benefit of its staff or any section thereof and to enter into arrangements with the Government or any organization or person for the operation of such schemes;

(n) to acquire any property, movable or immovable, and to take, accept and hold any property which may become vested in it by way of purchase, exchange, grant, donation, lease, testamentary disposition or otherwise;

(o) to sell, mortgage, let on hire, exchange, donate or otherwise dispose of any property held by it;

(p) to invest in land or securities such funds as may be vested in it for the purpose of endowment, whether for general or specific purposes, or such other funds as may not be immediately required for current expenditure;

(q) to borrow money for any purpose which the Council thinks fit;

(r) to lend money in the form of short-term loans to its staff on terms and conditions approved by the Council;

Membership of the University	5.		The University shall consist of:-
		(a)	a Chancellor, and
		(b)	a Vice-Chancellor, and
		(c)	one or more Pro-Vice-Chancellors, and
		(d)	members of the Council, and
		(e)	members of the Senate, and
		(f)	members of staff, and
		(g)	students, and
		(h)	the Convocation

(s) to do all such acts and things, whether or not incidental to the powers specified in this subsection and whether inside Or outside Zimbabwe, as may be requisite in order to further its objects or any of them.

Membership of the University 5. The University shall consist of:-
  (a) a Chancellor, and
  (b) a Vice-Chancellor, and
  (c) one or more Pro-Vice-Chancellors, and
  (d) members of the Council, and
  (e) members of the Senate, and
  (f) members of staff, and
  (g) students, and
  (h) the Convocation

Prohibition against discrimination in membership of University 6. (1) No test of religious or political belief, race, ethnic origin, nationality or sex shall be imposed upon or required of any person in order to entitle him to be admitted as a member of staff or student of the University or to hold any office therein or privilege thereof.

(2) Nothing in subsection (1) shall be constructed as preventing the University from giving preference to citizens or residents of Zimbabwe when making appointments or promotions or when admitting students.

Chancellor 7. (1) The President of Zimbabwe shall be Chancellor of the University.
(2) The Chancellor shall be the Head of the University.
(3) The Chancellor shall have the right:-
  (a) to preside over any assembly or meeting held by or under the authority of the University, and
  (b) upon the recommendation of the Council and the Senate, to confer degrees, diplomas, certificates and other awards and distinctions of the University and to withdraw or restore such awards.

Vice-Chancellor 8. (1) The Vice-Chancellor shall be appointed by the Chancellor after consultation with the Minister and Council and shall hold office for such period as is provided in his contract of employment.

Think in other terms

(2)   Subject to the general control of the Council, the Vice-Chancellor shall be the chief academic, administrative and disciplinary officer of the University, with general responsibility for maintaining and promoting the efficiency, effectiveness and good order of the University.

(3)   Subject to sub-sections (4) and (5), the Vice-Chancellor may:-

(a)   suspend from duty any member of staff of the University;

(b)   subject to section six, prohibit the admission of a student or any person to the University;

(c)   prohibit, indefinitely or for such period as he may specify, any student or groups of students from attending any class or classes;

(d)   prohibit any student or group of students or person or group of persons from entering or remaining on such part or parts of the University campus as he may specify;

(e)   expel or suspend, indefinitely or for such a period as he may specify, any student or group of students;

(f)   dissolve or suspend, indefinitely or for such period as he may specify, the Students Union or any of its committees or organs, or prohibit or suspend, indefinitely or for such period as he may specify, any activity or function of the Students' Union or any of its committees or organs;

(g)   impose any other or give any other order in respect of:-

(i)   a member of staff, which is recommended by the Disciplinary Committee in terms of subsection (6) of section *twenty-four*;

(ii)   a student, which is recommended by the Student Disciplinary Committee in terms of subsection (6) of section *twenty-five*.

(4)   The Vice-Chancellor shall not expel a student for misconduct unless the student has been found guilty of that misconduct by the Student Disciplinary Committee in terms of section *twenty-five.*

(5)   Any action taken by the Vice-Chancellor in terms of subsection (3) shall be subject to ratification by the Council.

Pro-Vice   9.   (1)   One or more Pro-Vice Chancellors may be appointed by the

Chancellors Council with the Approval of the Minister in accordance with the Statutes.

(2) A Pro-Vice Chancellor shall assist the Vice-Chancellor in the performance of his functions and, in addition, shall have such functions as may be specified in the Statutes.

(3) The Vice-Chancellor may delegate to a Pro-Vice Chancellor, either absolutely or subject to conditions, any of his functions in terms of this Act and may at any time amend or withdraw any such delegation;
Provided that the delegation of a function in terms of this subsection shall not prevent the Vice-Chancellor from himself exercising that function.

Council 10. (1) Subject to this Act any general directions as to policy given by the Minister, the government and executive authority of the University Shall be vested in the Council, which shall consist of:-
(a) the Chancellor, the Vice-Chancellor and the Pro-Vice Chancellors, who shall be ex-officio members; and
(b) sixteen persons appointed by the Minister; and
(c) nine persons who are members of the of the academic staff appointed by the Senate, other than the Vice-Chancellor and the Pro-Vice Chancellors; and
(d) the President of the Students' Union, who shall be an ex-officio member; and
(e) one person who is a distinguished academic appointed by the Council on the recommendations of the Senate; and
(f) one woman appointed by the Minister to represent women's interests; and
(g) one person approved by the Vice-Chancellor and elected by the non-Senate members of the academic staff from among themselves; and
(h) one person approved by the Vice-Chancellor and elected by the administrative staff from among themselves; and
(i) one person approved by the Vice-Chancellor and elected by the workers' committee of the University; and

Think in other terms

(j) one person appointed by the Minister from a list of names submitted by the Zimbabwe Congress of Trade Unions or, if that organization ceases to exist, by such other organization as the Minister, after consultation with the Minister to whom the administration of the Labour Relations Act, 1985 (No.16 of 1985) has been assigned, recognizes as its successor for the purposes of this paragraph; and

(k) one person appointed by the Minister from a list of names submitted by such organization representing teachers and additionally, or alternatively, lecturers, as the Minister recognizes for the purposes of this paragraph; and

(l) one person appointed by the Minister from a list of names submitted by the Zimbabwe National Chamber of Commerce, if that organization ceases to exist, by such other organization as the Minister, after consultation with the Minister responsible for commerce, recognizes as its successor for the purposes of this paragraph; and

(m) one person appointed by the Minister from a list of names submitted by the Confederation of Zimbabwe Industries or, if that organization ceases to exist, by such organization after consultation with the Minister responsible for industry, recognizes as its successor for the purposes of this paragraph; and

(n) one person appointed by the Minister from a list of names submitted by the Council of the Zimbabwe Institution of Engineers (Private) Act (Chapter 226) or if that organization ceases to exist, by such other organization as the Minister, after consultation with the Minister responsible for public construction, recognizes as its successor for the purposes of this paragraph; and

(o) one person appointed by the Minister from a list of names submitted by the Chamber of Mines of Zimbabwe Incorporation (Private) Act (Chapter 162) or, if that organization ceases to exist, by such other organization as the Minister, after consultation with the Minister responsible for mines, recognizes as its successor for the purposes of this paragraph; and

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(p) one person appointed by the Minister from a list of names submitted by such farmers unions as the Minister, after consultation with the Minister responsible for agriculture, recognizes for the purposes of this paragraph; and

(q) one person appointed by the Minister from a list of names submitted by such organization representing churches or organizes religion as the Minister recognizes for the purposes of this paragraph; and

(r) one person appointed by the Minister from a list of names submitted by such organization representing youths or the interests of youths as the Minister recognizes for the purposes of this paragraph.

(2) If any person, organization or authority fails or declines:-

(a) to appoint or elect any person in terms of paragraph (c), (g), (h), or (i) of subsection (1) within a reasonable time after being called upon to do so, the Council, after consultation with the Minister, may appoint any person to fill the vacancy;

(b) to submit a list of names in terms of paragraph (j), (k), (l), (m), (n), (o), (p), (q) or (r) of subsection (1) within a reasonable time after being called upon to do so, the Minister may appoint any person to fill the vacancy.

Functions of Council 11. (1) Subject to this Act and the Statutes, the Council shall:-

(a) appoint –
   (i) with the approval of the Minister, the Pro-Vice-Chancellors and the Registrar;
   (ii) the Bursar, the Librarian and academic staff; and
   (iii) the administrative staff and other employees of the University.

   Provided that the Council may delegate its duties under this paragraph to such committee as may be prescribed in the Statutes;

(b) on the recommendation of the Senate, institute professorships, associate professorships and other academic offices, and abolish or hold in abeyance any such offices;

(c) receive and, if the Council considers it proper to do so, give effect to report and recommendations from the Senate on those matters upon which the Senate is authorized or

Think in other terms

required by this Act or the Statutes to make reports and recommendations;

(d) cause to be prepared annually a statement of expenditure of the University during the previous financial year, and of the assets and liabilities of the University on the last day of that previous financial year;

(e) submit statements of income and expenditure referred to in paragraph (d) to audit by an auditor appointed by the Council, and shall publish such statements and the auditor's reports thereon;

(f) cause to be prepared annually estimates of income and expenditure for the following financial year;

(g) cause to be prepared and made available to the public a report on the activities of the University during each year.

(2) Without limitation on any other powers conferred on Council by this Act, the Council shall have the following powers:-

(a) to receive recommendations from the Senate for conferment, withdrawal or restoration of degrees, including honorary degrees, and diplomas, certificates and other awards and distinctions of the University and, if approved, to submit them to the Chancellor;

(b) to administer the property of the University and to control its affairs and functions;

(c) to exercise on behalf of the University such of the powers set out in subsection (2) of section *four* as are not exercisable in terms of this Act by any other authority;

(d) to do such other acts as it considers to be necessary for the proper administration of the University and the achievement of its objects.

Chairman and Vice-Chairman of Council

12. (1) The Council shall elect a chairman and a vice-chairman from amongst its members to hold office for such period and subject to such terms and conditions as are prescribed in the Statutes.

(2) At all meetings of Council at which the Chancellor is not present the chairman of the Council or, in his absence, the vice-chairman shall preside.

Think in other terms

		(3)	If at any meeting of the Council the Chancellor and the chairman and vice-chairman of Council are all absent, the members of the Council who are present shall elect a person from amongst their number to preside at the meeting.

Executive Committee of Council

13. (1) There shall be a principal committee of the Council to be known as the Executive Committee.

(2) The Executive Committee shall consist of:-
  (a) the chairman and vice-chairman of the Council and
  (b) the Vice-Chancellor and every Pro-Vice-Chancellor; and
  (c) ten members of the Council, of whom:-
    (i) five shall be appointed by the Minister; and
    (ii) three shall be appointed by the Senate; and
    (iii) two shall be appointed by the Council.

(3) The Chairman and Vice-Chairman of the Council shall be the chairman and vice-chairman of the Executive Committee.

(4) the Executive Committee shall exercise such of the functions of the Council as the Council may delegate to it.

(5) Any delegation of functions by the Council in terms of subsection (4) may be made absolutely or subject to conditions and may be amended or withdrawn at any time.

(6) A delegation of any function by the Council in terms of subsection (4) shall not prevent the Council from itself exercising that function.

Senate

14. (1) Subject to this Act, the Academic Authority of the University shall be vested in the Senate, which shall consist of:-
  (a) the Vice-Chancellor, the Pro-Vice-Chancellors, the Deans, the Full Professors, the Chairmen of Departments and the Librarian, who shall be *ex-officio* members; and
  (b) one member of the permanent academic staff from each Faculty elected annually by such staff; and
  (c) six students elected annually by the Students' Union:
    Provided that such students shall not be entitled to attend deliberations of the Senate on matters which are considered by the chairman of the Senate to be confidential.

(2) If the full-time academic staff or the Students' Union fails or declines to elect a person in terms of paragraph (g) or (h) of subsection (1), the council may appoint a suitably-qualified person to fill the vacancy.

Function of

15. The Senate shall have the following functions:-

Think in other terms

Senate

(a) to promote the advancement of knowledge through research;

(b) to formulate and carry out the academic policy of the University;

(c) to regulate the programmes, subjects and courses of study and the examinations held by the University;

(d) to regulate the admission of students to the University;

(e) to recommend to the Chancellor, through the Council, the conferment of degrees, including honorary degrees, diplomas, certificates and other awards and distinctions of the University and the withdrawal and restoration of such awards;

(f) to fix, subject to the consultation with any sponsors and subject to the approval of the Council, the times, modes and conditions of competitions for fellowships, scholarships and prizes;

(g) to appoint examiners for examinations conducted by the University;

(h) to cause to be prepared estimates of expenditure required to carry out the academic work of the University and to submit them to the Council;

(i) subject to the approval and direction of the Council, to formulate, modify and revise the organization of Faculties, Departments, Institutes, Centres and units of the University and to assign to them their various subjects or functions, and to advise the Council on the establishment of the Faculties, Departments, Institutes, Centres or units;

(j) to recommend to the Council the institution, abolition or holding in abeyance of professorial chairs and other academic offices;

(k) without derogation from the powers of the Council, to propose changes to the Statutes;

(l) to make any regulations it is authorized to make by or in terms of this Act;

(m) to appoint committees, which may include persons who are not members of the Senate, to exercise any of the functions of the Senate, other than the power to make regulations;

(n) to report on any matter referred to it by Council;

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			(o) to do such other acts as the Council may authorize or direct it to do.
Academic Board	16.	(1)	There shall be a principal committee of Senate to be known as the Academic Board.
		(2)	The Academic Board shall consist of:-

(a) the Vice-Chancellor, who shall be chairman; and
(b) every Pro-Vice-Chancellor; and
(c) *four* full professors of the University, elected annually by the Senate; and
(d) all the Deans of Faculties; and
(e) the Librarian; and
(f) two members of the Senate elected annually by the persons referred in paragraphs (a) and (b) of subsection (1) of Section *Fourteen*.

(3) The Academic Board shall exercise such of the functions of the Senate as the Senate, with the approval of the Council, may delegate to it.

(4) Any delegation of functions by the Senate in terms of sub-section (3) may be made absolutely or subject to conditions and may be amended or withdrawn at any time.

(5) A delegation of any function by the Senate in terms of sub-section (3) shall not prevent the Senate from its exercising that function.

Registrar 17. (1) There shall be a Registrar of the University who shall be appointed by the Council with the approval of the Minister in the manner provided in the Statutes.

(2) Subject to the directions of the Council, the Registrar shall be responsible for the general administration of the University, and shall perform such other functions as may be specified in the Statutes.

(3) The Registrar, or a member of his staff whom he may authorize to act for him, shall be secretary of the Council and the Senate.

Bursar 18. (1) There shall be a Bursar of the University who shall be appointed by the Council in the manner provided in the Statutes.

(2) Subject to the directions of the Council, the Bursar shall act as the accountant of the University and shall be responsible for the safe-guarding of its funds and, in accordance with the general directions of the Vice-Chancellor, for authorizing its investments and expenditure.

(3) The Bursar shall perform such additional functions as may be

specified in the Statutes.

Librarian	19.	(1)	There shall be a Librarian of the University who shall be appointed by the Council in the manner provided by the Statutes.
		(2)	Subject to the directions of the Senate and the Vice-Chancellor, the Librarian shall be responsible for the administration and safe-guarding of the libraries of the University.
Convocation	20.	(1)	The Convocation of the University shall consist of all persons whose names appear on the Convocation roll maintained by the Registrar.
		(2)	The Vice-Chancellor and all Pro-Vice-Chancellors, lecturers, Chairman of Departments, the registrar, the Librarian and the Bursar shall be *ex-officio* members of the Convocation.
		(3)	All graduates of the University who signify in writing addressed to the Registrar that they desire to be members of the Convocation and who inform the Registrar of their address shall be entitled to have their names entered on the Convocations roll.
		(4)	Subject to section seven, the Vice-chancellor or such other person as he may appoint shall be chairman of meetings of the Convocation.
		(5)	Meetings of the Convocation shall be held at such time and places as the Council shall direct.
		(6)	The convocation may deal with any matter relating to the University which may be referred to it by the Council.

Terms and Conditions of Service of Staff   21.   The terms and conditions of service for each category of staff employed by the University, including the Vice-Chancellor and every Pro-Vice-Chancellor, shall be determined by the Council in terms of this Act, and such terms and conditions shall provide that:-

(a) any person so employed shall be entitled to resign from his employment on giving such notice in writing to the Registrar as may be fixed such terms and conditions;

(b) any person so employed shall, subject to any exception that may be provided, retire from his office at such time or in such circumstances as may be fixed in such terms and conditions;

(c) no summary termination of the employment of any person so employed shall take place except for good cause and, in the event of any such termination, the person concerned shall have a right of appeal to the Council, whose decisions shall be final.

Think in other terms

Appointment and Grading of Staff	22.	(1)	Every appointment to the academic staff shall be made by an Academic Appointments Board consisting of :-

(a) the Vice-Chancellor or his nominee, who shall be chairman; and

(b) two members appointed by the Council from amongst those of its members who are not members of staff of the University; and

(c) the Chairman of the Department to which the appointment is made; and

(d) one other member approved by the Vice-Chancellor, of the Department to which the appointment is made; and

(e) the Dean of the Faculty to which the appointment is made; and

(f) the Chairman of a Department approved by the Council as being related to the Department referred to in paragraph (c).

(2) Subject to this Act and the Statutes, the Council shall appoint Boards of Selection for the purpose of appointing members of staff other than the Vice-Chancellor, a Pro-Vice-Chancellor, the Registrar, the Bursar, the Librarian and academic staff.

(3) The Council shall appoint a Grading Committee for the purpose of determining all matters relating to the grades and points of entry upon salary scales by members of staff of the University.

Promotion of Staff   23.   (1) Every promotion of a person to a post or grade within the academic staff shall be effected by an Academic Staff Promotions Committee consisting of:-

(a) the Vice-Chancellor or his nominee, who shall be Chairman; and

(b) every Pro-Vice-Chancellor; and

(c) four members of the Council who are not members of staff of the University, appointed by the Council; and

(d) all Deans of Faculties; and

(e) at least three full professors of the University appointed by the Senate once every three years.

(2) Every promotion of a person to a post or grade within the non-academic staff shall be effected by a Non-Academic Staff Promotions Committee appointed by the Council and consisting of:-

(a) a Pro-Vice-Chancellor, who shall be chairman; and

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(b) the Registrar; and

(c) the Bursar; and

(d) the Librarian; and

(e) two members of the Council who are not members of staff of the University; and

(f) one representative of each category of the non-academic staff prescribed in the Statutes; and

(g) one representative of each Faculty.

Staff Disciplinary Committee

24. (1) There shall be a Staff Disciplinary Committee which shall consist of the following members appointed by the Vice-Chancellor:-

(a) a Pro-Vice-Chancellor, who shall be chairman; and

(b) a senior member of the academic or administrative staff; and

(c) a member of the academic or administrative staff of similar status to the person charged.

(2) Two members of the Staff Disciplinary Committee shall form a quorum.

(3) All matters to be decided at any meeting of the Staff Disciplinary Committee shall be decided by a simple majority and, in the event of an equality of votes, the chairman or person presiding shall have a casting vote in addition to his deliberative vote.

(4) The functions of the Staff Disciplinary Committee shall be to investigate any breach of a Statute, regulation, ordinance or other misconduct on the part of any member of the academic or administrative and general staff and, subject to subsection (6), to recommend to the vice-Chancellor the punishment to be imposed on or order to be made in respect of the member if it finds him guilty of such misconduct.

(5) A person charged with misconduct referred to in subsection (4) shall have a right of audience before the Staff Disciplinary Committee.

(6) Where the Staff Disciplinary Committee has found a person guilty of misconduct referred to in subsection (4), the Committee shall recommend to the Vice-chancellor any one or more of the following:-

(a) that the person's employment be terminated;

(b) that the person pay a fine to the University not exceeding one thousand dollars;

(c) that the person be demoted;

(d) that the person be censured or reprimanded;

(e) such other penalty or order as may be provided for by or in terms of the Statutes.

Student Disciplinary Committee 25. (1) There shall be a Student Disciplinary Committee which shall consist of the following members appointed by the Vice-Chancellor:-

(a) a Pro-Vice-Chancellor, who shall be chairman; and

(b) the Senior Proctor, who shall be vice-chairman; and

(c) four members of the academic staff; and

(d) one student nominated by the Student's Union.

(2) Five members of the Student Disciplinary Committee shall form a quorum.

(3) All matters to be decided at any meeting of the Student Disciplinary Committee shall be decided by a simple majority and, in the event of an equality of votes, the chairman or person presiding shall have a casting vote in addition to his deliberative vote.

(4) The functions of the Student Disciplinary Committee shall be to investigate any breach of a Statute, regulation or ordinance or other misconduct on the part of any student and, subject to subsection (6), to recommend to the Vice-Chancellor the punishment to be imposed on the student if it finds him guilty of such misconduct.

(5) A student charged with misconduct referred to in subsection (4) shall have right of audience before the Student Disciplinary Committee.

(6) Where the Student Disciplinary Committee has found a student guilty of misconduct referred to in subsection (4), the Committee shall recommend to the Vice-Chancellor the imposition upon the student of any one or more of the following punishments:-

(a) expulsion or suspension from the University;

(b) the withdrawal of any academic or University privilege, benefit, right or facility other than to follow courses of instruction and present himself for examination;

(c) the imposition of a fine not exceeding five hundred dollars, which fine may be deducted from any allowances payable to the student and shall be paid to the University;

			(d) a censure or reprimand;
			(e) such other penalty as may be provided for by or in terms of Statutes.
Finance Committee	26.	(1)	Subject to this Act, there shall be a Finance Committee of the Council consisting of:-

(a) the Chairman of council, who shall be Chairman; and

(b) the Vice-Chancellor; and

(c) every Pro-Vice-Chancellor; and

(d) three persons appointed by the Council from among its members who are not members of the University staff; and

(e) two persons appointed by the Senate from among its members; and

(f) the Bursar, who shall be the secretary of the Finance Committee; and

(g) the Registrar; and

(h) a representative of the Deans of Faculties appointed by the Council.

  (2) The functions of the Finance Committee shall be as provided in the Statutes.

Statutes 27. (1) Subject to this Act, the University shall be administered in accordance with the Statutes.

  (2) With the approval of the Minister the Council may, by statutory instrument, amend, repeal or replace the Statutes set out in the Schedule in order to prescribe all matters which, in terms of this Act, are required or permitted to be prescribed in Statutes or which, in the opinion of the Council are necessary or convenient to be so prescribed for carrying out or giving effect to the provisions of this Act or for the proper administration of the University.

  (3) Subject to this Act, Statutes made in terms of subsection (2) may provide for:-

(a) the appointment, conditions of service and functions of the Vice-Chancellor, the Pro-Vice-Chancellors, the Registrar, the Bursar, the Librarian and all members of staff and the categorization of such members of staff;

(b) the functions of the Pro-Vice-chancellors;

(c) the election or appointment of persons to the Council and the Senate to committees of the Council and the Senate;

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(d) the terms of office of members of the Council and its committees, other than *ex-officio* members thereof;

(e) the terms of office and conditions of service of the chairman and vice-chairman of the Council;

(f) the convening of meetings of the Council and the Senate, the quorum at such meetings and the procedure to be adopted thereat;

(g) the terms of office of members of the Academic Appointments Board and the Academic Staff Promotions Committee, the convening of meetings of that Board and Committee, the quorum at such meetings and the procedure to be adopted thereat;

(h) the functions of the Academic Appointments Board, Boards of Selection, the Grading Committee, the Academic Staff Promotions Committee, the Non-academic Staff Promotions Committee and the Finance Committee;

(i) the persons who may enter into contracts and sign documents on behalf of the University, and the procedure to be followed in relation to transactions entered into by or on behalf of the University;

(j) the establishment and organization of Faculties, Departments, Centres and Institutes;

(k) the functions of Deans of Faculties, Chairmen of Departments and heads of Centres and Institutes;

(l) the holding of congregations of the University for the purpose of conferring degrees, diplomas, certificates and other honours and awards;

(m) the seal of the University and its use and custody;

(n) the academic year of the University;

(o) the discipline of members of staff and students and the procedures to be adopted in respect thereof;

(p) fees and charges to be paid for anything done by any person in terms of this Act;

(q) empowering any person specified in the Statutes to make ordinances or rules in respect of any matter referred to in paragraphs (a) to (p).

Regulations   28.   (1)   Subject to this Act and the Statutes and with the approval of the

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Council, the Senate may make regulations prescribing any matter which, in the opinion of the Senate, is appropriate to be prescribed for the better carrying out of the Senate's functions.

(2)   Regulations may provide for:-

(a)   teaching within the University, whether generally or in relation to specific subjects;

(b)   progress reports to be submitted by members of the academic staff;

(c)   schemes of study and research and the conditions subject to which such schemes may be embarked upon or continued;

(d)   the use of libraries of the University;

(e)   the conduct and supervision of examinations;

(f)   the award of degrees, diplomas, certificates and other academic honours and awards, other than honorary degrees, honours or awards.

(3)   The Senate may at any time amend or repeal any regulations.

(4)   Regulations need to be published in the *Gazette*, but the Senate shall publish them in such manner as the Senate considers will best make them known to the persons to whom they apply.

Validity of decisions   29.   No decision or act of the Council, the Senate, the Convocation or any of
Council, Senate,   board or committee established by or in terms of this Act shall be invalid
Convocation and boards   solely on the ground that:-
and Committees

(a)   the Council, Senate, Convocation, board or committee, as the case may be, consisted of fewer than the number of members for which provision is made by or in terms of this Act; or

(b)   a disqualified person acted as a member of the Council, Senate, Convocation, board or committee, as the case may be; if the duly qualified members who took the decision or did or authorized the act constituted a quorum of the membership of the Council, Senate, Convocation, board or committee, as the case may be.

Appointments and   30.   (1)   Subject to this section, the Minister may appoint not fewer than
Functions of   ten and not more than twenty-five persons to constitute a
Foundation Committee   committee to bring the University into existence.

(2)   Persons appointed in terms of subsection (1) shall be chosen for

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their ability and experience in academic matters or administration or their professional qualifications or their suitability otherwise for appointment.

(3)   The Minister shall designate one of the persons appointed in terms of subsection (1) to be the chairman and another such person to be the vice-chairman of the committee.

(4)   the functions of the committee appointed in terms of subsection (1) shall be:-

(a) with the approval of the Minister, to appoint a Vice-Chancellor, one or more Pro-Vice-Chancellors and other officers and members of staff of the University and to fix their terms and conditions of employment;

(b) to provide for election or appointment of the first Council of the University;

(c) to acquire movable and immovable property on behalf of the University;

(d) to make arrangements for the admission of students to the University;

(e) to make Statutes for the University;

(f) generally, to do all things necessary or expedient to bring the University into existence and make this Act effective on the date fixed in terms of subsection (2) of section one.

(5)   For the purpose of subsection (4), the appropriate provisions for this Act shall apply to the committee appointed in terms of subsection (1) as if it were the Council, notwithstanding that those provisions have not yet come into operation in terms of subsection (2) of section *one*.

(6)   any decision taken or act done or authorized by the committee appointed in terms of subsection (1) shall be deemed:-

(a)   on or after the date fixed by the President in terms of subsection (a) of section one; or

(b)   after the period specified by the Minister in terms of paragraph (a) of subsection (7); whichever is the later, to be a decision taken or act done or authorised, as the case may be, by the Council.

(7)   Notwithstanding any other provision of this Act, if the Minister is satisfied that it is necessary or expedient for the committee appointed in terms of subsection (1) to continue to exercise its functions after the date fixed in terms of subsection (2) of section

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one, he may, by notice in writing to the chairman of the committee:-

(a) authorise the committee to continue exercising its functions for such period after that date, not exceeding twelve months, as the Minister may specify; and

(b) suspend or modify such of the provisions of this Act as the Minister may specify, for the purpose of enabling the committee to continue exercising its functions; and the provisions concerned shall be suspended or shall apply with the appropriate modifications for the period specified in terms of paragraph (a).

SCHEDULE (SECTIONS 2 AND 27)

STATUTES OF THE UNIVERSITY

ARRANGEMENT OF STATUTES

1. Appointment of Pro-Vice-Chancellor.
2. Length of appointment of members of Council.
3. Casual vacancies in Council.
4. Meetings and quorum of Council.
5. Resolutions by circulation among members of Council.
6. Meetings and quorum of Senate.
7. Convocation.
8. Faculties.
9. Deans.
10. Composition of Faculty Boards
11. Functions of Faculty Boards
12. Meetings of Faculty Boards.
13. Teaching Departments.
14. Institutes and Centres.
15. Appointment of Registrar, Bursar Librarian.
16. Procedure generally.
17. Financial procedures.
18. Auditors.
19. University seal.
20. Ordinances.
21. Arrangements with other Universities, affiliated bodies, etc.

1.Appointment of Pro-Vice-Chancellors

(1)   For the purpose of considering appointments to the office of Pro-Vice-Chancellor, there shall be a joint committee of the Council and the Senate consisting of –

   (a)   the chairman of the Council, who shall be chairman of the joint committee; and the Vice-Chairman of the Council; and

   (b)   the Vice-Chairman of the Council; and

   (c)   the Vice-Chancellor; and

   (d)   two persons appointed by the Council from among its members who are not members of the Senate; and

   (e)   three persons appointed by the Senate from among its members.

(2)   The joint committee constituted by this Statute shall consider each applicant for appointment to a vacancy in the office of Pro-Vice-Chancellor and shall make recommendations thereon to the Council, and the Council, after considering the joint committee's recommendations, shall make the appointment concerned with the approval of the Minister.

(3)   A Pro-Vice-Chancellor shall hold office for three years from the date of his appointment and, subject to subsection (2) and the approval of the Minister, shall be eligible for re-appointment.

2.   Length of appointment of members of Council

(1)   Members of the Council, other than ex-officio members, shall hold office for three years, and shall be eligible for re-appointment or re-election, as the case may be; provided that –

   (i)   of the first sixteen members appointed by the Minister, five shall be appointed for a period ending one year after the date of commencement of the Act and further five shall be appointed for a period ending two years after the date of commencement of the Act.

   (ii)   of the first nine members appointed by the Senate, three shall be appointed for a period ending one year after the date of commencement of the Act and a further

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three shall be appointed for a period ending two years after the date of commencement of the Act;

(2)   Any member of Council, other than an ex officio member, may resign his membership at any time by notice in writing addressed to the Registrar.

3.   Casual vacancies in Council

Any casual vacancy occurring among the appointed or elected members of the Council shall be filled as soon as possible by the person, persons or body which appointed or elected the member whose place has become vacant, and the person so appointed or elected shall hold office for the remainder of the period for which he fills was appointed or elected.

4.   Meetings and quorum of Council

(1)   The Council shall meet at least three times a year.

(2)   The quorum of the Council shall be one-half of the members holding office at the time of the meeting.

5.   Resolutions by circulation among members of Council

A resolution proposed by the Executive Committee of the Council, other than for the purpose of making a Statute, which is on its authority circulated by the Registrar to all members of the Council and which receives the written agreement of not less than two-thirds of such members shall, upon receipt of such agreement by the Registrar, have the same force and effect as a resolution passed at a meeting of the Council.

6.   Meeting and quorum of Senate

(1)   The Senate shall meet at least three times a year.

(2)   The quorum of the Senate shall be one-half of the members holding office at the time of meeting.

(3)   The Vice-Chancellor or, in his absence, a Pro-Vice-Chancellor, shall be the chairman of Senate.

7.   Convocation

There shall be no quorum for meetings of the Convocation, the proceedings of which shall be regulated by the chairman, subject to any general or special direction of the Council.

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8.   Faculties

The University shall include such Faculties as may from time to time be established by the Council.

9.   Deans

(1)   There shall be a Dean of each Faculty, who shall be appointed by a Selection Board appointed by the Council, and chaired by the Vice-Chancellor, or in his absence, a Pro-Vice-Chancellor. The Selection Board shall consist of the Vice-Chancellor, the Pro-Vice-Chancellor(s), two persons not belonging to the Faculty appointed by the Senate, and three persons appointed by the Faculty. Normally, the Dean must be a prominent academic with a proven administrative record who commands respect among the staff in the faculty and within the University community.

(2)   A Dean shall hold office for four years or such other period as may be prescribed by Ordinance, and shall be eligible for re-appointment for a further term of office.

(3)   A Dean shall preside at meetings of the Faculty Board of his Faculty and at meetings called by him in terms of these statutes, and shall have such functions as are prescribed by Ordinance.

10.   Composition of Faculty Boards

For each Faculty there shall be a Faculty Board which shall consist of –

(a) all the full-time academic staff of the Faculty; and
(b) such persons as may be assigned to the Faculty Board by the Senate; and
(c) two students elected annually by the students in the Faculty

11.   Functions of Faculty Boards

A Faculty Board shall have the following functions –

(a)   to regulate, subject to the approval of the Senate, the teaching and study of the subjects assigned to the Faculty;

(b)   To report to the Senate on any matter specifically relating to the work of the Faculty;

(c)   To deal with any matter referred or delegated to it by the Senate;

(d)   To appoint committees, which may include a minority of persons who are not members of the Faculty Board, to carry out any of the duties or exercise any of the powers of the Board.

12.   Meetings of Faculty Boards

(1)   The Dean of each Faculty shall call regular meetings of the Faculty Board at which matters relating to the policy of the Faculty and appointments shall be discussed and recommendations adopted for submission to the appropriate authorities on appointments.

(2)   The Vice-Chancellor and every Pro-Vice-Chancellor shall be entitled to attend any meeting of a Faculty board or any committee thereof.

13.   Teaching Departments

(1)   The Teaching Departments and their allocation to Faculties shall be prescribed by ordinances

(2)   A Chairman of Department shall be appointed by the Vice-Chancellor, on behalf of the Council, from among the full-time members of the academic staff of the Department, and the Dean of the Faculty to which the Department is allocated.

(3)   A Chairman of Department shall hold office for a period of three years, or such other period as may be determined by ordinance, and shall be eligible for re-appointment.

(4)   A Department may be allocated to twoor more Faculties.

14.   Institutes and Centres

The Council, after consultation with the Senate, may establish Institutes or Centres of learning within or outside the University and shall appoint at the head of any such Institute or Centre and give directions as to its studies and research and administration.

15.   Appointment of Registrar, Bursar and Librarian

(1)   For the purpose of considering appointments to the offices of Registrar, Bursar and Librarian, there shall be a joint committee of the Council and the Senate consisting of –

(a)   the chairman of the Council, who shall be the chairman of the joint committee; and

(b)   the vice-chairman of the Council; and

(c)   the Vice-Chancellor; and

(d)   every Pro-Vice-Chancellor; and

(e)   two persons appointed by the Council from among its members who are not members of the Senate; and

(f)   three persons appointed by the Senate from among its members

(2)   The joint committee constituted by this Statute shall consider each applicant to a vacancy in the office of Registrar, Bursar or Librarian and shall make recommendations thereon to the Council.

16.   Procedure generally

(1)   Except as otherwise specifically provided by the Act or these Statutes, in the absence of the chairman or vice-chairman at a meeting of a board or committee the members present shall elect from those present a chairman to preside over that meeting.

(2)   Except as otherwise specifically provided by the Act or these Statutes, the quorum at any meeting of a board or committee shall be as fixed by the person or authority that appointed the board or committee.

(3)   Except as otherwise specifically provided by the Act or these Statutes, each board or committee shall determine and may make rules for the time, place and procedure of its meetings.

(4)   The minutes of a meeting of a board or committee shall be laid on the table at the next following meeting of the body that appointed it.

(5)   At a meeting of board or committee, in the event of an equality of votes on any matter, the person presiding shall have a casting vote in addition to his original vote.

(6)   Subsection (3), (4) and (5) shall apply, *mutatis mutandis*, to the Council and the Senate, save that minutes of the Council shall be sent to the Chancellor and the Minister and a report of each meeting of the Senate shall be laid on the table at a meeting of the Council.

17.   Financial Procedures

(1)   The Council shall fix the financial year of the University.

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(2) The Finance Committee shall submit to the Council, before the beginning of the financial year, draft estimates of income and expenditure, and such estimates, amended as the Council thinks fit, shall be approved by the Council before the beginning of the financial year.

(3) The Council may revise the estimates during the course of the financial year and give directions for the manner in which amendments of expenditure estimates may be made, which directions may make provision for delegating the powers of revision so long as such delegation does not extend to altering the total estimated expenditure.

(4) As soon as practicable after the end of financial years, a balance sheet and income and expenditure account with supporting schedules shall be submitted to the auditors.

(5) The audited accounts, with any comments thereon made by the auditors, shall be submitted to the Council.

18. Auditors

(1) Subject to subsections (2) and (3), the Council shall, before the beginning of each financial year, appoint auditors who are registered in terms of the Accountants Act (Chapter 215).

(2) No person shall be appointed as an auditor in terms of subsection (1) if he, or any of his partners or employees, holds any other office in the University.

(3) If no appointment of new auditors is made before the beginning of any financial year, the auditors in office shall continue in office.

(4) An auditor appointed in terms of subsection (1) shall be entitled at all reasonable times to require any officer, employee or agent of the University:-

(a) to produce all accounts and other records relating to the financial affairs of the University as may be in the custody of such officer, employee or agent; and

(b) to provide such information or explanation as, in the opinion of the auditor, is necessary for the purposes of the audit.

19. University seal

(1) There shall be a seal of the University, of such design as may be approved by the Council.

(2) The seal of the University shall be kept in the custody of the Registrar and, subject to the directions of the Council, shall be affixed to-

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(a) certificates, degrees and diplomas conferred by the University; and

(b) any document attested by the signature of the Vice-Chancellor and the Registrar.

20. Ordinances

(1) The Council may, with the approval of the Minister, make ordinances providing for any matter referred to in paragraphs (a) to (p) of subsection (3) of section 27 of the Act.

(2) The Registrar shall publish any ordinance made in terms of subsection (1) in such manner as the Council may direct, being a manner which the Council considers will best make the ordinance known to the persons whom it applies.

21. Arrangements with other universities, affiliated bodies, etc.

(1) The Council may make arrangements with any other university whereby students of the University may be registered as students of such other university and so enabled to study for, enter the examination of and be afforded the degrees of such other university.

(2) The Council may affiliate to the University, any other institution or any branch or departments thereof and recognize selected members of the staffs thereof as teachers of the University and admit the members thereof to any of the privileges of the University and accept attendance at courses of study in such institutions or branches or departments thereof in place of such part of the courses of study in the University and upon such terms and conditions and subject to such rules as may from time to time be determined by the Council.

THE FACULTY GOVERNANCE

ORDINANCE: 2003

In terms of Statute 20(1), The Council of the National University of Science and Technology in exercise of its powers under Section 27 of the National University of Science and Technology Act Chapter 25..13 (formerly Act 1990), hereby makes the following Ordinance:-

1.0 FACULTY

A Faculty shall consist of related teaching Departments, Research Institutes, Schools and Centres as established by the Council on the recommendations of Senate.

2.0 THE FACULTY BOARD

2.1 There shall be a Faculty Board for each Faculty which shall consist of:

2.1.1 The Dean of the Faculty,

2.1.2 The Deputy Dean of the Faculty,

2.1.3 All full-time Academic Staff of the Grade of Lecturer or above of the Faculty,

2.1.4 All full-time Research Fellows of the Faculty,

2.1.5 All Teaching Assistants,

2.1.6 Where relevant, one representative of the Technical Staff of the Faculty,

2.1.7 Such persons as may be assigned to the Faculty Board by Senate, and

2.1.8 Two Student Representatives, elected annually by the students from among the Student Representatives to the Departmental Boards in the Faculty. The Chairperson shall have the authority to exclude Student Representatives from Faculty Board deliberations on matters considered by the Board to be confidential to members of staff only.

2.2 The Vice-Chancellor and Pro-Vice-chancellor(s) shall be entitled to attend Faculty Board Meetings and any Committee Meetings thereof in an *ex-officio* capacity

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2.3   The Faculty Board may invite staff from the other Faculties and other persons to attend meetings of the Board.

2.4   A Faculty Board shall meet at least three times every Semester and shall maintain a proper record of Agendas and Minutes for every Meeting.

2.5   The quorum of the Faculty Board shall be 50% of the membership.

2.6   Normally, the Faculty Assistant Registrar/Senior Assistant Registrar shall serve as the Secretary of all Faculty Board Meetings.

2.7   Fifty Percent (50%) of members of the Faculty Board may petition the Dean to require him to call a Special Meeting.

3.0   DUTIES AND RESPONSIBILITIES OF THE FACULTY BOARD

Subject to the provisions of the University Statutes, the authority of the Senate and the provisions of this Ordinance, the Faculty Board:

3.1   shall regulate, subject to the approval of the Senate, the teaching and study of the subjects assigned to the Faculty.

3.2   shall make reports to the Senate on any matters specifically relating to the work the Faculty.

3.3   shall make recommendations to the Senate for the establishment of new Courses and Programmes and the Faculty Regulations thereof, and the amendment of existing General Regulations, Faculty Regulations and Syllabi relating to studies within the Faculty.

3.4   may appoint Committees, to carry out any of the duties or exercise any of the responsibilities of the Faculty Board.

3.5   shall deal with any matter referred or delegated to it by Senate

3.6   shall exercise such responsibilities as may be conferred upon it by the Senate and the Vice-Chancellor.

3.7   shall make such other recommendations and decisions as may be required of the Faculty by other University Ordinances and Regulations and make decisions on such other matters as it may deem appropriate for other proper functioning of the Faculty.

4.0 DEAN

4.1 There shall be a Dean of each Faculty who shall be appointed by a Selection Board appointed by the Council and chaired by the Vice-Chancellor, or in his absence, a Pro-Vice-Chancellor.

The Selection Board shall consist of the Vice-Chancellor, the Pro-Vice-Chancellor(s), two persons not belonging to the Faculty appointed by the Senate, and three persons appointed by the Faculty. Normally, the Dean must be a prominentj academic with a proven administrative record who commands respect among the staff in the Faculty and within the University Community.

4.2 The term of office shall be four (4) years and, on the expiry of his term of office, shall be eligible for re-appointment. Normally, a Dean may not serve for more than two consecutive terms. At the end of office, if not re-appointed, a Dean who is appointed from one of the Departments in the University shall revert to an academic position within the Faculty, if he so wishes.

4.3 The performance of a Dean shall be evaluated annually by a Committee appointed by the Vice-Chancellor and consisting of Senior Academic Staff and Administrators of which at least fifty-percent (50%) shall be drawn from the Faculty concerned.

4.4 A Dean may resign from his office by giving the Vice-Chancellor three months' written notice or such longer or shorter notice as the Dean and the Vice-Chancellor may agree on.

4.5 Subject to the approval of the Council, the Vice-Chancellor may terminate the appointment of a person as Dean:

4.5.1 on the recommendations of a Committee referred to in Section 4.3 above or

4.5.2 for any other good cause

4.6 A Dean whose appointment has been terminated in terms of Section 4.5 above may appeal to the Council within fourteen days of being notified of the termination, an on any such appeal the Council may confirm, vary or rescind the termination, as the case may be, or give such other direction in the matter as it thinks appropriate.

5.0 DUTIES AND RESPONSIBILITIES OF THE DEAN

5.1 The Dean is the Chief Academic, administrative and Financial Officer for the Faculty and shall be responsible to the Vice-Chancellor for:-

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5.1.1   The character and quality of the academic and teaching programmes of the Faculty.

5.1.2   The proper direction, control and management of the staff, students, property, equipment and finances of the Faculty

5.1.3   Contributing to the evolution and maintenance of an environment conducive to learning at the University.

5.2   Without limiting Sub-Section 5.1, a Dean's function shall include:

5.2.1   Provision of leadership in innovative curriculum design and delivery.

5.2.2   Promotion of academic achievement and learner satisfaction consistent with the nationally and internationally accepted standards in the programmes.

5.2.3   Ensuring the quality and integrity in academic functions of the Faculty.

5.2.4   Motivation and support of research activities with the Faculty and facilitation and encouragement of inter-Faculty multi-disciplinary research programmes.

5.2.5   Fostering collegiality within the Faculty at all levels and maintaining a close working relationship with Chairpersons of Departments in the Faculty.

5.2.6   Calling and Chairing regular Meetings of the Faculty Board.

5.2.7   Chairing the Faculty Planning Committee Meetings.

5.2.8   Implementing policies approved by the Faculty Planning Committee, Faculty Board, Senate, Senior University Management and Council.

5.2.9   Provision of leadership for increasing national and international visibility and reputation.

5.2.10   Attracting new resources and planning and managing the use of all resources responsibly within the Faculty.

5.2.11   Developing innovative and strategic alliances with industry, government and international partner institutions and organizations.

5.2.12   Maintaining collaborative and consultative relationships with other Deans and with the University Administration.

Think in other terms

5.2.13　Chairing Faculty Board of Examiners Meetings.

5.2.14　Representing the Facultyinappropriate University Committees and other bodies as required.

5.2.15　Entitlement to attend Departmental Board and Panel of Examiner's meetings in an *ex-officio* capacity.

5.2.16　Making recommendations with respect to Probation, Advancement and Promotion of all staff within the Faculty.

5.2.17　Presenting to the Congregation for Conferment of Degrees, persons who have qualified for the degrees of the University at examinations held in Departments for which responsibility is allocated to that Faculty. This shall exclude honorary degrees.

5.2.18　Report to the Vice-Chancellor annually on the activities of the Faculty.

5.3　In exercising his/her duties and responsibilities, the Dean shall take full cognizance of the provisions of the Ordinance on Departmental Governance.

6.0　THE DEPUTY DEAN OF A FACULTY

6.1　In every Faculty there shall be a Deputy Dean, whose term of office shall be three (3) years. The Deputy Dean shall be appointed by the Vice-Chancellor after consultation with the Faculty Planning Committee.

6.2　In addition to teaching, research and other duties and responsibilities, the Deputy Dean of a Faculty shall:

6.2.1　serve as the Acting Dean in the absence of the Dean.

6.2.2　perform such other functions as may be delegated to him/her by the Dean.

Date of Operation

This Ordinance shall apply with effect from 1 January 2003, or any later date as approved by the Minister of Higher and Tertiary Education, Science and Technology Development, and shall remain in force until otherwise repealed or varied by a further Faculty Governance Ordinance of the National University of Science and Technology.

Think in other terms

1.0	This Ordinance may be cited as The Departmental Governance Ordinance 1982 and shall take effect from 3 April 1992.

**2.0	THE DEPARTMENTAL BOARD**

2.1	There shall be a Departmental Board for each Department which shall consist of:-

2.1.1	The Chairman of the Department,

2.1.2	All full-time members of the Academic Staff of the Department,

2.1.3	Honorary and Part-time Lecturers in the Department or their representative, as determined by the Departmental Board,

2.1.4	Where relevant, at least one representative of the technical staff in the Department, or where technical staff are assigned to the Faculty and not to Departments and the Board considers it helpful to have representatives of such staff, at least one representative of the technical staff in the Faculty, elected annually by such staff, provided that the representative(s) so elected shall not be entitled to attend for deliberations on matters considered by the Chairman to be confidential,

2.1.5	Two students in the Department elected annually by the students from amongst themselves, provided that the students so elected shall not be entitled to attend for deliberations on matters considered by the Chairman to be confidential.

2.2	The Vice-Chancellor, the Pro-Vice-Chancellor(s) and the appropriate Dean and Deputy Dean shall be entitled to attend Departmental Board meetings in an *ex-officio* capacity.

2.3	From time to time, the Chairman of the Department, after consultation with members of the Departmental Board, may invite other persons to attend Departmental Board meetings.

2.4	Each Departmental Board shall meet at least twice every Semester and shall maintain a proper system of Agendas and Minutes for such meetings.

2.5	Subject to Section 3 of this Ordinance, each Departmental Board shall regulate its own procedures, including the establishment of a quorum.

3.0 DUTIES AND POWERS OF THE DEPARTMENTAL BOARD

Subject to the provisions of the University Statutes, the authority of the Senate, provision of this Ordinance and such limitations as the Faculty of which the Department forms a part may impose, the Departmental Board:-

3.1 Shall arrange for, conduct and control the teaching and instruction of students within the Department and the setting and marking of examination papers in accordance with regulations approved by the Senate, the general academic policy agreed by the Faculty Board and the approved administrative procedures of the University.

3.2 Shall make recommendations to the Faculty Board for the establishment of new courses and the amendment of existing regulations and syllabuses relating to studies within the Department.

3.3 May delegate functions and responsibilities to individuals or groups of individuals within the department.

3.4 Shall exercise such powers as may be conferred upon it by the Faculty Board, the Senate or the Vice-Chancellor.

3.5 May provide consultancy services on matters concerning the subject assigned to the department within the limitations of its capabilities and subject to the general University policy on consultancy services.

3.6 Shall monitor the implementation of the University's conditions relating to the undertaking of private remunerative work in respect of the members of the Department.

3.7 May take recommendations in respect of estimates of expenditure in the department Budget Committee.

3.8 Shall suggest preliminary short-list of candidates for appointment to academic and technical posts within the Department, taking into account the need to maintain strict confidentiality in handling applications, and shall forward such short-lists to the relevant Board of Selection for consideration.

3.9 Shall recommend candidates for Staff Development Programmes.

Think in other terms

3.10 Shall formulate general guidelines on pure and applied research and suggest means of funding research programmes in the Department.

3.11 Shall submit recommendations to the Senate in respect of the appointment of External Examiners and any other consultations.

4.0   CHAIRMEN OF DEPARTMENTS

4.1 There shall be a Chairman of each Department appointed by the Vice-Chancellor, on behalf of the University Council, from among the full-time members of the Academic Staff of the Department.

4.2 Before appointing a Departmental chairman, the Vice-Chancellor:-

4.2.1 shall consult and take note of the views of each member of the academic staff in the Department about the appointment.

4.2.2 Shall consult and take note of the views of at least one of the Pro-Vice-Chancellors and the Dean of the Faculty concerned.

4.3 The Chairman of a Department shall hold office as such for a period of up to three years and shall be eligible for re-appointment.

4.4 After consultation with a Pro-Vice-Chancellor, the Dean of the Faculty and the Chairman concerned, the Vice-Chancellor may terminate the appointment of a Chairman of Department as such by giving him two months' notice in writing.

4.5 The Chairman of a Department may resign his appointment as such by giving the Vice-Chancellor two months' notice in writing.

4.6 Where the Chairman of a Department is unable, either by reasons of his absence from the University or for any other reason, to carry out his functions as Chairman, the Vice-Chancellor may, subject to the provisions of Section 4.2 of this Ordinance, appoint an Acting Chairman of the Department for such a period and under such conditions as he may determine, provided that the period of appointment does not exceed the balance of the period of office of the substantive Chairman.

4.7 A Chairman of Department shall be paid a responsibility allowance at a rate determined from time to time by the Finance Committee of Council for the duration of his term of office as Chairman, provided that no allowance shall be payable where the Chairman is absent or unable to perform his functions for a period of more than 10 days.

4.8 An Acting Chairman of Department who is appointed Acting Chairman for a period in excess of 10 days shall be paid a responsibility allowance at a rate determined from time to time by the Finance Committee of Council for the duration of his term of office as Acting Chairman.

5.0 DUTIES AND POWERS OF THE CHAIRMAN OF DEPARTMENT

In addition to his teaching, research and other duties and responsibilities, the Chairman of Department shall:-

5.1 Serve as Chairman of Departmental Board meetings.

5.2 Represent the Department on the appropriate University Committees and other bodies as required.

5.3 At all times use his best endeavour to ensure that proper and acceptable standards of teaching and instruction are maintained in the Department.

5.4 Make recommendations with respect to probation, advancement and promotion of academic staff within the Department, provided that:-

5.4.1 In so doing the Chairman shall consult full-time academic members of the Department.
5.4.2 If the Chairman is himself a candidate for promotion, the appropriate recommendations shall be made by the Dean of the relevant Faculty after consultation with all full-time academic members of the Department.

5.5 Serve as executive officer of the Department in the implementation of Departmental Policy, as determined by the Departmental Board and other University authorities, and be responsible for the day to day administration of the Department.

Think in other terms

ACADEMIC STAFF GRADING, TENURE AND PROMOTIONS ORDINANCE (1997): ORDINANCE 28

1.0   This Ordinance may be cited as the Academic Staff Grading, Tenure and Promotions Ordinance 1983, and shall take effect from 1 January 1984.

2.0   The Staff (Tenure) Ordinance 1973 is hereby repealed.

3.0   **Objectives**

In making this Ordinance, the Council has as its objective the establishment within the University of an equitable and workable system of appointments and promotions which satisfy the legitimate career aspirations of academic staff and which ensure the achievement of the University's academic aims whilst maintaining the high quality of its academic staff.

4.0   **Structure of Academic Staff Grades**

4.1   the following structure of grades and notches for Academic Staff shall apply within the University;

Grade	**Number of notches**
Professor	*As approved by the University from time to time*
Associate Professor	
Senior Lecturer	
Lecturer	

4.2   The salary scales applicable to each grade and the salary step applicable to each notch within a scale shall be such as may be approved by University Council from time to time, and published as part of the University's Salary Scales.

4.3   The University Council or its authorized committees shall have sole discretion to determine the academic staff establishment in each Academic Department and Faculty in the

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Think in other terms

University, and in so doing, may designate that posts be established at any of the grades listed in Section 4.1 above, but normally:

4.3.1   there shall be only one established Professorial Chair in a Department which shall be filled by appointment;

4.3.2   each of the other academic posts on a Department's or Faculty's establishment may be filled at professorial level only by the promotion of existing staff.

5.0   Grading and Notching on Initial appointment

5.1   On initial appointment of the University's Academic Staff, a successful candidate shall be graded and notched according to his or her qualifications experience and published research, and in so doing, the following criteria will apply;

5.2   **Qualifications**

5.2.1   The basic qualification for appointment to the University's academic staff is a good first degree or an approved equivalent in the appropriate discipline.

5.2.2   An appointee with a good first degree or any approved equivalent in the appropriate discipline, but without any relevant post-graduate experience, shall be placed at the first notch of the teaching assistant scale.

5.2.3   An Appointee with approved research or non-research post-graduate qualifications which have been the subject of an examination process, shall be granted additional notches within a grade according to the following guidelines:-

    5.2.3.1 a postgraduate diploma or postgraduate Masters Degree extending over less than 2 years of study or equivalent.   (1 notch).

    5.2.3.2 a postgraduate Masters Degree extending over 2 years of study or equivalent. (2 notches).

    5.2.3.3 a DPhil or PhD Degree or equivalent. (3 notches).

5.2.4   The qualifications which are accepted by the University as approved equivalent to the basic levels recognized are set out in the First Schedule to this Ordinance.

Think in other terms

5.2.5 A serving member of the University's Academic Staff who obtains a further qualification, as described in Section (c) above, shall be awarded the appropriate additional notches with effect from the 1st of the month after the additional qualification is finally awarded, provided that such additional notches do not result in the member of staff being effectively promoted to a higher grade.

5.3 **Experience**

5.3.1 New appointees to the University's Academic Staff will be awarded, on initial appointment, one notch on the salary scales for each year of relevant postgraduate experience, provided that such recognition of experience does not result in the appointee being appointed at a higher grade than that of the Lecturer, unless the appointee also satisfies the criteria for promotion to such higher grade as specified in Section 7.5 of this Ordinance.

5.3.2 in granting recognition to relevant postgraduate experience the University shall:

5.3.2.1 make no distinction between professional experience

5.3.2.2 recognise in full, the time spent as a full-time member of the academic (teaching and/or research) staff of a reputable university.

5.3.2.3 no grant credit in notching on the scales for the time an appointee has spent in full time study for a postgraduate qualification.

5.3.3 in all disciplines, any postgraduate experience in the appropriate discipline will be recognized as relevant, and in particular internship year following graduation as an MBChB or B. Pharm, or equivalent will be recognized as a postgraduate experience.

5.3.4 In general, the University will not provide any credit in notching an appointee, on initial appointment, for pre-graduate experience, but from time to time the University may recognize such experience and, in so doing, shall specify the type of experience and the extent of its recognition by the University, by including such information in the Second Schedule to this Ordinance.

Think in other terms

5.4   **Published Research**

The University recognizes published research, other than that forming part of a post-graduate qualification, for the purposes of determining the notch on initial appointment.

The University does not prescribe specific mechanisms or guidelines for such recognition, and relies on the appropriate Appointment Board to make recommendations in each appointee's case. In making such recommendations, Appointment Boards shall take cognizance of the quality of the published work and whether it had been referred by persons expert in the particular field.

6.0   PROFESSIONAL SUPPLEMENT

6.1   There shall be only one Academic (Teaching and Research) grading and salary structure, and the same salary scales shall apply to all posts in all Faculties within the University.

6.2   In certain fields a pensionable, professional supplement in addition to the basic salary may be paid to staff.

7.0   PROMOTION

7.1   **Criteria for Promotion**

In assessing the suitability of members of the academic staff for promotion to a higher grade, the University shall take into account the following broad criteria;

7.1.1   Teaching

7.1.2   Research, Scholarship and Creative Work and

7.1.3   University Service.

7.2   **Assessment of Teaching**

In making an assessment of a candidate's teaching, the University regards the following general areas as being of central importance.

7.2.1   Teaching method;

7.2.2   Course content;

7.2.3   The general performance of students in the course taught by the candidate for promotion;

7.2.4   The quality of the candidate's supervision of graduate students;

7.2.5   The development of new and effective techniques of instruction.

7.3   **Assessment of Research, Scholarship and Creative Work**

7.3.1   In making an assessment of a candidate's research, scholarship and creative work (hereinafter referred to as "research"), the University recognizes that research has a number of dimensions and, therefore, would examine a candidate's research to determine which of the following dimensions apply:-

     7.3.1.1   The accumulation of data that confirms an existing theory

     7.3.1.2   The application of existing theory to acts specific to given contexts;

     7.3.1.3   The generation of new theory and its empirical testing;

     7.3.1.4   The generation of new methodologies for dealing with problems in the discipline or in practice;

     7.3.1.5   Originality and innovation in contributions to issues of culture, of creative arts, writing, architectural designs etc.

7.3.2   Normally, the University would take into account for promotion purposes only research which has been published, been accepted for publication or, in the case of longitudinal studies, is in written-up form which can be referred. Invariably, the University will seek the views of referees, which it appoints, on the quality of the candidate's research.

7.3.3   In addition to making an assessment of a candidate's research from the point of view of its quality, the University would also make an assessment in terms of the quantity of research output.

7.4   **Assessment of University Service**

In assessing a candidate's University service, the University is conscious of the fact that every member of the academic staff should be a good University citizen, performing his/her duties conscientiously and well, attending and participating on committees to which he/she is assigned. The University regards such activity as adequate University service. If

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a candidate has taken a leadership role in University service such as serving as Dean, Chairman of Department, Chairman of a Committee or in organizing a Faculty or organizing vacation research for students or is involved in student counseling and does the activities outstandingly well, the University would regard such service as better than adequate.

7.5   **Criteria for Promotion to Specific Grades**

7.5.1   Criteria for Promotion to the Senior Lecturer Grade

7.5.1.1 Assessments at the level of satisfactory in teaching, research and University service and

7.5.1.2 An assessment at the level of outstanding in at least one of the following, teaching, research and University service.

7.5.2   Criteria for the Promotion to the Associate Professor Grade

The criteria for promotion to the Associate Professor Grade are as follows:-

7.5.2.1 An international reputation for scholarship in the candidate's field as testified by external assessors, examiners or reviewers of the candidate's work;

7.5.2.2 In some fields, one or more books and substantial publications in scholarly journals;

7.5.2.3 It is possible, but unlikely, for a Lecturer to be promoted directly to the Associate Professor Grade;

7.5.3   An Associate Professor would be required to demonstrate the sustained record required for promotion to a Professor in the period he/she was promoted or appointed as an Associate Professor.

7.6   **Promotion Procedures**

7.6.1   Annually, in the early part of each calendar year, the Chairman of a department shall place in the file of each academic member of that Department a report concerning the member's teaching, research and University service in the previous

year. This report shall be available to the member of staff concerned, the Faculty and the appropriate members of the University administration.

7.6.2　The Annual Reports filed in terms of Section 7.6.1 will form the basis of a chairman of Department's report to the Promotion or appropriate Academic Appointments Board for the purposes of application for promotion.

7.6.3　A member of staff wishing to apply for promotion should do so in response to the annual invitation to apply for promotion issued by the University Administration. In the first instance, such applications shall be submitted to the Chairman of the member's Department who will submit to the Promotions Committee, through the Dean of Faculty, a dossier containing the following documents:-

　7.6.3.1　The candidate's complete, up-to-date curriculum vitae;

　7.6.3.2　The candidate's application for promotion;

　7.6.3.3　Copies of each of the Annual Reports on the member since initial appointment or since the date of promotion whichever is the most recent;

　7.6.3.4　A summary of the Departmental Board's views on the candidate's application;

　7.6.3.5　A report containing his recommendations on the candidate's application, which shall first have been made available to the candidate for comment, but in all other respects should be regarded as confidential to the Promotions Committee;

　7.6.3.6　Any comments on the Chairman's report which the candidate may wish to submit to the Promotions Committee.

7.6.4　In circumstances where the candidate expressly wishes the Departmental Board to consider any difference of opinion between him/herself and the Departmental Chairman he/she may request the Departmental Board to do so, in which event the outcome of the Departmental Board's deliberations would be included in the dossier submitted through the Dean to the Promotions Committee.

7.6.5　The dossier shall also include a list, in order of preference, of assessors to whom the Promotions Committee may refer. This list shall be prepared by the Departmental Board and shall be as follows in applications for promotions to:-

Think in other terms

7.6.5.1 Senior Lecturer: 3 assessors, at least one of which shall be an outsider to the University.

7.6.5.2 Associate Professor or Professor: 6 assessors, at least two of which shall be outsiders to the University.

7.6.6 The Dean of each Faculty shall forward to the Promotions Committee the dossier received from the Chairman of Department on each candidate, together with a report and recommendation by him/herself as Dean. The Dean's report shall be confidential, except that if he/she disagrees with the Chairman's report, the Dean is required to make his report available to the Chairman and the candidate, in which event the candidate's comments on the Dean's report shall be included in the final dossier submitted to the Promotions Committee.

7.6.7 The Promotions Committee shall have final authority in all promotion matters and, in particular, shall be the sole arbiter as to whether or not to seek reports from assessors in any case for promotion. If a "prima facie" case for promotion is judged to exist then the Committee shall seek the opinion of external assessors, in which event the assessors' reports shall be confidential to the Promotions Committee.

7.7 **Composition of Annual Report**

7.7.1 The Annual Report placed in each academic member of staff's personal file each year by the Chairman of the Department shall include an assessment of the member's teaching, research and University services as indicated in Section 1.2.1.3 and 1.4 above.

7.7.2 **Report on Teaching**

In compiling the section of the Annual Report on a member's teaching the Chairman of Department shall include an evaluation arrived at after implementing at least the following means assessment.

7.7.2.1 **Peer Evaluation of Teaching**

The Departmental Board shall establish a panel of at least two academic members of staff for each academic member of the Department, with the responsibility of attending lectures given by their colleagues on different occasions and without prior notice to the person giving the lecture. The

panel's report will be considered by the Departmental Board and after constructive, open discussion with the member of staff concerned, will become a component in the assessment of each member of staff's teaching.

7.7.2.2 Evaluation by Students

Students will be provided with an opportunity to complete an evaluation form in respect of each course. In the first instance, evaluation forms completed by students will be submitted to the Chairman ofDepartment who will discuss the views expressed with the member of staff concerned and the Departmental Board before including any informal comment in the Annual Report.

7.7.2.3 Assessment by External Examiners

Any comments by External Examiners on a member's teaching shall be included in the Annual Report.

7.7.2.4 Seminars

All departments are required to encourage members of the staff to hold seminars on relevant subjects of their choice to which staff and students should be invited to attend. The feed-back from these seminars is seen as being helpful to the Lecturer but need not be included formally in the assessment of teaching ability for the Annual Report.

7.7.3 Report on University Services

The Section of the Annual Report on a member's University service shall comprise:-

7.7.3.1 a report by the Chairman of Department on the quality and quantity of the member's University service during the year in question;

7.7.3.2 any written comments by the member of the Chairman's report made in terms of Section 7.7.3.1 above.

Think in other terms

8.0 TENURE

8.1 Only citizens and residents of Zimbabwe, in accordance with section 6(2) of the University Act, shall be appointed on permanent terms of service which enable the gaining of tenure in due course should the University so determine.

8.2 Persons who are not citizen or residents of Zimbabwe shall be appointed only on fixed term contracts, which do not entitle such staff to being considered for tenure, and therefore, the further provisions of this section of this Ordinance do not apply to such staff.

8.3 All academic staff appointed by the University shall be required to serve a probationary period before being considered for tenure.

8.4 The duration of the probationary period shall be:-

8.4.1 In the case of staff who, before appointment, had tenure at another reputable university or institution of higher education: 2 years.

8.4.2 In the case of staff who had not previously had tenure: 3 years

8.5 Appointments Boards are authorized to recommend the granting of immediate tenure, and the consequent waiver of the probationary period, in cases where the Board is recommending an appointment at the Associate Professor of Professor level and feels there are good grounds for making the appointment with immediate tenure.

8.6 The criteria for granting of tenure on completion of the requisite probationary period shall be:

8.6.1 Satisfactory teaching;

8.6.2 Satisfactory research;

8.6.3 Satisfactory University service.

8.7 The procedures for determining whether or not to grant tenure shall be as stipulated above for the consideration of applications for promotion, and therefore, the provisions of sections 7.2.3, 7.4, 7.6.2, 7.6.3, 7.6.4, 7.6.6 and 7.7 shall apply except that:-

8.7.1 the appropriate final authority shall be the appropriate Academic Appointments Board rather than the Academic Promotions Committee.

8.7.2 the initiation of the process will be made by the University Administration, at a time suitably in advance of the scheduled date of completion of a member's probationary period of service.

8.8 If a member of staff is not granted tenure after the completion of his/her probationary period the University may either:-

8.8.1 extend the probationary period by up to two further years with permission for the member of staff to apply for tenure before the expiry of that time, or terminate the member of staff's employment with the University.

8.9 If at the end of the probationary period a member of staff is granted tenure then the appointment shall be without time limit up to the age fixed by the University for retirement except that:-

8.9.1 a member may resign his appointment by giving not less than 3 months' notice in writing, provided that he/she may not give notice of resignation while he/she is on Sabbatical Leave or Contact Visit, nor may any period preceding or spent on such leave visit be counted as a period or portion of a period of notice.

8.9.2 the University Council may terminate the appointment for "good cause" by giving the member of staff not less than 3 calendar months' notice or paying the member's salary in lieu thereof.

8.10 Before terminating appointment in terms of Section 8.9.2 the Council:-

8.10.1 shall inform the member in writing of the matters alleged against him/her and give the member the opportunity of replying in writing to those charges.

8.10.2 may, and if so requested by the member of staff shall, before considering such dismissal, refer the case to the Staff Disciplinary Committee established in terms of Section 24 of the University Act.

8.11 "Good Cause" for the termination of an appointment in terms of Section 2.9.2 means:-

8.11.1 conviction of any offence which the Council considers to be such as to render the person concerned unfit for the execution of the duties of his/her office.

8.11.2 any physical or mental incapacity which Council considers to be such as to render the person concerned unfit to continue to hold his/her office.

Think in other terms

8.11.3   conduct of an immoral, scandalous or disgraceful nature which the Council considers to be such as to render the person concerned unfit to continue to hold his office.

8.11.4   conduct which the Council considers to be such as to constitute failure or inability of the person concerned to perform the duties of his office or to comply with the conditions of tenure of his office.

9.0   TRANSITIONAL ARRANGEMENTS

9.1   On the coming into effect of this Ordinance, all existing academic staff shall be incorporated into the new grades designated in Section 4.1 of the Ordinance in accordance with the arrangements set out in the Fourth Schedule to this Ordinance.

9.2   In addition, all academic members of staff below the grade of Senior Lecturer shall have their grading and notching reviewed in the light of the criteria set out in the Section 5 of this Ordinance provided that such review:-

9.2.1   does not result in a member of staff being re-notched to a lower grade than he/she is currently on,

9.2.2   such review does not result in a member of staff being re-notched to a new higher grade,

9.2.3   the results of such review shall only come into effect from the member of staff's next incremental date.

10.0   INTERPRETATION

In this Ordinance:-

"Academic Staff" means all persons employed by the University as professors, associate professors, senior lecturers or lecturers and who are contractually required to carry out teaching, and administrative duties and to conduct research,

"A good first degree" means a first degree classified at the level of Upper Second or equivalent,

"Longitudinal" means research which is carried out over a period of at least 5 years before final results are obtainable.

Think in other terms

FIRST SCHEDULE

QUALIFICATIONS ACCEPTED BY THE UNIVERSITY AS APPROVED EQUIVALENTS

(SECTIONS 5.2.4 OF THE ORDINANCE)

1.0 Qualifications recognized as equivalent to a postgraduate Diploma or postgraduate Masters Degree extending over less than 2 years of study.

Faculty/Department		Qualifications
1.1	Agriculture	No specific equivalent qualifications identified.
1.2	Architecture and Quantity Surveying	Bachelor of Architecture Degree
1.3	Arts	Aggregation
1.4	Commerce	Membership of the Institute of Cost and Management Accountants
1.4.1	Accountancy	Membership of the Institute of Chartered Secretaries and Administrators
1.4.2	Business Studies	Membership of the Institute of Marketing Management.
		Membership of the Institute of Chartered Secretaries and Administrators.
		Membership of the Institute of Personnel Management
1.5	Education	Graduate Certificate of Education.
1.6	Engineering	No specific equivalent qualifications identified.

Think in other terms

1.7	Medicine	No specific equivalent qualifications identified.
1.8	Science	No specific equivalent qualifications identified.
1.9	Social Studies	No specific equivalent qualifications identified.
1.10	Veterinary Science	Specialty certificates issued after one year's full time study, or the equivalent in part-time study, and after examination by Universities and bodies such as the Royal College of Veterinary Surgeons, the American Veterinary Medical Association, and the Australian College of Veterinary Scientists.

2.0 Qualifications recognized as equivalent to a Postgraduate Masters Degree extending over 2 years of study.

Faculty/Department		**Qualifications**
2.1	Agriculture	No specific equivalent qualifications identified.
2.2	Art	B.Litt., B Phil.
2.3	Commerce Accounting	Membership of the Institute of Chartered Accountants of Zimbabwe or Membership of an approved society as defined in the Accountants By-Laws promulgated in terms of the Accountants Act.
2.4	Education	No specific equivalent qualifications identified.
2.5	Engineering	Corporate Membership of an appropriate Institute of Engineering obtained by

examination at a professional interview procedure.

Faculty/Department	Qualifications
2.6 Medicine	M.Gen.Med. M. Med.(in Medicine, Surgery, Pathology, Paediatrics, Obstrics and Gynaecology or Psychiatry) MRCP (UK) FRCS (Eng.), (Glasg),(Edin)or (Irel) MRCOP, FFARCS, MRCPath
	any other qualification s acceptable to the Medical, dental and allied Professions Council of Zimbabwe for registration as a Practitioner on a Specialist Register
2.7 Science	No specific equivalent qualifications identified.
2.8 Social Studies	No specific equivalent qualifications identified.
2.9 Veterinary Science	Speciality Diplomas or Certificates issued after 2 years or 3 years full- time study, or the equivalent in part-time study, and after examination by Universities and bodies such as the Royal College of Veterinary Surgeons, the American Veterinary Medical Association, and the Australian College of Veterinary Scientists.

3.0   Qualifications recognized as equivalent to a DPhil or PhD Degree.

Faculty/Department	Qualifications
3.1 Agriculture	No specific equivalent qualifications identified.

Think in other terms

3.2	Arts	No specific equivalent qualifications identified.
3.3	Commerce	No specific equivalent qualifications identified.
3.4	Education	No specific equivalent qualifications identified.
3.5	Law	No specific equivalent qualifications identified.
3.6	Medicine	MD, Pharm. D
3.7	Science	No specific equivalent qualifications identified.
3.8	Social Studies	No specific equivalent qualifications identified.
3.9	Veterinary Science	No specific equivalent qualifications identified.

Think in other terms

SECOND SCHEDULE

RECOGNITION OF PRE-GRADUATE EXPERIENCE

(SECTION 5.3.4 OF THE ORDINANCE)

Faculty/Department	Recognised Postgraduate	Extent of Recognition
1.0 Agriculture	Experience in the Agriculture Industry following award of a recognized Diploma in Agriculture.	One notch for each complete year of the relevant experience up to a maximum of years.
2.0 Arts	Nil	Nil
3.0 Commerce		
3.1 Accountancy	Relevant experience at an appropriate level in any of Auditing, Taxation, Financial and Management Consultancy.	One notch for each complete year of experience up to maximum of 5 years.
3.2 Business Studies	Experience at an appropriate	One notch for each complete year

	level in a relevant activity in Business or Government administration at a supervisory or more senior level.	of experience up to a maximum of 5 years.
4.0 Education complete	Depending on the job description of the post involved, teaching at Primary or Secondary level educational administrative experience following the award of a recognized certificate in education.	One notch for each complete year of experience up to a maximum of 5 years.
5.0 Engineering	Relevant experience at an appropriate level in engineering.	One notch for each complete year of experience up to a maximum of 5 years.
6.0 Law	Relevant experience at an appropriate level in law.	One notch for each complete year of experience up to a maximum of 5 years
7.0 Medicine	Relevant experience at an appropriate level in Medical Laboratory Technology following the award of a Diploma in Medical Laboratory Technology.	One notch for each complete year of experience up to a maximum of 5 years
8.0 Science	Depending on the job description of the post involved, certain	One notch for each complete year of experience up to a maximum of

Think in other terms

technical experience may be recognized following the award of an appropriate technical qualification.

5 years.

9.0 Social Studies

Professional full time experience Studies in areas such as counseling fiscal, public and social administration following the award of a recognized qualification.

One notch for each complete year of experience up to a maximum of 5 years.

10.0 Veterinary Science

Depending on the job description following the award of an appropriate qualification in a field related to the Veterinary profession. Examples of appropriate qualifications for this purpose are degrees in Animal Science, Microbiology or Zoology and Diplomas in Medical Laboratory or Animal Nursing.

One notch for each complete year of experience up to a maximum of 5 years

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THE RULES OF STUDENT CONDUCT AND DISCIPLINE ORDINANCE NO.30 (AMENDED 2006)

These shall be the rules of Student Conduct and Discipline read together with the NUST Act Chapter 25.13 (formerly Act 1990).

1. This Ordinance may be cited as "The Rules of student Conduct and discipline Ordinance, Ordinance No. 30 (Amended 2006)".

2. The Student Disciplinary Committee hereby delegates to the officials referred to in the Rules of Student Conduct and Discipline the power of investigating and exercising disciplinary authority in respect of misconduct by any student to the extent and in the manner set out in the Rules of Student Conduct and Discipline.

3. The Student Disciplinary Committee may:-

    3.1 Order a student to pay to the University the amount of any financial loss caused to the University by such a student;

    3.2 After reference to the Vice-Chancellor, impose any penalty on a student which in the circumstances of a particular case it deems appropriate.

SCHEDULE

RULES OF STUDENT CONDUCT AND DISCIPLINE

1.0   INTERPRETATION

The University Officers charged with the administration of these rules will at all times seek to implement the letter and spirit of the University Act and will, in particular, have regard to the following principles:

1.1   The University is a Society in which a high standard of communal life must be established and maintained for the benefit of both present and future members of the University;

1.2   A high level of personal integrity and a developed sense of responsibility towards others are as important to the University as outstanding scholastic achievement;

1.3   A proper concern for the reputation of the University and what it ought to stand for makes it incumbent upon its members to live decent and orderly lives;

1.4   Individual or collective action by members of the University which constitutes a breach of these rules may require to be punished, notwithstanding that the motive or goal of such action was a commendable one in the belief of such members.

2.0   UNDERTAKING AT REGISTRATION

When registering as a member of the University a student shall be given a copy of these rules and shall sign a statement in which he/she acknowledges that he/she has been furnished with the rules, and he/she undertakes to conduct himself/herself while a student of the University in accordance therewith and with any amendments duly made thereto.

3.0   STUDENT CONDUCT

3.1   No student of the University shall:-
      3.1.1   Use the University premises contrary to University Regulations, residence, Faculty or Departmental rules or do any act reasonably likely to cause such mis-use;

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3.1.2   Damage or deface any property of the University or do any act reasonably likely to cause damage or defacement thereto;

3.1.3   Disrupt teaching, study, research or administrative work, or prevent any member of the university or its staff from carrying on his/her study or work, or do any act reasonably likely to cause disruption or prevention;

3.1.4   Engage in any conduct whether on or off the campus which is or is reasonably likely to be harmful to the interests of the University, members of the University staff or students.

3.2   The following would be regarded by the University as instances of breaches of the rule contained in 3.1 (above):-

3.2.1   Displaying violence by word or act towards any member of the University, whether academic or administrative staff or student, or a guest of the University, or any visitor to the University or in any way intimidating or obstructing the free movement of such member, guest or visitor;

3.2.2   Disrupting or seeking to disrupt any proper function of the University whether it be an official function, Council Meeting, Senate Meeting, Faculty or Committee Meeting, Lecture, teaching session, the function of any University Society or day to day administrative activity;

3.2.3   Seeking to prevent a speaker invited by any section of the University Community from lawfully expressing his/her views.

3.3   Students are informed that:-

3.3.1   If a group of students forms a common intention to commit certain acts and assist each other in their commission, and in due course a breach of these Rules is committed by one or some of the group, then each member of the group who foresaw that the breach would occur, may be held to have committed that breach of the Rules. A member of such a group can avoid this happening to him/her by taking clear and unequivocal steps, before such a breach is committed, to show that he/she dissociates himself/herself from the acts of the group with whom he/she has so far been associating;

Think in other terms

3.3.2   Where a number of students have committed a breach of these Rules and only one or more of these students can be identified, the University will not hesitate to take disciplinary action against those students who can be identified and against whom there is sufficient evidence to warrant such a disciplinary action;

3.3.3   Where a student commits an act which is both an offence according to the laws of the country and one which after investigation appears to be a breach of the disciplinary rules of the University, the University may punish such a student notwithstanding that he/she is prosecuted and/or punished by the courts of the country;

3.3.4   A Student Identity Card is solely for the legitimate use by the person to whom it has been issued.

3.4   A student shall obey any Rules made from time to time by the Vice-Chancellor and shall further obey all instructions given by the Vice-Chancellor and shall further obey all instructions given by the Vice-Chancellor, the Proctors, and all those persons whom the Vice-Chancellor has charged to assist him/her in the maintenance of discipline, and in this regard:-

3.4.1   Academic staff and Senior Administrative staff may order any member of a gathering of students which is committing an offence, or whose activities are likely to lead to a breach of Rule 3 (above), to disperse, and may further order any such member to furnish his/her full name or to accompany the member of staff for an interview with the Vice-Chancellor or a Proctor, or give both such orders. For the purposes of this section 'Senior Administrative Staff shall include the Registrar, Deputy Registrars, the Bursar, Deputy Bursars, Librarian, Deputy Librarian, Sub-Librarians, Directors, Dean of Students, Deputy dean of Students, Assistant/Senior Assistant Registrars, Assistant/Senior Assistant Librarians, Chief Security Officer, Accountants, Principal accountants, and Wardens of University Residence.

3.4.2   If a student misbehaves in a lecture or teaching session or interferes with the conduct of a lecture or teaching session the member of staff conducting such a lecture or teaching session may order the student to leave or to cease such interference.

3.4.3 Failing to comply with any order given as stated above constitutes a serious offence.

4.0   THE POWERS OF THE UNIVERSITY PROCTORS

The Vice-Chancellor shall from time to time appoint as many Proctors as he deems necessary from among the academic staff who are not members of the Student Disciplinary Panel or Wardens. One Proctor shall be known as the Senior Proctor with the responsibility of organising and supervising the work of the other Proctors. A second Proctor shall have legal expertise and known as the Legal Proctor with a particular responsibility for the presentation of cases before the Student Disciplinary Committee.

4.1   A Proctor shall be charged with ensuring the proper observance of these Rules by students on or off the University site and to this end shall, in addition to his power under Rule 3.4, have the following powers:

4.1.1   To receive and investigate reports of student misconduct;

4.1.2   To summon any student to appear before him/her either to answer a charge or complaint against him/her or to answer questions in regard to any matter under investigation by him/her;

4.1.3   To proceed in the absence of a student who in the opinion of the Proctor has been duly summoned but has failed to appear;

4.1.4   To recommend to the Registrar that a student be summoned to appear before the Student Disciplinary Committee to answer a charge or complaint against him/her or to answer questions in regard to any matter under investigation by the Student Disciplinary committee or Proctors;

4.1.5   To reprimand a student;

4.1.6   To impose a maximum fine on a student not exceeding 25% of the average annual tuition fees as stipulated by the Fees Ordinance for the State Universities for the first offence, and a maximum not exceeding 50% of the average annual tuition fees for the second offence. Any subsequent offences should be referred to the Registrar;

4.1.7   To order a student to pay to the University the amount of any financial loss caused to the University by such student;

4.1.8   To withdraw an existing student privilege, other than residence, for a period not exceeding 1 (one) semester.

4.2   When a report is made to a Proctor of an alleged misconduct by a resident of a Residential Unit, the Proctor shall communicate such a report to the Warden of the Residential Unit concerned before taking action against the resident.

5.0   POWER OF THE WARDENS

5.1   A Warden of a Residential Unit shall have the power to investigate any breach of these Rules by a student of his/her Residential Unit committed within any residential Unit and to make any of the following orders in respect of such student adjudged by him/her to have committed a breach of these rules.

5.1.1   To reprimand a student;

5.1.2   To withdraw an existing resident student privilege;

5.1.3   To impose a maximum fine not exceeding 5% of the average annual tuition fees as stipulated by the Fees Ordinance for State Universities;

5.1.4   To order a student to pay to the University the amount of any financial loss caused to the University. Such an order may be made on the person or persons who caused the loss or, where identity cannot be established, on members of the residence in which the loss was sustained;

5.1.5   To suspend a student from his/her University Residence;

5.1.6   To expel a student from his/her University Residence for a period not exceeding two semesters.

5.2 Where a warden wishes to impose penalties 5.1.5 or 5.1.6 above, he/she shall first furnish the Senior Proctor with a full report concerning the alleged offence and the proposed penalty. On receipt of this report the Senior Proctor may, either:-

5.2.1 Confirm the proposed penalty and order of the Warden and in the event of variation, order the Warden to execute such varied order; or

5.2.2 Institute a further investigation of the matters before making such order at the conclusion as he/she deems fit; or

5.2.3 Recommend to the Registrar that a Student Disciplinary Committee be convened to examine the case.

5.3 A Warden of a University Residence and the Warden of Non-resident Students shall have the power to report any matter of student misconduct to the Proctors or, through the registrar, to the Student Disciplinary Committee.

5.4 Where a warden has imposed any of the penalties set out in Section 5.1.1 to 5.1.4 above on a student he/she shall submit a report to the Senior Proctor, Registrar and Dean of Students.

6.0 RULES FOR UNIVERSITY STUDENT RESIDENCES

6.1 **General**

A resident shall obey all Rules made by the University and instructions given by the Warden, Deputy and Sub-Wardens of the residence and shall refrain from conduct which:-

6.1.1 May bring discredit upon his/her Residential Unit; or

6.1.2 Is prejudiced to the welfare of other residents of the Unit.

6.2 **Powers of University Residence Committee Members**

Members of Residence Committee shall have power;
To investigate and if necessary reprimand residents for any infringement of the Rules contained in this Section, and report such investigation or reprimand to the Warden.

Think in other terms

6.3 Damage to University Residence Property

A residence shall be liable to compensate the University in full for any damage caused by him/her to University property. Damage caused to a study - bedroom shall be presumed to have been caused by the resident to whom such a room has been allocated unless the contrary is proved.

6.4 Fire

6.4.1 Normally, fire drills shall be conducted at least three times per Semester (beginning, middle and end of the Semester)

6.4.2 A resident having knowledge of the outbreak of fire in, or adjacent to Resident premises shall as soon as possible:-

6.4.2.1 Raise the alarm;
6.4.2.2 Inform the Warden, Deputy or Sub-Warden;
6.4.2.3 Summon the Municipal fire-brigade;
6.4.2.4 Inform the Director of Physical Planning, Works and Estates/Dean of Students.

6.5 Vacation Residence (Only for NUST Campus Residence)

6.5.1 A resident may not occupy a study-bedroom during University vacations, save with the prior written authority from the Office of the Dean of Students, on the recommendation of the Dean of the appropriate Faculty and the Warden. Applications for vacation residence must be submitted through the prescribed channels and on the prescribed form.

6.5.2 A student granted leave to reside in University Residence during vacation who no longer wishes to avail himself/herself of this privilege shall furnish the Office of the Dean of Students with at least 3 (three) days' written notice of such fact. Omission to do so will, normally, render such resident liable to monetary penalty equivalent to the amount that was due.

6.6 Absence from Residence

To be absent from University Residence for two or more consecutive nights, a resident student needs to inform the Dean of his/her Faculty in addition to the Warden. A resident

student may be required to be in residence every night by such time as may be laid down in Residence Regulations unless he/she has given prior notice to the Warden or a Sub-warden that he/she will return to Residence at a later hour.

6.7   **Visitors**

6.7.1   Resident students' parents may visit them in their rooms from 1000 to 2230 hours.

6.7.2   Students in University Residence may visit each other's rooms between the following hours:

Monday to Friday   -   1000 to 2230 hrs
Saturday   -   1000 to 0000 hrs
Sunday   -   1030 to 2230 hrs

6.7.3   Students may have other Visitors between 1630 and 2030 hours.

6.7.4   Outside the prescribed visiting hours, all parts of the Residence except the Common rooms and entrance foyers are out of bounds.

6.7.5   Special arrangements for visits may be made by application to the Warden of the Residence concerned.

6.7.6   These provisions apply to all students – undergraduate and postgraduate, living in undergraduate residence.

6.7.7   No visitor or non-resident student may make unauthorised use of accommodation or dining facilities in University Residence. Students introducing visitors or non-resident students to the Residences may be held responsible by the Wardens for the conduct of such visitors, and non-resident students making unauthorized use of the residence facilities shall be guilty of misconduct.

6.8   **Withdrawal from Residence**

If a student should leave the University or withdrawal from Residence before the end of the session for which he/she has been admitted, fees already paid by him/her are not normally returnable, except that a student gives proper notice before the end of a session that

Think in other terms

he/she wishes to vacate Residence for the remainder of the session may be refunded the balance of Residence fees in respect of the remaining period of session.

6.9 Loss of Valuables

A resident shall report as soon as possible to the Warden, Deputy or Sub-Warden the loss of any article from Residence.

6.10 Relationship of Resident and Staff

A resident shall not require a member of the Central Services Department Staff to perform a service outside the scope of his/her normal employment duties.

6.11 Illness

For a resident who is confined in bed, the Sub-Warden/Warden must ensure that his/her illness is reported to the University Student Health Service.

7.0 RULES FOR THE USE OF VEHICLES

7.1 A student wishing to keep or use a motor vehicle including a motor cycle, motor scooter or motorized bicycle within the boundaries of the University site shall previously notify the Registrar in writing on the form prescribed.

7.2 Save with the prior written permission of the Registrar, a student shall not, within University grounds:-

7.2.1 Park a vehicle in a parking place marked "for staff and visitors only";
7.2.2 Park a vehicle in any place at which parking by any persons has been prohibited;
7.2.3 Bring a vehicle within any University building;
7.2.4 Ride or drive a vehicle on any part other than roads, tracks or parking places;
7.2.5 Leave a vehicle in an unusable condition for a period longer than is reasonably required to effect necessary repairs.

7.3   Whenever a vehicle registered with the University is driven, ridden or parked in contravention of the Rules set out in Section 7.2 it shall be presumed that it was so driven, ridden or parked by the person in whose name the vehicle has been registered with the University unless the contrary is proved.

7.4   **Penalties**

7.4.1   The Wardens, Proctors and such other persons so authorized by the Vice-Chancellor shall have power to investigate breaches of the Rules contained in this Section and to impose penalties calculated as proportions of the average annual tuition fees as stipulated by the Fees Ordinance for State Universities.

7.4.1.1 First offence, 2% of annual Tuition Fees
7.4.1.2 Second offence, 4% of annual fees

7.4.2   In the case of a third subsequent offence the name of the offender, with particulars of his previous offences under this Section, shall be reported to the Proctors, who shall exercise appropriate authority in Terms of Rule 4.

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RULES OF PROCEDURE IN DISCIPLINARY PROCEEDINGS BEFORE THE STUDENT DISCIPLINARY COMMITTEE

1.1   The Chairman of the Committee shall regulate proceedings in a manner as simple and informal as possible which is, notwithstanding, best fitted to do substantial justice and at all times in accord with the principles of natural justice. More particularly, a student charged with breach of the Rules of Student Conduct and Discipline shall at any investigation thereof before the Committee and with no derogation of his/her rights in terms of Section 23 (3) of the University Act:-

   1.1.1   Be furnished with a full and fair opportunity to meet such allegations if he so desires;

   1.1.2   Be permitted to present any relevant facts or call any witness capable of giving testimony relevant to the investigation;

   1.1.3   Be permitted to put questions to witnesses save those which are irrelevant, frivolous or vexatious;

   1.1.4   Be permitted to be present at all times save when the Committee is deliberating upon its decision of the matter;

   1.1.5   Be advised as fully and clearly as possible of the Committee's decision or recommendation and of its reasons for arriving at that decision or recommendation.

1.2   The Proctors and Wardens shall conduct any proceedings before them in accordance with Rule 8.1 save that the provisions of Section 25 (3) of the University Act will not be applicable.

1.3   In the event of the Legal Proctor conducting an investigation before the Student Disciplinary Committee it shall further be his/her duty:-

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1.3.1 To elicit all evidence brought to his/her attention which is relevant to the investigation and admissible, whether favourable to or prejudicial to the student whose conduct is the subject thereof;

1.3.2 If so required by the Committee, to advise the Committee as to the issues which they have to decide and as to any point of law or procedure so as to ensure that the conduct of the investigation is consistent with the principles of natural justice;

1.3.3 To be absent at all times from the deliberations of the Committee upon its final judgments.

1.4 A notice to a student summoning him/her to appear before the Committee for investigation of an alleged breach of the University Rules of Student Conduct and Discipline shall be contained in a letter addressed to him/her and advising him/her of:-

1.4.1 The place at which he/she is to attend;

1.4.2 The date and time at which he/she is to attend, provided that such date shall be not less than 5 days after the date upon which such notice is received;

1.4.3 The rule which he/she is to have contravened and full particulars of his/her alleged contravention;

1.4.4 His/her right to make any relevant statements he/she wishes to the Committee;

1.4.5 His/her right to call witnesses to attend and give any relevant testimony on his/her behalf before the Committee;

1.4.6 His/her right to be accompanied and represented before the Committee by a legal practitioner;

1.4.7 The right to furnish to the Proctors in advance of the investigation any information which he/she wishes to have given due consideration.

1.5 A member of the Committee who has acquired, other than in the course of his University life, knowledge of evidence in an investigation of misconduct to be held before the Committee' shall not participate in such investigation.

Think in other terms

1.6   The member of the Committee who is a relative of a student charged with breach of the Rules of Student Conduct and Discipline shall not participate in the Committee's proceedings.

1.7   The Committee shall only find a student to have committed a breach of the rules of Student Conduct and Discipline when it is satisfied beyond reasonable doubt that the student has committed such breach.

1.8   In the event of the Committee finding a student to have committed a breach of the rules, either on the student's own admission or at the conclusion of an investigation, it shall, before determining the punishment it should impose or the terms of its recommendation to the Vice-chancellor, permit such a student a full opportunity to make a statement or produce evidence which he/she wishes to be taken into consideration in mitigation of his/her punishment.

1.9   The Chairman of the Committee or his/her nominee shall keep full notes of any proceedings before the Committee but these need not be a verbatim record.

Date of Operation

This Ordinance shall apply with effect from 1 October, 2006, or any later date as approved by the Minister of Higher and Tertiary Education, Science and Technology Development, and shall remain in force until otherwise repealed or varied by further Rules of Student Conduct and Discipline Ordinance of the National University of Science and Technology.

Think in other terms

GENERAL ACADEMIC REGULATIONS FOR UNDERGRADUATE DEGREES

1.0   PREAMBLE

1.1 The Senate shall be the final authority for the interpretation of these regulations.

1.2 The Senate reserves the right to alter, amend, cancel, suspend, or replace any of these regulations.

1.3 The Senate has the power to exempt any student from any of the regulations.

1.4 A student who has started a programme of study following one set of regulations shall not be affected by regulations subsequently adopted unless agreed to in writing by the student.

1.5 There shall be academic regulations for each Faculty which shall be subject to approval by the Senate and which shall include provision for admission to Programmes, Subjects and Modules within the Faculty and schemes of examinations for these Programmes.

1.6 The General Academic Regulations shall take precedence over the Faculty Regulations.

1.7 Detailed syllabi for Subjects or Modules in a Subject will not form part of the General or Faculty Regulations but shall be submitted to the appropriate Faculty Boards for approval.

1.8 In these regulations the following shall be used as described:-

"Academic Year"	-	A defined portion of a Programme consisting of two semesters.
"Part"	-	A defined portion of a Programme covering one academic year.
"Continuous Assessment"	-	Prescribed assignments to be completed within a given period and forming a part of a module.
"Industrial Attachment"	-	A prescribed period of hands-on experience in a relevant work setting.
"Module"	-	Is a component within a Programme which is separately examinable.
"Programme"	-	A plan of study lasting over a period of time which leads to the award of a degree, diploma, or certificate of the University.
"Project"	-	A defined practical assignment which is separately examinable.
"Semester"	-	A prescribed period normally comprising 15 weeks, including teaching, revision and examinations.
"Subject"	-	A field of study offered by a Department.
"Credit"	-	Quantified means of expressing the volume of learning based on the workload students need in order to achieve the expected outcomes of a module.
"Credit accumulation"	-	The process of collecting credits awarded for achieving the learning outcomes of a module component of a programme.

1.9 A schedule of Programmes, Subjects and Modules and their codes for use in computerised student records shall be maintained by the Registrar. These codes shall be alphanumeric.

Think in other terms

2.0   PROGRAMMES

2..1   The University may offer programmes for undergraduate Bachelor's Degrees at Honours Level.

2.2   **Honours Degrees**

2.2.1   The structure of Honours Degree Programmes shall be as prescribed in the Faculty Regulations. These structures may vary in accordance with the particular requirements of different Faculties and Subjects but all Honours Programmes shall normally contain the following elements:-

(a)   one or more 'subjects' shall be studied over at least four years of full-time study(or equivalent), including one academic year of Industrial Attachment. These subjects shall be studied intensively and progressively (i.e. studies in the final year(s) assume prior knowledge of the Subject at first, second and third year level) and be taught and examined at a level requiring great breadth and depth of knowledge and understanding.

(b)   the combination of subjects and modules within an Honours Programme shall be prescribed so as to focus on specific topics and to disallow a wide choice of disparate options. This specific focus may be influenced by the requirements for professional recognition and registration within a particular field.

(c)   one or more subsidiary subjects or modules may be studied within the Honours programme but assessment in these subjects/courses either will not contribute to the final classification of the degree awarded or will be assigned a relatively lighter weighting in the overall calculation.

(d)   a student for an 'Honours' degree shall normally be required to complete a project or dissertation within the programme of study. Normally, at least 60% of the courses taken in an 'Honours' Programme will be in the major subject(s)

2.2.2   The following are Degrees offered by the University:

Bachelor of Architectural Studies Honours (BArch Studies Hons)

Think in other terms

Bachelor of Commerce Honours (BCom Hons)
Bachelor of Engineering Honours (BEng Hons)
Bachelor of Technology Honours (BTech Honours)
Bachelor of Science Honours (BSc Hons)
Bachelor Medicine and Bachelor of Surgery (MBBS)
Bachelor of Quantity Surveying Honours (BQS Hons)
Bachelor of Education Honours (BScEd Hons)
Bachelor Design Education (BDesEd)
Bachelor of Technology Education Honours (BTechEd Hons)

3.0 ENTRY REGULATIONS
3.1 Normal Entry

3.1.1 For normal entry candidates should:-

(a) have satisfied the general requirements as prescribed below; and
(b) have satisfied the special requirements for entry into the particular programme chosen; and
(c) have passed English Language and Mathematics at Ordinary Level or approved equivalents.

General Requirements

Passes in at least 5 subjects at Ordinary Level and at least 2 subjects at Advanced Level or their equivalents.

The following are acceptable to the University:-

Ordinary Level Pass or Equivalent.
Ordinary Level of the Associated Examining Board's General Certificate of Education.
Credit standard of the Cambridge Overseas Higher School Certificate;
Ordinary Level of the University of London's General Certificate of Education;
Ordinary Level of the Zimbabwe General Certificate of Education/ Zimbabwe School Examinations Council.
Subsidiary standard of the Cambridge Overseas Higher School Certificate;

Advanced Level Pass or Equivalent

Advanced Level of the Associated Examining Board's General Certificate of Education.

Principal subject standard of the Cambridge Overseas Higher School Certificate;

Advanced Level of the University of London's General Certificate of Education.

Advanced Level of the Zimbabwe General Certificate of Education/Zimbabwe School Examinations Council.

3.1.2 **General Subject Provisions**

Subjects must have been chosen from the approved list below and restrictions against the combination of overlapping subjects must have been observed.

3.1.3 **APPROVED SUBJECTS FOR ADMISSION PURPOSES:**

Subjects approved by the Associated Examining Board; and/or the Cambridge Local Examination Syndicate and/or the London General Certificate of Education/and/or Zimbabwe General Certificate of Education/Zimbabwe School Examinations Council.

Level

OA   Accounting

O   Accounts

OA   Accounts, Principles of

OA   Ancient History

A   Ancient History and Literature

OA   Applied Mechanics

O   Applied Statistics

OA   Art

OA   Art and Crafts (AEB)

OA   Bible Knowledge

OA   Biology

O   Bookkeeping and Accounting

OA   Botany

O   Building Studies

OA   Business Management

OA   Business Studies

OA   Chemistry

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O	Commerce
OA	Computer Studies
A	Computing Science
O	Computing Studies
OA	Divinity
O	Drama and Theatre Arts (AEB)
A	Economic & Political Studies
O	Economic and Public Affairs
A	Economic and Social History
A	Economic Geography
OA	Economic History
O	Economic Principles
OA	Economics
A	Electronic Systems (AEB)
O	Electricity & Electronics
O	Elementary Physiology
O	Elements of Sociology
OA	Engineering Drawing
OA	Engineering Science
O	English Language
OA	English Literature
O	Environmental Biology (AEB)
OA	Environmental Studies
OA	Fashion and Fabrics/Dress and Textiles
OA	Food and Nutrition/Food Studies
OA	French
O	French Literature (Cambridge)
O	French Studies
O	General Mathematics
O	General Paper (Use of English)
OA	General Principles of English Law
O	General Science
OA	Geography
OA	Geology
A	Government & Political Studies/Politics
O	Government Economics and Commerce
OA	Health Science

Think in other terms

OA	History
OA	History, Ancient
O	History & Appreciation of Music
O	Home Economics
OA	Human Biology
OA	Law
OA	Mathematics
A	Mathematics, Applied
OA	Mathematics, Pure
O	*Metalwork
O	*Metalwork Engineering
OA	Music
OA	Ndebele
OA	Physical Science
OA	Physics
O	Physics with Chemistry
OA	Political Studies
OA	Portuguese
O	Principles of Economics
OA	Psychology
OA	Religious Studies
O	Rural Biology
OA	Shona
OA	Social Science
OA	Sociology
OA	Statistics
O	*Surveying
OA	Technical Drawing
O	Technical Graphics
O	*Woodwork
OA	Zoology

* Not more than one subject indicated above by an asterisk may be recognised for the purpose of satisfying Ordinary Level requirements.

Other subjects and other Examining Boards may be accepted by the Senate on the recommendation of the Registrar.

Think in other terms

3.1.4   Restrictions against the combination of Overlapping Subjects:

In the selection of subjects for the purpose of satisfying the general requirement, subjects listed under Column A in the Table below cannot be counted with any corresponding subjects under Column B.

COLUMN A	COLUMN B
Accounting	Accounts, Principles of Accounts, Bookkeeping.
Art	History of Art
Biology	Rural Biology, Botany, Zoology, General Science
Chemistry	Physical Science, Physics with Chemistry, General Science
Economic Geography	Geography, Environmental Studies
Economics	Economic Principles, Commerce, Economic History
Elementary Physiology	Human Biology
Elements of Sociology	Sociology
Engineering Drawing	Technical Drawing, Technical Graphics and Design
Environmental Studies	Geography
General Mathematics	Mathematics
General Science	Physics, Physical Science, Physics with Chemistry, Biology, Zoology, Botany, Rural Biology
Geography	Economic Geography
Government & Political Studies	Government & Politics
Health Science	Human Biology
Human Biology	Zoology, Biology, Health Science
Mathematics	Pure & Applied Mathematics, Pure Mathematics, Applied Mathematics, Additional

Think in other terms

	Mathematics, Mechanical Mathematics, Statistics
Physical Science	Physics with Chemistry, Chemistry, General Science, Physics
Physics	Physics with Chemistry, Physical Science, General Science
Pure & Applied Mathematics	Pure Mathematics, Applied Mathematics
Social Science	Sociology
Zoology	Human Biology, Health Science
Building Technology and Design	
Business Enterprise	Business Studies
Design and Technology	
History	
Literature in Shona	
Literature in Ndebele	
Literature in Tonga	
Sport Management	Physical Education, Sport and Mass Displays, Sport Science and Technology
Computer Science	Software Engineering
Theatre Arts	Dance, Music
Wood Technology and Design	
Animal Science	
Communication Skills	
Food Technology and Design	
Home Management	
Literature in English	
Metal Technology and Design	
Technical Graphics and Design	
Agricultural Engineering	Crop Science
Shona	
Ndebele	
Tonga	
French	
Textiles Technology and Design	
Family and Religious Studies	

Think in other terms

3.1.5   **Faculty Requirements**

For admission to a particular programme of study and/or for Subject/ Courses within the programme there may be specific restrictions on the choice of subjects in the General Requirements and/or additional requirements concerning entry. Such additional requirements shall be prescribed in the Faculty Regulations.

3.2   **Special Entry**

3.2.1   The following persons may apply for Special Entry and for permission to proceed to a first degree with exemption from the whole or part of the normal entry requirements:

3.2.1.1 A person who has obtained a degree of this or another University or degree awarding Institution.

3.2.1.2 A person who has obtained from a University or an Institution of similar status, academic qualifications (other than degrees) acceptable to the Senate;

3.2.1.3 A person who has obtained an appropriate number of subjects at An approved examination equivalent to the standard of the Ordinary Level of the General Certificate of Education examination and has subsequently passed an intermediate or equivalent examination at a University acceptable to the Senate;

3.2.2   Students who qualify under this regulation for Special Entry may apply to the Senate to be exempted from certain courses and examinations. Permission may be given to complete the programme for a Bachelor's degree in less than the normal required period provided that no student shall be allowed direct entry to the Final Part of any Programme;

3.2.3   Students who apply for admission under this regulation may be required to attend interviews and/or special tests at the University to determine their suitability for admission to Bachelor's degree studies.

3.3   **Mature Entry**

Persons who are at least 25 years of age on the first day of the academic year in which

admission is sought and who are not eligible for entry under the Normal or Special Entry Regulations may apply for Mature Entry provided that:

3.3.1   Applicants must have passed at least five approved 'O' level subjects including English Language and Mathematics (or equivalents) and must have demonstrated potential suitability for university studies by virtue of their attainments and/or relevant work experience.

3.3.2   Normally, applicants should have completed their full-time school or college education at least five years before the start of the academic year in which admission is sought.

3.3.3   **Requirements for Mature Entry**

Applicants who wish to be considered under the Mature Entry provisions may be required to attend interviews and/or special tests at the University designed to assess their command of the English Language, numeracy and reasoning ability and general suitability for admission to Bachelor's degree studies. Applicants who have previously attended Mature Entry tests and/or interviews without success will not be considered for admission under this form of entry unless in the intervening period they have acquired additional qualifications and/or experience.

3.4   **Submissions of Applications**

3.4.1   Applications must be submitted on the official Admission forms.

3.4.2   The closing dates for receipt of application forms for Normal Entry shall be as advised for each year. Another date shall also be advised for receipt of late application forms. Late applications may be considered upon payment of the prescribed late- application fee until the advised date for such applications.

3.4.3   The closing date for Special Entry and Mature Entry applications shall be as advised for each year.

3.5 General Provisions

3.5.1 Every student must satisfy the University that he/she has an adequate command of the English Language. New students may be required to undertake a test in English proficiency set by the University, upon registering for Bachelor's degree studies.

3.5.2 Students admitted under the Special Entry provisions may be exempted from this requirement.

3.5.3 A student may not register simultaneously for more than one programme at the University without the permission of the Senate.

3.5.4 Registration will take place in accordance with the arrangements prescribed each year through the Registrar's Office.

3.5.5 A student's registration shall not be confirmed until he/she has fulfilled the requirements for payment of fees.

3.5.6 Normally, no student shall be admitted to any programme or any course more than two weeks after its commencement. Any exception to this Regulation must have the written endorsement of the Chairperson of the Department and the Dean of Faculty concerned and will be subject to approval through the Registrar's office.

3.5.7 Students who enter or return to the University late shall not be entitled to special tuition.

3.5.8 Such students shall be liable to pay the late registration fine, unless permission for such late registration has been given by the Registrar.

3.5.9 A student registered for a Subject and/or Course is expected to attend all classes prescribed for such Subject and/or Course. Where tutorials, seminars, fieldwork, vacation work and practical sessions are prescribed a student is

Think in other terms

required to attend and to complete any assignment set.

3.5.10   If a student is unable to attend classes for health reasons for longer than 72 hours, he/she must notify the appropriate Faculty Office of the facts as soon as possible and submit certification in support thereof by a medical practitioner registered in accordance with the Medical, Dental and Allied Health Professions Act.

For absence on grounds other than health, prior permission from the Dean on the recommendation of the Chairperson of Department concerned shall be necessary.

3.5.11   After taking due consideration of the academic progress of a student, the Senate may require or allow a student originally registered for one programme or Subject to register for another Programme or Subject on the completion of either the First Part or the Second Part of the Programme for which he/she is registered.

3.5.12   Normally, no programme shall commence with fewer than five students.

4.0   STRUCTURE OF PROGRAMMES

4.1   The duration of Bachelor's Degree Programmes shall be prescribed in the Faculty Regulations.

4.1.1   **Maximum Time Allowable to Complete an Undergraduate Degree Programme.**

Except as otherwise provided for in the General Academic Regulations, a student must complete a Degree Programme within the specified duration period as ` provided for in the respective Faculty Regulations.

The maximum time allowable to complete a Degree Programme shall be calculated based on the expected course duration and shall include deferments. The maximum time allowable to complete a Degree Programme shall be calculated as follows:

For all undergraduate degrees offered by the University either Full-time or Part-time it shall be the normal duration period of the degree programme plus 2 years.

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4.1.2 **Process of Requesting for an Extension of Programme Time Limit for Undergraduate Degree Programmes.**

A student who reaches the maximum time limits allowed for their programme shall submit an Application in writing for an Extension of Programme Time Limit in the prescribed Form to the Department and payment of a fee determined by the University. The Department shall recommend its decision to the Faculty which in turn will recommend to the Academic Board. The application shall be considered by the Academic Board on behalf of the Senate, which may approve or reject the application. The decision of the Academic Board shall be final.

A student whose application is rejected or does not submit an application shall be deregistered from the programme. A student who wishes to rejoin the University shall be required to re-apply.

A student who is differently abled may apply for a time limit extension for reasons directly related to their disability. Such an application shall be in the prescribed Form and must be accompanied by a supporting letter from a Medical Doctor. Such an application for an extension due to a disability shall be exempted from payment of an application fee.

Applications to extend a time limit shall be submitted before the programme Time Limit expires.

Each Programme shall be divided into Years of Study.

An academic year of study shall comprise of not less than 30 weeks excluding vacations. Before the beginning of each academic year there shall be an orientation week for Part I students. Normally, before university examinations begin, there shall be a minimum period of one week of individual study/revision.

The possible combinations of Modules within a Subject shall be in accordance with the Faculty Regulations and shall be subject to approval by the Chairperson of the Department and the Dean concerned.

5.O   MARKING SCHEME DEGREE CLASSIFICATION

5.1   All Bachelor's degrees, except the MBBS degree, shall be classified in the following divisions:

5.1.1   First Division, Upper Second Division, Lower Second Division, Pass.

Think in other terms

5.1.2   In determining the degree classification of a programme, the weightings of all parts of the degree programme shall be taken into consideration. The actual weightings shall be prescribed in the programme regulations.

5.2   The following Grading Scheme shall be adopted for all Modules and Programmes:

```
75%    and  above      1       (First Division)
65%    -  74%          2.1     (Upper Second Division)
60%    -  64%          2.2     (Lower Second Division)
50%    -  59%          PASS   (P)
Below    50%           FAIL   (F)
```

5.3   The following Credit Accumulation regulations shall apply to all Modules and Programmes:

5.3.1.   A Credit shall be equivalent to 10 notional hours of learning.

5.3.2   All programmes offered by the University shall use an academic credit allocation system approved from time to time by the Senate. The University shall adopt the following credit level framework prescribed by the Zimbabwe Council for Higher Education for all programmes offered:

SADC- QF LEVEL	QUALIFICATION
8	Bachelor's Honours
7	Bachelor's General

5.3.3   A student who successfully completes a module shall be awarded the credits approved for the module at the assigned level.

5.3.4   **Award of Credit**

A student shall be awarded credits on successful completion of a module.

5.3.5   **Credit Accumulation and Degree Qualification**

A student shall progressively accumulate credits for modules that they successfully complete. A student shall be required to accumulate sufficient credits to progress through the programme and would be required to gain the

Think in other terms

total credits required for the award of the degree qualification as prescribed in the Faculty Regulations.

5.3.6 Accreditation of Prior Learning

A student who is exempted from the first year of study shall be awarded credit determined by the Faculty recognising prior learning that matches the learning outcomes gained from an accredited institution and relevant work experience.

6.0 ASSESSMENT OF CANDIDATES FOR BACHELOR'S DEGREES

6.1 Normally, evaluation shall be based on Continuous Assessment as well as University Examinations. Unless otherwise approved by the Senate, Continuous Assessment will contribute between 25% and 50% of the overall assessment.

6.2 Each Department shall determine which items of coursework and practical work will be included in the Continuous Assessment and shall define the relative weighting assigned to each item of coursework or practical work. Each Department shall inform the students of these details at the beginning of the module and shall maintain written records of each student's Performance in these elements of Continuous Assessment. Items Incorporated in the Continuous Assessment may include assignments, tests, essays, fieldwork, laboratory work and projects.

6.3 University Examinations shall normally be taken by students at the end of each appropriate semester as prescribed in the Faculty Regulations.

6.4 External Examiners shall be appointed to moderate all University Examinations.

6.5 All matters relating to the conduct of University Examinations shall be the responsibility of the Registrar.

6.6 To be admitted to any University Examination, a candidate must:-

6.6.1 be registered as a student of the University in accordance with the General Regulations;

6.6.2 have satisfactorily completed approved modules of study at the University. 'Satisfactory completion' of modules may require submission of written work, attendance at lectures, seminars, tutorials, Industrial Attachment and other activities as stated in the Faculty Regulations;

6.6.3 have completed and submitted work on Continuous Assessment and has been

awarded a mark for such work.

6.7   Exclusion from a University Examination shall require the authority of the Senate.

6.8   The Examiners may require any candidate to attend an oral examination and/ or write a special examination.

7.0   DETERMINATION OF CANDIDATES' RESULTS

Results shall be determined by the Senate on the recommendations from the Faculty Boards of Examiners.

7.1   Departmental Panels of Examiners shall comprise of all full-time lecturing staff in that Department, the External Examiner (s) and, where appropriate, as determined by the Departmental Panel, part-time lecturers and/or teaching assistants for   the Course/Subject concerned.

7.2   Faculty Boards of Examiners shall comprise of the Dean and Deputy Dean of the   Faculty, the Chairperson of each Department, and one other academic member of the Department nominated by the Departmental Panel from each Department involved in the subjects for that examination and normally the External Examiner(s) for the Department. The Chairperson of the Board of Examiners shall normally be the Dean of the Faculty who shall have a casting vote.

7.3   The Departmental Panel of Examiners shall:

   7.3.1   agree, for each candidate, marks in terms of percentages, for Continuous Assessment, for the University Examinations and overall marks (combining the Continuous Assessment and University Examination) in courses and, where required, in terms of the Faculty Regulations, in Subjects.

   7.3.2   recommend to the Faculty Board of Examiners whether a candidate should pass or fail the relevant Module (s) and Subject (s) taken.

   7.3.3   where Subject/Course prizes are available for award, make recommendations for the award of these prizes.

7.4   The Faculty Board of Examiners shall:

   7.4.1   consider the recommendations of the Panels of Examiners and recommend to the Senate an overall result for each candidate and any other conditions as it may deem appropriate;

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7.4.2   make recommendations to the Senate with regard to the award of any prizes which may be available for candidates within the Programme.

7.5 In determining results, all Departmental Panels of Examiners and Faculty Boards of Examiners shall have regard to all special requirements as prescribed in the Faculty Regulations. Such regulations may require candidates to satisfy the examiners in Continuous Assessment and University Examinations separately and/or that candidates must satisfy the examiners in individual components of the University Examinations either separately or in aggregate.

8.0   PROVISIONS FOR PASSING A COURSE OR PART, AND PROCEEDING IN A PROGRAMME

8.1   A candidate shall be deemed to have passed a Part of a Programme if he/she has satisfied the Examiners in terms of the Scheme of Examination as prescribed in the relevant Faculty Regulations.

8.2   Each Scheme of Examination shall indicate which Courses must be passed before a candidate may be allowed to proceed to a subsequent part of the Programme (or portion thereof).

8.3   Normally, a student shall not be allowed to proceed in a Subject without having passed the previous final examination (s) in that subject and having satisfied all the prerequisites for proceeding in that Subject as may be specified in the Faculty   Regulations and to timetable feasibility.

8.4   A student who passes in one part with an aggregate of 45% or above may be permitted to proceed to a subsequent part carrying a course or courses subject to the provisions in Faculty Regulations.

9.0   FAILURE TO SATISFY THE EXAMINERS

9.1   A candidate who fails to satisfy the Examiners in terms of these General Academic Regulations and Faculty Regulations may be required by the Senate to:

9.1.1   proceed to the next part of the Programme carrying not more than 25 % of the modulesfrom the preceding Parts

9.1.2   repeat

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9.1.3   discontinue

9.1.4   withdraw

9.2   Where a dissertation or a project is prescribed in any programme, a candidate shall be informed in advance of the deadline for submission of such dissertation or project. Unless prior permission for an extension of this deadline has been granted by the Academic Board, any candidate who fails to meet this submission deadline shall normally fail and would be required to repeatthe dissertation or project. A candidate who fails the dissertation or project but obtains a mark of 40% - 49% may on the recommendation of the Examiners, be permitted to submit the dissertation or project at a later date, normally within three months of the publication of theresults. Unless otherwise determined by the Senate, the maximum mark allowable for such referred work shall be 50%.

9.3   **CARRY OVER**

9.3.1   The number of carry-over modules may be limited by Faculty Regulations.

9.3.2   For all Parts, other than the Industrial Attachment year which consists of only onemodule, the total number of carry-over modules shall not exceed 25% of the number of normally scheduled modules in a particular year of a Programme.

9.3.3   A student shall be required by Senate to undertake Continuous Assessment with their carry-over modules. This assessment will then be taken into account in the usual way in determining the overall assessment.

9.3.4   No candidate may carry over a particular module for more than two years.

9.4   **REPEAT**

9.4.1   A candidate who is not allowed to proceed to the subsequent Part of the Programme, but has passed at least 50% of the modules in that Part of the Programme, may be allowed to apply to repeat.

9.4.2   'Repeat' means that the student may apply for readmission into the same Programme and his/her application will be considered through the normal procedures.

9.4.3   If a student is repeating a module(s), he/she shall only be credited with the marks obtained during the 'repeat' year. A Repeat student shall only repeat failed courses.

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9.5   **DISCONTINUE**

   9.5.1   A candidate who fails more than half of the modules for any year of their programme or obtains an overall aggregate mark of less than 35% (40% in the Faculty of Medicine) shall discontinue.

   9.5.2   'Discontinue' means that the student must discontinue the Programme in which he/she failed. Such a student will be free to apply for admission/transfer into a different programme and his/her application will be considered through the normal admission procedures.

9.6   **WITHDRAW**

   9.6.1   A candidate who is not allowed to proceed to the subsequent Part of the Programme, and

   9.6.1.1 has passed less than 25% of the modules in that Part of the Programme, or

   9.6.1.2 has failed the same Part of the Programme twice, or

   9.6.1.3 has failed two different Programmes, will be required to withdraw.

   9.6.2   'Withdraw' means that the student must withdraw from the University. Once 'withdrawn' the student may not apply for admission until after a period of two years has elapsed.

10.0   INDUSTRIAL ATTACHMENT

10.1   Programmes at the University shall normally include one academic year of supervised Industrial Attachment approved by the appropriate Departmental Board,   in   the penultimate year of the undergraduate course. Exception will be in the MBBS programme, where the period of this attachment shall be determined by the Faculty Board.

10.2   The implementation of Industrial Attachment programme shall be as provided by Faculty Regulations.

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10.3 Assessment of the Industrial Attachment programme will be carried out in accordance with the following regulations:

10.3.1 To obtain an overall pass, a student must pass both the Continuous Assessment and the Final Assessment components of the Industrial Attachment.

10.3.2 A student who fails the Continuous Assessment component will be required to repeat.

10.3.3 The Overall Assessment shall be as follows:-

50% Continuous Assessment and 50% Final Assessment.

10.3.4 The Continuous Assessment mark shall be determined by the Departmental Panel of Examiners from the marks awarded by the industrial and academic supervisors on the appropriate forms.

10.3.5 The Final Assessment mark shall be determined on the basis of the final report assessment (40%) and oral presentation assessment (10%).

10.3.6 Two copies of the final report in a form approved by the University must be submitted to the Department within two weeks of the end of the lecture period for the second semester of the academic year.

10.3.7 A student who fails to meet the required date for submission of the final report will normally be considered to have failed the Final Assessment.

10.3.8 A Student who fails the Final Assessment but has passed the Continuous Assessment component may be allowed to resubmit the industrial attachment report within two months, and be reassessed. Unless otherwise determined by Senate, the maximum mark allowable for such referred work shall be 50%.

10.3.9 The General Academic Regulations on repeat, discontinue and withdraw shall apply to industrial attachment.

10.4 A student who fails the Industrial Attachment Part shall not proceed to the Final Year of

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the Degree Programme.

11.0   INDUSTRIAL ATTACHMENT GENERAL GUIDELINES FOR STUDENTS

GUIDELINES FOR STUDENTS

11.1   The student is subject to university regulations and the company regulations during the industrial attachment.

11.2   The student is expected to:-

    11.2.1   conform to the company's regulations, working time and discipline;

    11.2.2   fulfil the supervisor's instructions concerning the training process and carrying out of the industrial research project;

    11.2.3   write a log book on a daily basis and submit a report after finishing the training in a given department (or training unit);

    11.2.4   take part only with educational purpose in mind according to the ultimate instructions of the supervisor;

    11.2.5   put his/her best efforts to acquire extensive knowledge and skills in order to achieve the required standard of training;

    11.2.6   keep good relations with all the staff of the company;

    11.2.7 promote the good name of NUST.

11.3   The choice of a company for the industrial attachment will not be based on any probable monetary benefits the students may stand to gain.

11.4   The student must always bear in mind that his/her conduct during the industrial attachment period will reflect not only on him/her but also on NUST and that it may also affect considerably the future Industrial attachment placements and the relationship between NUST and the company.

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12.0 GUIDELINES FOR THE INDUSTRY ON THE TREATMENT OF THE STUDENT DURING THE INDUSTRIAL ATTACHMENT

12.1 The student will be subject to the company's regulations and is expected to function like a full time employee of the company.

12.2 For the period of the industrial attachment the student will have an insurance and medical aid cover from the University.

12.3 The company is requested to provide the student every opportunity to function like a full-time employee and permit him/her to actively participate in all aspects of the business including management and administration except where confidentiality constraints may not permit his/her participation.

12.4 Wherever possible, the company is requested to assist the student by providing welfare measures such as providing help in finding suitable accommodation close to the company, access to canteen facilities, company transport facilities etc.

12.5 If the company wishes to pay the student an extra allowance, the arrangement is only between the two parties, that is the student and the company involved.

13.0 APPEALS AGAINST TERMINATION OF STUDIES

13.1 Any candidate who, having failed to satisfy the Examiners, is required to withdraw from the University or discontinue a programme, has a right to appeal.

13.2 A committee shall be established by the Senate to consider such an appeal.

13.3 Any candidate who wishes to lodge an appeal against withdrawal or discontinuation must do so in writing to the Registrar within 21 days after the publication of the Examination results.

13.4 On appeal, the candidate must state clearly the grounds of the appeal. Medical grounds must be substantiated in writing by a medical practitioner registered in terms

of the Health Professions Act. Any other evidence which the candidate wishes to submit in support of his/her case must also be lodged with the written appeal.

13.5   The Registrar will refer all timeous appeals to the Appeals Committee for consideration.

13.6   The Appeals Committee will consider, as legitimate grounds for appeal, new evidence of mitigating circumstances (except mere lack of diligence or other fault on the part of the student) which was not previously available to the Examiners. Extenuating circumstances of a force majeure' nature, which explain and are directly relevant to the student's academic performance and which he/she could not reasonably have been expected to have foreseen or avoided, will be considered.

13.7   The Committee shall be empowered to hear an appellant orally and to seek all such information or evidence as it may consider pertinent.

13.8   No right to automatic oral hearing is conferred upon appeals and the University will not reimburse any expenses incurred by an appellant in making a personal appearance before the Committee.

13.9   The Committee shall make recommendations in each case, as it deems appropriate. Its recommendations shall be submitted to the Senate for approval, or to the Academic Board or the Vice-Chancellor on behalf of the Senate for consideration.

14.0   AEGROTAT PROVISIONS

14.1   If a candidate, having completed a substantial component of a Part of his/her Programme, is prevented by serious illness or other sufficiently substantiated cause, from completing the prescribed requirements for that Part of the Programme, he/she may be deemed by the Senate to have satisfied the examiners for that Part upon the recommendation of the Board of Examiners concerned and upon such other conditions as the Senate may decide, provided that:-

        14.1.1   The candidate will not normally be exempted from presenting a thesis or dissertation where such is prescribed.
        14.1.2   The award of an Aegrotat Degree shall be without classification.

14.2   Where a student qualifies for an Aegrotat Degree, he/she may opt instead to write a

special examination in order that an overall grade may be determined and formally credited to the student. Application for such an option must be submitted in writing to the Registrar not later than four weeks before the scheduled examinations.

14.3   The Senate may require any candidate, irrespective of his/her Programme or Faculty, whose examination performance has been adversely affected by sufficiently substantiated circumstances of 'force majeure' nature to write a special examination at   an appropriate future date, normally not later than three months after the date of the last examination missed.

In such a case, unless otherwise stipulated by the Senate, the mark obtained in the special examination will be counted in the overall assessment for   purposes of degree classification.

14.4   A candidate who wishes to be considered for an Aegrotat Degree must apply in writing, together with written substantiation for his/her case, to the Registrar normally within ten days of the end of the University Examinations for the Programme concerned. Appeals which are submitted on medical grounds must be supported by a certificate from a medical practitioner registered in terms of the Health Professions Act.

14.5   A candidate who is awarded an Aegrotat Degree may not re-enter the examination for that same degree, but shall be eligible to apply to proceed to an appropriate higher degree.

15.0   PLAGIARISM

15.1   Definition
Plagiarism is the unacknowledged use of another person's material or ideas. As such, plagiarism is an academic offence in the sense that theft is in ordinary daily life.

15. 2   Recommendations on the severity of the penalty shall be determined by the appropriate Departmental Board or Board of Examiners. Cases of plagiarism shall be handled in the following manner:-

15.3   **Minor Cases of Plagiarism**

15.3.1   **FIRST OFFENCE** : In the case of plagiarism being discovered in a piece of work such as an essay or laboratory report or Dissertation the student shall

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get a Chairman's warning but shall be given an opportunity to re-do and re-submit an acceptable piece of work after one week and shall be awarded a maximum of 50%.

15.3.2 **SECOND OFFENCE**: The student shall get a Dean's warning and shall be awarded a mark of zero for the submitted work.

15.3.3 **THIRD OFFENCE**: The Senate shall take disciplinary measures such as suspension or expulsion of the student who will have been awarded a mark of zero.

15.4 **Major Cases of Plagiarism**

15.4.1 In the case of plagiarism being discovered in a project at the end of the year the candidate shall be denied the opportunity to resubmit the project, but will be required to submit a new project.

15.4.1.1 The new project shall be submitted not later than June of the following year.

15.4.1.2 The new project will be awarded a maximum mark of 50%

15.4.2 In the case of plagiarism being discovered in a project for the second time and after re-submission, a mark of zero shall be awarded and recorded, and the Senate shall take disciplinary action either to suspend or expel the student.

16.0 MISCONDUCT AT EXAMINATIONS

16.1 Subject to Ordinance 30, any candidate found using unauthorised material, or attempting to obtain information from other candidates or their papers, or otherwise guilty of misconduct during the examination shall be disqualified not only in that examination and subject, but in the whole examination, and further disciplinary action may be taken by the University.

17.0 PUBLICATION OF RESULTS

17.1 The Registrar shall be responsible for the publication of the results of University Examinations as approved by the Senate.

17.2 Results lists shall be published individually to the student's web portal, and where

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necessary, shall be posted on University Notice Boards.

18.0   ACADEMIC TRANSCRIPT

On leaving the University each student may obtain, on application to the Registrar, one copy of a formal transcript of his/her complete academic record at the University.

19.0   AWARD OF DEGREES

The award of Degrees of the University shall be subject to approval by the University Council.

Candidates completing the requirements for such award will be entitled to receive a formal certificate of the University, bearing the University seal and signed by the Vice-Chancellor and the Registrar, confirming the award.

20.0   NUST COURSE CODING SYSTEM

The NUST coding system is based on a format of Three Alphabetical Letters and Four Figures **i.e.**

X	X	X	0	0	0	0

Three Letters are explained as follows:

-        First letter stands for the Faculty.

-        Subsequent two letters stand for the department.

The Four Figures are explained as follows:

The First "digit" or figure from the last letter denotes the year of study i.e.

PART I   CODE 1

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PART II	CODE 2
PART III	CODE 3
PART IV	CODE 4
PART V	CODE 5

The Second "digit" or figure from the last letter denotes the semester, i.e.

0	-	(Zero) whole year course
1	-	First semester course
2	-	Second semester course

The last two "digits" or figures denote the course number

However, it must be noted that fixing semesters for subjects does not deny the department flexibility to offer these subjects at any other point of the programme as long as it accords the relevant sequence in the teaching

The last two positions (figures) are designated for the different subjects offered by the departments. Each subject number is at the discretion and choice of the department concerned.

The need for two positions for each subject arose as a concern for department that have more than nine subjects on offer although normally not more than nine subjects can be on offer per given semester.

DEFERMENT AND LEAVE OF STUDIES POLICY

PURPOSE

The formulation of the policy on deferment of studies is an acknowledgement that students enrolled at the National University of Science and Technology (NUST) may apply for a deferment of studies and take leave from studies.

The policy is developed with the objective of ensuring that students are able to apply for deferment or leave of studies. In addition this policy will facilitate efficient and effective management of deferment of studies by the University.

SCOPE

This policy shall allow the Deferment and Leave of Studies in all programmes offered by NUST. Students who have been formally offered a place to study at the University and have notregistered, have the option to defer the offer while students who have registered and havecommenced studies may apply to take Leave from studies at any time. Applications by students with pending disciplinary cases shall be considered after finalisation of their disciplinary cases. Applications for Deferment and Leave of studies shall be considered by the University according to their respective individual merits. Conditions listed on the offer Letter of Admission must be satisfied before an application for Deferment or Leave of Studies is considered.

1. This Policy shall allow Deferment and Leave of Studies from the National University of Science and Technology Undergraduate and Postgraduate degree programmes.

2. **Definitions**

    Deferment: Postponement of studies for a period of up to 12 months, normally covering the Academic Year, for a person who has been offered a place, or a person who is allowed to proceed to the next part of the programme and has not registered.

Leave of Studies:	A period of 6 to 12 months covering the normal teaching period when a registered student is excused from formal study. Leave applies to students that have commenced studies.
Offer:	When an applicant is informed in writing that he has been offered a place in a programme to study.
Programme:	A plan of study lasting over a period of time which leads to the award of a diploma or a degree of the University.

DEFERMENT AND LEAVE OF STUDIES

3. Deferment

Applicants who have received a written offer of a place or applicants who have been allowed to proceed to the next part of the programme and have not registered, **MAY** be granted deferment of studies on application, a written application in the prescribed form must be submitted before the end of the registration period.

The maximum period of deferment shall be one Academic Year (12 months). A period of the semester of six months may be granted where appropriate. Deferment shall not be granted once a student is registered. Granting of a deferment of studies shall be on condition that the applicant has paid part of the prescribed fees. Application for deferment during the First Semester where there are course prerequisites for the Second Semester shall **NOT** be granted and the applicant shall not register for the Second semester.

4. Leave of Studies

When a student has registered and commenced studies, he may apply for Leave of Studies for a period of between one and two semesters in an academic year. An application in the prescribed form for Leave of Studies shall be granted upon recommendation of the Department and the Faculty. In the case of Higher Degrees, the Faculty Higher Degrees Committee shall consider the application for leave of Studies and recommend to the Academic Board in accordance with the General Academic Regulations for Higher Degrees. Application for Leave of Studies during the First Semester where there are course prerequisites for the Second Semester shall **NOT** be granted and the applicant shall not register for the Second semester. Such applicants shall apply for Leave of studies for the whole academic year (Semester I and Semester II)

IMPORTANT NOTES

The following are the circumstances under which Deferment or Leave of Study shall be considered:

1. Medical reasons and special circumstances (such as family crisis, tuition fees and national duty) are normally the acceptable reasons for Deferment or Leave of Studies.

2. A student may indicate in which semester he would like to resume his studies; however, the actual resumed semester will be subject to the discretion of the University. Normally the maximum Deferment or Leave of Studies period shall be two semesters.

3. If a student has completed some coursework requirements before Deferment or Leave of Study is granted, the Department offering the degree programme has the discretion to decide whether he shall be required to resubmit these requirements upon resuming his studies.

4. No refund of fees shall be given to students whose applications are approved. Students whose deferment is made before the start of a semester or Block shall have their fees credited to their accounts.

5. In the event that there is an increase in programme fees during the deferment period, a student will not be required to pay the difference if their deferment is approved.

6. A student should continue with their studies until a formal approval has been received from the University.

7. If the programme, for which Deferment or Leave of Study is approved, is not on offer when one is due to resume studies, the University reserves the right to transfer the student to another degree programme subject to the student meeting of entry requirements for this other programme.

8. A student may not defer a course but instead should defer studies for a whole semester.

9. Where a Leave of Study is granted, the fees paid shall be credited on a pro-rata basis. In a case of a student who has attended more than 75% of the lectures, the student shall not be credited with fees paid for the semester which a Leave of studies has been granted.

10. In the event of a curriculum review during a student's deferment or leave of study period, the student shall be required to sign for the new approved curriculum when the student resumes studies.

Think in other terms

GENERAL REGULATIONS FOR POSTGRADUATE DIPLOMAS MASTERS DEGREES BY COURSEWORK,

MASTER OF PHILOSOPHY DEGREES

DOCTOR OF PHILOSOPHY DEGREES

HIGHER DOCTORATE DEGREES

1.0 PREAMBLE

1.1 The Senate shall be the final authority for the interpretation of these Regulations.

1.2 The Senate reserves the right to alter, amend, repeal, suspend or replace any of these Regulations.

1.3 The Senate has the power to exempt any student from any of the Regulations.

1.4 A student who has started a programme of study following one set of Regulations shall not be affected by Regulations subsequently adopted unless agreed to in writing by the student.

1.5 There shall be Academic Regulations for each Faculty which shall be subject to approval by the Senate and which shall include provision for admission to Programmes.

1.6 The General Academic Regulations shall take precedence over the Faculty Regulations.

1.7 In these Regulations the following terms shall be used as described:-

"Continuous Assessment"	-	Prescribed assignments to be completed within a given period and forming a part of a module.
"Module"	-	A component which is separately examinable within a subject.
"Part"	-	A defined portion of a Programme.

Think in other terms

"Programme"	-	A plan of study lasting over a period of time which leads to the award of a diploma or degree of the University.
"Project"	-	A defined practical assignment which is separately examinable.
"Subject"	-	A field of study offered by a Department.
"Credit"	-	Quantified means of expressing the volume of learning based on the workload students need in order to achieve the expected outcomes of a module.
"Credit Accumulation"	-	The process of collecting credits awarded for achieving the learning outcomes of a module component of a programme

A schedule of Programmes, Subjects and Modules and their codes shall be maintained by theRegistrar. These codes shall be alpha/numeric; alphabetical codes being used to identify Programmes and Subjects, with prefixing numerical module codes being used to indicate the level of study and individual examination components (units) within that module.

2.0 PROGRAMMES

2.1 **Postgraduate Diploma Programmes**
The University may offer Post Graduate Diploma Programmes in the following fields of study:

2.1.1 **Faculty of Applied Science**
Applied Biology
Applied Biochemistry
Applied Chemistry
Applied Mathematics
Applied Physics
Computer Science
Radiography
Sports Science and Coaching
Environmental Science and Health
Forest Resources and Wildlife Management

2.1.2 **Faculty of Commerce**
Accounting
Actuarial Science
Banking
Management
Marketing
Finance
Risk Management and Insurance

2.1.3 **Faculty of Engineering**
Chemical Engineering
Civil and Water Engineering
Electronic Engineering
Industrial and Manufacturing Engineering
Fibre and Polymer Engineering

2.1.4 **Faculty of the Built Environment**
Architecture
Construction Project Management
Landscape Architecture
Quantity Surveying
Urban Design

2.1.5 **Faculty of Communication and Information Science**
Journalism and Media Studies
Library and Information Science
Publishing Media Studies
Records and Archives Management

2.1.6 **Faculty of Science and Technology Education**
Art, Design and Technology Education
Science Mathematics and Technology Education
Technical and Engineering Education and Training

2.2 **MASTERS DEGREE PROGRAMMES BY COURSEWORK**

The Masters Degree Programmes by Coursework shall normally consist of prescribed lectures,

Think in other terms

practicals and assignments, a dissertation and written examinations.

The University may offer Masters Degree Programmes by Coursework in the following fields of study:-

2.2.1   **Faculty of Applied Sciences**
Master of Science in:
Applied Biology
Applied Biochemistry
Computer Science
Applied Mathematics
Operations Research and Statistics
Applied Physics
Radiography
Sports and Coaching
Environmental Science and Health
Forest Resources and Wildlife Management

2.2.2   **Faculty of Commerce**

Master of Business Administration
Development Studies
Disaster Management

Master of Science in:
Accounting
Actuarial Science
Banking
Finance
Management
Marketing
Risk Management and Insurance

2.2.3   **Faculty of Engineering**
Master of Engineering in:
Chemical Engineering
Civil and Water Engineering
Electronic Engineering

Think in other terms

Industrial and Manufacturing Engineering
Fibre and Polymer Engineering

2.2.4 **Faculty of the Built Environment**
Architecture
Construction
Landscape Architecture
Quantity Surveying
Urban Design

2.2.5 **Faculty of Communication and Information Science**
Journalism and Media Studies
Library and Information Science
Publishing Media Studies
Records and Archives Management

2.2.6 **Faculty of Medicine**
Medicine
Midwifery

2.2.7 **Faculty of Science and Technology Education**
Accounting and Business Studies
Art
Biology
Chemistry
Civil and Construction Engineering
Clothing Textile
Computer Science
Design and Technology
Electrical and Electronic Engineering
Mechanical and Industrial Engineering
Mathematics
Physics
Technical Graphics
Wood Science

Think in other terms

2.3 MASTER OF PHILOSOPHY DEGREE PROGRAMMES

The University may offer Master of Philosophy Degree Programmes in the following fields of study:-

2.3.1 Faculty of Applied Science
Applied Biology
Applied Biochemistry
Applied Chemistry
Applied Mathematics
Applied Physics
Computer Science
Operations Research and Statistics
Operations Research
Statistics
Radiography
Sports Science and Coaching
Environmental Science and Health
Forest Resources and Wildlife Management

2.3.2 Faculty of Commerce
Accounting
Actuarial Science
Banking
Finance
Management
Marketing
Risk Management

2.3.3 Faculty of Engineering
Chemical Engineering
Civil and Water Engineering
Electronic Engineering
Industrial and Manufacturing Engineering
Fibre and Polymer Engineering

2.3.4 Faculty of the Built Environment
Architecture
Construction Project Management

Think in other terms

Landscape Architecture
Quantity Surveying
Urban Design

2.3.5 **Faculty of Communication and Information Science**
Journalism and Media Studies
Library and information Science
Publishing Media Studies
Records and Archives Management

2.3.6 **Faculty of Medicine**
Medicine

2.3.7 **Faculty of Science and Technology Education**
Accounting and Business Studies
Art
Biology
Chemistry
Civil and Construction Engineering
Clothing Textile
Computer Science
Design and Technology
Electrical and Electronic Engineering
Mechanical and Industrial Engineering
Mathematics
Physics
Technical Graphics
Wood Science

2.4 **DOCTOR OF PHILOSOPHY DEGREE PROGRAMMES**
The University may offer Doctor of Philosophy Degree Programmes in the following fields study:-

2.4.1 **Faculty of Applied Sciences**
Applied Biology
Applied Biology and Biochemistry
Applied Mathematics
Applied Physics
Computer Science

Think in other terms

Radiography
Operations Research and Statistic
Operations Research
Statistics
Sports Science and Coaching
Environmental Science and Health
Forest Resources and Wildlife Management

2.4.2 **Faculty of Commerce**
Accounting
Actuarial Science
Banking
Finance
Management
Marketing
Risk Management

2.4.3 **Faculty of Engineering**
Chemical Engineering
Civil and Water Engineering
Electronic Engineering
Industrial and Manufacturing Engineering
Textile Technology

2.4.4 **Faculty of the Built Environment**
Architecture
Construction Project Management
Landscape Architecture
Quantity Surveying
Urban Design

2.4.5 **Faculty of Communication and Information Science**
Journalism and Media Studies
Library and information Science
Publishing Media Studies
Records and Archives Management

Think in other terms

2.5   **HIGHER DOCTORATE DEGREE PROGRAMMES**
The University may offer Doctor of Science Degree in the following fields of study:-

2.5.1   **Faculty of Applied Sciences**
Applied Biology
Applied Biochemistry
Applied Chemistry
Applied Mathematics
Applied Physics
Computer Science
Operations Research and Statistics
Operations Research
Statistics
Radiography
Sports Science and Coaching
Environmental Science and Health
Forest Resources and Wildlife Management

2.5.2   **Faculty of Commerce**
Accounting
Actuarial Science
Banking
Finance
Management
Marketing
Risk Management

2.5.3   **Faculty of Engineering**
Chemical Engineering
Civil and Water Engineering
Electronic Engineering
Industrial and Manufacturing Engineering
Textile Technology

2.5.4   **Faculty of the Built Environment**
Architecture
Construction Project Management
Landscape Architecture

Think in other terms

Quantity Surveying
Urban Design

2.5.5 **Faculty of Communication and Information Science**
Journalism and Media Studies
Library and information Science
Publishing Media Studies
Records and Archives Management

2.5.6 Other Higher Doctorates include the Doctor of Laws and Doctor of Literature (D.Litt.) which may be offered in the Faculties of Humanities and Commerce.

2.5.7 **Faculty of Medicine**
Medicine

2.5.8 **Faculty of Science and Technology Education**
Accounting and Business Studies
Art
Biology
Chemistry
Civil and Construction Engineering
Clothing Textile
Computer Science
Design and Technology
Electrical and Electronic Engineering
Mechanical and Industrial Engineering
Mathematics
Physics
Technical Graphics
Wood Science

3.0 ENTRY REGULATIONS

3.1 POSTGRADUATE DIPLOMAS

The normal minimum entry requirements shall be an appropriate First Degree or approved equivalent qualification.

Think in other terms

3.1.1   Other qualifications may be considered by the Senate on the recommendation of the Department and Faculty concerned.

Normally, for such qualifications the University shall require proof of relevant experience and may require applicants to pass a qualifying examination to decide on their acceptability for admission.

3.1.2   For admission to a particular programme of study and/or for subjects/courses within the programme there may be specific restrictions on the choice of subjects in the general requirements and/or additional requirements shall prescribe such additional requirements.

3.2   MASTERS DEGREES BY COURSE WORK

The normal entrance requirement shall be an appropriate Honours Degree or approved equivalent qualification.

3.2.1   Other qualifications may be considered by the Senate on the recommendation of the Department and Faculty concerned.

Normally, for such qualifications the University shall require proof of relevant experience and may require applicants to pass a qualifying examination to decide on their acceptability for admission.

3.2.2   For admission to a particular programme of study and/or for subjects/courses within the programme there may be specific restrictions on the choice of subjects in the general requirements and/or additional requirements shall prescribe such additional requirements.

3.3   MASTER OF PHILOSOPHY DEGREES

3.3.1   The normal entrance requirements shall be an appropriate Honours Degree in the first or Upper Second Division.

3.3.2   An appropriate Honors Degree in the Lower Second Division or Third Division may be considered provided performance in the intended field of study was in the First or Upper Second Division.

3.3.3   Other qualifications may be considered by the Senate on the recommendation of the Department and Faculty concerned. Normally, for such qualifications the

University shall require applicants to pass a qualifying examination to decide on their acceptability for admission.

3.4 TRANSFER FROM MASTER OF PHILOSOPHY TO DOCTOR OF PHILOSOPHY DEGREE

A student who is registered for the Master of Philosophy Degree may apply, after completing one year, if his/her Supervisor so recommends, to transfer his/her registration and to proceed to Doctor of Philosophy Degree programme. Retrospective registration may be permitted.

On recommendation of the Supervisor (s) the Departmental Board may recommend to Senate through the Faculty Higher Degrees Committee that a student, who is registered for the Master of Philosophy degree transfers his/her registration and proceeds to the Doctor of Philosophy programme.

3.5 TRANSFER FROM DOCTOR OF PHILOSOPHY TO MASTER OF PILOSOPHY

A student who is registered for the Doctor of Philosophy Degree but wishes to proceed to the Master of Philosophy Degree, may apply if his/her Supervisor so recommends, to transfer his/her registration and to proceed to the Master of Philosophy Degree Programme. The length of requisite further study, if any, shall be prescribed.

On recommendation of the Supervisor(s) the Departmental Board may recommend to Senate through the Faculty Higher Degrees Committee that a student who is registered for the Doctor of Philosophy degree transfers his/her registration and proceeds to the Master of Philosophy programme.

3.6 DOCTOR OF PHILOSOPHY
The normal entrance requirement shall be an appropriate Masters Degree.

3.7 HIGHER DOCTORATE DEGREES

Applicants shall be approved graduates in the tenth or subsequent year after the date of their graduation and must have published work of an exceptionally high standard such as would confer on them an authoritative and international standing in their subject and in their particular field of research.

Think in other terms

4.0   FACULTY REGULATIONS

There shall be Faculty Regulations which should be read in conjunction with the General ` Academic Regulations.

For admission to a Programme of study and/or for Subject/Course within the Programme there may be specific restrictions on the choice of subjects and additional requirements for entry. Faculty Regulations may prescribe additional requirements

5.0   SUBMISSION OF APPLICATIONS

5.1   **POST GRADUATE DIPLOMAS AND MASTERS DEGREES BY COURSEWORK**

    5.1.1   Applications shall be submitted on the official forms.
    5.1.2   Application forms shall be submitted by the closing dates as advertised.
    5.1.3   Late applications may be considered upon payment of the prescribed late application fee.

5.2   **MASTER OF PHILOSOPHY AND DOCTOR OF PHILOSOPHY DEGREES**

    5.2.1   Applications shall be submitted on the official forms.
    5.2.2   There shall be no deadlines for the submission of applications.
    5.2.3   Acceptances and rejections shall be determined by the Senate on the recommendations by the Departmental Board through the appropriate Faculty Higher Degrees Committee.

5.3   **HIGHER DOCTORATE DEGREES**

    5.3.1   Applications shall be made on the official forms.
    5.3.2   An eligible candidate may make an application at any time and shall, at the same time, submit evidence of his qualifications; such evidence shall consist of published work, papers or books containing original contribution to the advancement of knowledge.
    5.3.3   Where a part of the work submitted is not in a candidate's sole name, the candidate shall produce satisfactory evidence of his/her part in the initiation, direction and conduct of the work.
    5.3.4   A candidate shall indicate what part, if any, of the work has been submitted for a Degree in this or any other university, by himself/herself or in the case of joint work, by any of his co-authors.

Think in other terms

5.3.5 The term 'published' in these Regulations shall mean printed in a periodical or as a pamphlet or book which has been available for criticism by relevant experts. The Examiners shall be given discretion to disregard any of the work submitted, if any, in their opinion, the work has not been so available for criticism either on account of its in access or because it has been submitted for the Degree at too short an interval after it publication.

5.3.6 The application and supporting documentation shall be submitted to the appropriate Departmental Board for preliminary consideration. The Departmental Board shall make recommendations to the Faculty Higher Degrees Committee.

5.3.7 If the Faculty Higher Degrees Committee considers that the application has sufficient merit, it shall recommend to Senate the appointment of both Internal and External Examiners and that the applicant be formally registered as a candidate for examination.

6.0 STRUCTURE AND DURATION OF PROGRAMMES

6.1 POSTGRADUATE DIPLOMAS

The minimum duration of the Postgraduate Diploma Programmes shall be:-

Full-time	-	1 year
Part-time	-	2 years

6.2 MASTERS DEGREES BY COURSEWORK

The minimum duration of the Masters Programme by Coursework shall be:-

Full-time/modular	-	1 year
Part-time	-	2 years

6.3 MASTER OF PHILOSOPHY DEGREE

The duration of the Master of Philosophy Programmes shall be:-

Think in other terms

Full-time	-	18 months
		3 years maximum
Part-time	-	3 years
		5 years maximum

6.4 DOCTOR OF PHILOSOPHY DEGREES

The duration of the Doctor of Philosophy Degree Programmes shall be:-

Full-time	-	3 years
		4 years maximum
Part-time	-	5 years
		6 years maximum

6.5 Maximum Time Allowable for Postgraduate Degree Programmes by Coursework.

The maximum limit of study allowable to complete a Postgraduate Degree by Coursework shall be as follows:

For a Full-time mode of study, the maximum limit of study allowable to complete shall be the normal duration period plus 1 year.

For a Part-time mode of study, the maximum limit of study allowable to complete shall be the normal duration period plus 1 year.

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6.6 Process of Requesting for an Extension of Programme Time Limit for Postgraduate Degree Programmes by Coursework

A student who reaches the maximum time limits allowed for a Programme shall submit an Application in writing for an Extension of the Programme Time Limit in the prescribed Form to the Department and payment of a fee determined by the University. The Department shall recommend its decision to the Faculty which in turn shall recommend to the Academic Board. The application shall be considered by the Academic Board on behalf of the Senate, which may approve or reject the application. The decision of the Academic Board shall be final.

A student who is differently abled may apply for a time limit extension for reasons directly related to their disability. Such an application shall be in the prescribed Form and must be

Think in other terms

accompanied by a supporting letter from a Medical Doctor. Such an application for an extension due to a disability shall be exempt from payment of an application fee.

An application to extend a time limit shall be submitted before the programme Time Limit expires.

6.7 **Process of requesting for an Extension of Programme Time Limit for Postgraduate Research Degree**.

6.7.1   If a student reaches his/her time limit and has not submitted his/her thesis, the student's registration status shall automatically lapse and may be withdrawn from the University. Only in very exceptional circumstances shall a student be granted a time limit extension after submitting an application.

6.7.2   An application for an extension using a prescribed Form, shall be considered on its merits by the Department and Faculty Higher Degrees Committee which shall recommend to the Senate through the Academic Board.

6.7.3   In his/her application, a student must clearly state the reason why he/she failed to submit the thesis on time and demonstrate how he/she shall use the requested extension period effectively in order to complete the writing of the thesis and meet the new deadline.

6.7.4   An application to extend a time limit shall be submitted three months before the programme Time Limit expires and shall be considered by the Academic Board on behalf of the Senate. The decision of the Academic Board shall be final.

If a student's application is approved and the student fails to submit the thesis at the end of the final extension period, the student shall be withdrawn. Any data or material gathered during the period of study prior to the withdrawal shall remain the property of the University.

7.0   **PROGRAMME AND STUDY OF MASTER OF PHILOSOPHY AND DOCTOR OF PHILOSOPHY DEGREES**

7.1   Applications for the Master of Philosophy and Doctor of Philosophy studies shall not follow the normal University calendar. Faculty Higher Degrees Committees can receive and process these anytime of the Year.

Think in other terms

7.2   Registration/Enrolment for the Master of Philosophy and Doctor of Philosophy Degrees shall follow after acceptance of submitted proposals and suggested supervisors by the Academic Board.

7.3   Each student shall be required to pursue a prescribed programme of study under the direction of a supervisor, who shall be a member of the academic staff of the University in the appropriate discipline. Normally, one or more Associate Supervisors will also be appointed.

7.4   Each student shall be required to pursue a prescribed programme of study under the direction of a Supervisor who shall be a member of the academic staff of the University in the appropriate discipline. If the need arises, a Co-supervisor and an Associate Supervisor(s) may also be appointed.

7.5   The appointment of all Supervisors shall be made by the Senate on the recommendations of the appropriate Faculty Higher Degrees Committee.

7.6   The Supervisor shall report on each student's progress every six months to the Faculty Higher Degrees Committee through the appropriate Departmental Board.

7.7   A student shall maintain regular contact with the supervising Department and shall be required to attend for certain periods at the University as directed by their approved Supervisor (s).

7.8   Students shall maintain regular contact with the supervising Department and shall be required to attend for certain periods at the University as directed by their approved Supervisor (s). Replaces 7.3 as above

7.9   The student shall complete the relevant Progress Report Form and submit it after every six months to the Supervisor. The Supervisor shall report on each student's progress every six months to the Faculty Higher Degrees Committee through the appropriate Departmental Board.

7.10   The Faculty Higher Degrees Committee shall recommend and submit the student's progress report to the Academic Board for publication.

7.11   A student who fails to submit a progress report within a six-month period of study shall receive a written warning from the Chairperson of the Department.

7.12   No break in the normal continuity of study shall be permitted, except by permission of the Senate on the recommendation of the Faculty Higher Degrees Committee.

Think in other terms

7.13   A student who fails to submit a progress report within a twelve-month period of study shall be regarded as having had a break in the normal continuity of study and may be deregistered from the programme.

7.14   A full-time student may be engaged in limited teaching at the University.

7.15   A student who is employed outside the University, or a staff member employed in the University, other than on the research programme for which he/she proposes to be registered, may normally be accepted for registration only on a part-time basis.

7.16   If a student does not begin his/her studies for the Master of Philosophy or Doctor of Philosophy Degree within one calendar year from the date of approval, his/her registration shall lapse, and he/she will be required to re-apply to the University if   he/she still desires to proceed.

7.17   A student may be required, as part of their Programme, to complete elements of course work to enhance their research studies, provided that such course work shall amount to not more than 25% of the minimum period allowed for the full programme.

The prescription of any coursework element shall require the approval of the Senate on the recommendation of the Departmental Board through the Higher Degrees Committee concerned. Where such course work is prescribed, the Department concerned shall ensure that the student is informed in writing of the precise requirements for satisfactory completion of the course work for reporting in due course to the Board of Examiners.

7.18   **SUBMISSION OF THESIS**
The Supervisor and the Chairman of the Faculty of Higher Degrees Committee shall satisfy themselves that the thesis is in a form suitable for submission for examination and that, where items of course work have been set, the candidate has satisfactorily completed these items.

The Chairman of the Department and the Chairman of the Faculty Higher Degrees Committee shall request that the thesis be subjected to professional proofreading and editing before submission.

Plagiarism is an academic offence in the sense that theft is in ordinary daily life hence every submission shall be checked for originality. An originality report showing the similarity index shall be submitted together with the thesis.

Think in other terms

A thesis whose originality report shows an unacceptably high level of similarity index shall not be accepted for examination by the Faculty Higher Degrees Committee.

A soft copy, together with four hard copies of the thesis, in loose-bound form shall be submitted by the Department to the Deputy Registrar Academic Affairs for examination. After examination, the Deputy Registrar Academic Affairs shall submit one corrected loose-bound copy of the thesis to the Academic Board.

After approval by the Academic Board, a soft copy together with five hard copies of the final thesis, in hard-bound form shall be submitted by the Department to the Deputy Registrar Academic Affairs.

8.0 MARKING SCHEME AND CLASSIFICATION

8.1 POSTGRADUATE DIPLOMAS AND MASTERS DEGREES BY COURSEWORK

Postgraduate diplomas and Masters Degrees by Coursework shall be awarded in the categories; distinction, merit, credit and pass.

The following Grading Scheme shall be used for the Modules and Programmes:

80% and above	-	DISTINCTION	(D)
70% - 79%	-	MERIT	(M)
60% - 69%	-	CREDIT	(C)
50% - 59%	-	PASS	(P)
Below 50%	-	FAIL	(F)

8.2 MASTER OF PHILOSOPHY DEGREES

The Master of Philosophy Degrees shall not be classified.

8.3 DOCTOR OF PHILOSOPHY DEGREES

The Doctor of Philosophy Degrees shall not be classified.

8.4 HIGHER DOCTORATE DEGREES

The Higher Doctorate Degrees shall not be classified.

Think in other terms

9.0   ASSESSMENT OF CANDIDATES

9.1   MODE OF ASSESSMENT

9.1.1   Normally, evaluation shall be based on continuous assessment, dissertation and formal examinations. The percentage allocation of each component of the assessment shall be set by the Senate on the recommendation of the appropriate Faculty Board;

9.1.2   Satisfactory completion of modules may require submission of written work, attendance at lectures, seminars, tutorials, industrial attachment and other activities as stated in the Faculty Regulations;

9.1.3   Each Department shall determine which items of the module shall be included in the continuous assessment and shall define the relative weighting assigned to each item. Each Department shall inform the students of these details at the beginning of the module and shall maintain written records of each student's performance in these elements of continuous assessment. Items incorporated in the continuous assessment include assignments, tests, essays and projects;

9.1.4   External Examiners shall be appointed to moderate all formal examinations;

9.1.5   All matters relating to the conduct of formal examinations shall be the responsibility of the Registrar;

9.1.6   To be admitted to any formal examination, a candidate shall:-

a) be registered as a student of the University in accordance with the General Academic Regulations;
b) have satisfactorily completed approved modules of study at the University.

9.1.7   Exclusion from a formal examination shall require the authority of the Senate.

9.1.8   The Examiners may require any candidate to attend an oral examination and/or write a special examination.

Think in other terms

9.2 **CREDIT ACCUMULATION**

9.2.1 The following Credit Accumulation regulations shall apply to all Modules and Programmes:

9.2.2 A Credit shall be equivalent to 10 notional study hours of learning.

9.2.3 All programmes offered by the University shall use an academic credit allocation system approved from time to time by the Senate. The University shall adopt the following SADC qualification framework as prescribed by the Zimbabwe Council for Higher Education for all programmes offered:

SADC-QF LEVEL	QUALIFICATION
10	Doctorate
9	Masters

9.2.4 A student who completes a module shall be awarded the credits approved for the module at the assigned level.

9.2.5 **Award of Credit**

A student who passes a module shall be awarded the approved credit for that module**.**

9.2.6 **Credit Accumulation and Degree Qualification**

A student shall progressively accumulate credits for modules that they successfully complete. A Student shall be required to accumulate sufficient credits to progress through the programme and shall be required to gain the total credits required for the award of the degree qualification as prescribed in the Faculty Regulations.

9.2.7 **Accreditation of Prior Learning**

A student who is exempted from the first year of study shall be awarded credit determined by the Faculty recognising prior learning that matches the learning outcomes of the programme gained from an accredited institution and relevant work experience.

9.3   **MASTER   OF PHILOSOPHY AND DOCTOR OF PHILOSOPHY DEGREES**

9.3.1   **THESIS**

9.3.1.1 **TITLE OF THESIS**

A candidate shall submit to the Faculty Higher Degrees Committee, the title of his/ her thesis for approval by Senate at least six months before final submission of the thesis. After the title has been approved, it may not be changed except with the permission of the Senate.

9.3.2   **SUBMISSION OF THESIS**

The Supervisor and the Chairman of the Faculty Higher Degrees Committee shall satisfy themselves that the thesis is in a form suitable for submission for examination and that, where items of coursework have been set, the candidate has satisfactorily completed these items. Four copies of the thesis, in loose-bound form shall be submitted to the Deputy Registrar (Academic Affairs).

9.3.3   After completing the study, a student shall submit a thesis which should comply with the following conditions:

9.3.3.1 The greater portion of the work submitted shall have to be done by the student after registration for the degree.

9.3.3.2 The presentation of the thesis shall be of an acceptably high standard.

9.3.3.3 A Master of Philosophy thesis shall provide evidence that the candidate has mastered relevant research techniques, has shown scholarship, has developed a capacity for criticism of his/her own and other work, and has widened his/her knowledge and understanding of literature of his field of study.

9.3.3.4 A Doctor of Philosophy thesis shall constitute an original and substantial contribution to the advancement of knowledge in the Subject chosen, and show evidence of a   greater depth of scholarship than that required for the Master of Philosophy degree described above.

Think in other terms

9.3.3.5 The length of the thesis shall normally be established in consultation with the Supervisor and the Faculty Higher Degrees Committee.

9.3.3.6 The thesis shall be written in English.

9.3.3.7 The literary form of the thesis shall be satisfactory.

9.3.3.8 The thesis shall consist of the candidate's own account of his/her research.

9.3.3.9 The thesis may describe work done in conjunction with the candidate's Supervisor(s), and include material obtained or produced with technical or other assistance, provided that the candidate shall state clearly his/her personal share in the investigation and specifically acknowledge all such assistance. This statement shall be certified by his/her Supervisor and bound as part of the preface of the thesis. Work done jointly with persons other than the candidate's Supervisor(s) may be accepted as a thesis, or part of a thesis, in certain circumstances, provided the candidate's share is clearly certified.

9.3.3.10 Work already published, including that published in Joint names, may be included only if it forms an integral part of the thesis. A series of publications alone shall not be acceptable as a thesis.

9.3.3.11 An abstract of the thesis, in single spacing form, not exceeding one page shall be incorporated as part of the preface to the thesis.

9.3.4 A candidate shall not be permitted to submit as his/her thesis, a thesis which had been submitted to another university. However, a candidate shall not be precluded from incorporating work which he/she shall indicate on his/her thesis for entry to the examination and also in his/her thesis, any work which has been so incorporated.

9.3.5 The format of the thesis submitted for examination shall be as follows: Typed, or printed, double-spacing form or reproduced there from, (except for the abstract which shall be in single-spacing form) in the following format:-

9.3.5.1 Size of paper: International A4: (210 mm x 297 mm). No restriction shall be placed on the drawing of maps.

9.3.5.2 There shall be a margin of 40 mm on the left-hand side of the page, to allow for binding, a margin of 10 mm on the right-hand side and a margin of 20 mm at the top and at the bottom of the page.

9.3.6 A candidate may submit as subsidiary matter in support of his/her candidature, any publications or contributions to the advancement of his/her subject which he/she may have published independently or jointly. In the event of a candidate submitting such subsidiary matter, he/she shall be required to state fully his/her own share in any joint work. Where there is a substantial computing content in the thesis, a machine readable copy of the source programme shall be submitted together with the copies of the thesis.

9.3.7 After the completion of the examination process, a candidate shall submit four copies of the successful thesis which shall be bound in accordance with University Regulations.

10.0 DETERMINATION OF CANDIDATES' RESULTS
10.1 POSTGRADUATE DIPLOMA AND MASTERS DEGREE BY COURSEWORK

10.1.1 Results shall be determined by the Senate on recommendation of Faculty Boards of Examiners.

10.1.2 Departmental Panels of Examiners shall comprise all full-time lecturing staff in that Department, the External Examiner(s) and, where appropriate, as determined by the Departmental Panel, Part-time Lecturers for the course/subject concerned.

10.1.3 Faculty Boards of Examiners shall consist of the Dean and Deputy Dean of the Faculty, the Chairman of each Department, the External Examiner for the Department and normally one other academic member of the Department, nominated by the Departmental Panel from each Department involved in the subjects for that examination.

Think in other terms

The Departmental Panel of Examiners shall:

10.1.3.1 agree, for each candidate, marks in terms of percentages, for continuous assessment, for the dissertation where applicable, for the formal examination and overall course work in terms of the Faculty Regulations for courses.

10.1.3.2 recommend to the Faculty Board of Examiners whether a candidate should pass or fail the relevant module(s) and subject(s) taken, and recommend the category of passing.

10.1.3.3 where subject/module prizes are available for award, make recommendations for the award these prizes.

10.1.4 The Faculty Board of Examiners shall:

10.1.4.1 consider the recommendations of the Panels of Examiners and recommend to the Senate an overall result for each candidate and any other conditions as it may deem appropriate;

10.1.4.2 make recommendations to the Senate with regard to the award of any prizes which may be available for candidates within the programme.

10.2 MASTER OF PHILOSOPHY AND DOCTOR OF PHILOSOPHY DEGREES

10.2.1 EXAMINATION AND DETERMINATION OF CANDIDATES' RESULTS

Results shall be determined by the Senate on the recommendation of the Faculty Board of Examiners which shall consists of the following:

10.2.1.1 the Dean or Deputy Dean of the Faculty (Chairman), the Chairman of the Faculty Higher Degrees Committee, the Chairman of Department concerned, Supervisor(s), one Internal Examiner who is an expert in the field.

THE EXTERNAL EXAMINER: The External Examiner need not be present at the Board of Examiners Meeting for the Master of Philosophy Degrees.

Think in other terms

10.2.1.2 candidates shall be assessed on the merits of their thesis but where elements of course work have been prescribed, they shall also satisfy the examiners that this has been satisfactorily completed.

10.2.1.3 when a candidate is ready to submit his/her dissertation in detail for examination, the Departmental Board shall recommend to the Senate through the Faculty Higher Degrees Committee, the appointment of Examiners, one being an External Examiner and two being members of staff of the University who are specialists in the field of study concerned. These Examiners shall assess the dissertation in detail and shall each submit a written report with comments and recommendations to the Dean of the Faculty concerned. A member of staff who has been appointed as Supervisor for the dissertation may not be appointed as one of these Examiners.

10.2.1.4 on receipt of reports of the Examiners, the Dean of the Faculty concerned shall refer these reports to the Board of Examiners.

10.2.1.5 the Board of Examiners shall normally examine the candidate orally. The Board of Examiners may require further examination through written papers, or practical examination, or both, on the subject of the thesis and, if they see fit, subjects relevant thereto.

10.2.1.6 after the Board of Examiners has considered the written reports of the Examiners it may recommend to the Senate that the candidate be passed or failed.

10.2.1.7 If the thesis is adequate, but the candidate fails to satisfy the Examiners at the oral or other examination, the Board of Examiners may recommend to the Senate that the candidate be permitted to represent the same thesis and submit to further oral or other examination within a period of one calendar year.

10.2.1.8 the candidate may be required to make editorial amendments to his/her thesis to the satisfaction of the Chairman of the Board of Examiners, after consultation with the Chairman of the Department concerned before lodgement of the final bound copies of the dissertation.

10.2.1.9 if the thesis, though inadequate, shall seem of sufficient merit to justify such action, the Board of Examiners may recommend to the Senate that

the candidate be permitted to represent his/her thesis in a revised form within one calendar year from the decision of the Senate with regard thereto. The Board of Examiners shall not, however, make such recommendation without submitting the candidate to any oral examination or, exceptionally, if an oral examination is impracticable, a written examination.

10.2.1.10 in the event of a disagreement between Examiners on the merits of the work, the Board of Examiners may refer the thesis to a second External Examiner.

10.3 **HIGHER DOCTORATE DEGREES**

10.3.1 The Board of Examiners shall consist of the following persons:

The Dean or Deputy dean of the Faculty (Chairman), All Professors in the Faculty, The Chairman of the Faculty Higher Degrees Committee, The Chairman of the Department concerned, The Internal Examiners and, where appropriate, one or more suitably qualified persons who shall, normally be members of the academic staff. Such persons may be appointed to the Board at the discretion of the Dean after consultation with the Chairman of the Department concerned.

10.3.2 Assessment of the work submitted by the candidate shall be made initially by two or more External Examiners and by two or more Internal examiners appointed by the Senate on the recommendation of the appropriate Faculty Higher Degrees Committee.

10.3.3 Each External Examiner shall be required to submit a formal written report on the submission, to the Deputy Registrar (Academic Affairs) with his/her recommendations.

10.3.4 On receipt of the report from the External Examiner(s), the Deputy Registrar (Academic Affairs) shall refer it to the Chairman of the Department concerned, through the Dean of the Faculty, for consideration by the Internal Examiners.

10.3.5 Having read the submission and the report(s) from the External Examiners, the Internal Examiners shall report formally and make

recommendations to a Board of Examiners which shall, in turn, report and recommend to the Senate.

11.0   FAILURE TO SATISFY EXAMINERS

11.1   A candidate who fails to satisfy the examiners in terms of the Faculty Regulations may be required by the Senate to 'repeat' or to 'withdraw'.

11.2   'Repeat' means that the student may apply for readmission into the same Programme and his/her application shall be considered through the normal procedures.This measure would normally be taken in respect of a student who has failed in a Programme. Such a candidate shall be re-admitted only if a place is available after normal entry candidates have registered. If a student is repeating a module(s), he/she shall only be credited with the marks obtained during the 'repeat' examination. Nevertheless where this is provided in the Faculty Regulations a 'repeat' student may be exempted from re-attendance and re-examination in any module(s) in which he/she previously passed, or may take another approved course or other approved modules instead of the module(s) previously passed. Exemptions shall be granted only in those cases where a candidate has scored credit or better pass.

11.3   'Withdraw' means that the student shall withdraw from the University. This measure would normally be taken in respect of a student who has either failed in two programmes failed overall twice in one Part of one Programme. Once 'withdrawn' the student shall not apply again for admission until after a period of two years has elapsed.

11.4   Where a dissertation or a project is prescribed in any programme, candidates shall be informed in advance of the deadline for submission of such dissertation or project. Unless prior permission for an extension of this deadline has been granted by the Academic Board, any candidate who fails to meet this submission deadline shall normally fail and would be required to repeat the dissertation or project. A candidate who fails the dissertation or project but obtains a mark of 40% - 49% shall on the recommendation of the Examiners, be permitted to submit the dissertation or project at a later date, normally within three months of the publication of the results. Unless otherwise determined by the Senate, the maximum mark allowable for such referred work shall be 50%.

Think in other terms

12.0   APPEALS AGAINST TERMINATION OF STUDIES

12.1   Any candidate who, having failed to satisfy the Examiners, is required to withdraw from the University or discontinue a programme, has a right to appeal.

12.2   A committee shall be established by the Senate to consider such an appeal.

12.3   Any candidate who wishes to lodge an appeal against withdrawal or discontinuation must do so in writing to the Registrar within 21 days after the publication of the Examination results.

12.4   On appeal, the candidate must state clearly the grounds of the appeal. Medical grounds must be substantiated in writing by a medical practitioner registered in terms of the Health Professions Act. Any other evidence which the candidate wishes to submit in support of his/her case must also be lodged with the written appeal.

12.5   The Registrar will refer all timeous appeals to the Appeals Committee for consideration.

12.6   The Appeals Committee will consider, as legitimate grounds for appeal, new evidence of mitigating circumstances (except mere lack of diligence or other fault on the part of the student) which was not previously available to the Examiners. Extenuating circumstances of a force majeure' nature, which explain and are directly relevant to the student's academic performance and which he/she could not reasonably have been expected to have foreseen or avoided, will be considered.

12.7   The Committee shall be empowered to hear an appellant orally and to seek all such information or evidence as it may consider pertinent.

12.8   No right to automatic oral hearing is conferred upon appeals and the University will not reimburse any expenses incurred by an appellant in making a personal appearance before the Committee.

12.9   The Committee shall make recommendations in each case, as it deems appropriate. Its recommendations shall be submitted to the Senate for approval, or to the Academic Board or the Vice-Chancellor on behalf of the Senate for consideration.

Think in other terms

13.0 AEGROTAT PROVISIONS

13.1. If a candidate, having completed a substantial component of a Part of his/her Programme, is prevented by serious illness or other sufficiently substantiated cause, from completing the prescribed requirements for that Part of the Programme, he/she may be deemed by the Senate to have satisfied the examiners for that Part upon the recommendation of the Board of Examiners concerned and upon such other conditions as the Senate may decide, provided that:-

13.1.1 The candidate will not normally be exempted from presenting a thesis or dissertation where such is prescribed.

13.1.2 The award of an Aegrotat Degree shall be without classification.

13.2 Where a student qualifies for an Aegrotat Degree, he/she may opt instead to write a special examination in order that an overall grade may be determined and formally credited to the student. Application for such an option must be submitted in writing to the Registrar not later than four weeks before the scheduled examinations.

13.3 The Senate may require any candidate, irrespective of his/her Programme or Faculty, Whose examination performance has been adversely affected by sufficiently substantiated circumstances of 'force majeure' nature to write a special examination at an appropriate future date, normally not later than three months after the date of the last examination missed.

In such a case, unless otherwise stipulated by the Senate, the mark obtained in the special examination will be counted in the overall assessment for purposes of degree classification.

13.4 A candidate who wishes to be considered for an Aegrotat Degree must apply in writing, together with written substantiation for his/her case, to the Registrar normally within ten days of the end of the University Examinations for the Programme concerned. Appeals which are submitted on medical grounds must be supported by a certificate from a medical practitioner registered in terms of the Health Professions Act.

Think in other terms

13.5   A candidate who is awarded an Aegrotat Degree may not re-enter the examination for that same degree, but shall be eligible to apply to proceed to an appropriate higher degree.

14.0   PLAGIARISM

14.1   **Definition**

Plagiarism is the unacknowledged use of another person's material or ideas. As such, plagiarism is an academic offence in the sense that theft is in ordinary daily life.

14. 2   Recommendations on the severity of the penalty shall be determined by the appropriate Departmental Board or Board of Examiners. Cases of plagiarism shall be handled in the following manner:-

14.3   **Minor Cases of Plagiarism**

14.3.1   **FIRST OFFENCE**: In the case of plagiarism being discovered in a piece of work such as an essay or laboratory report or Dissertation the student shall get a Chairman's warning but shall be given an opportunity to re-do and re-submit an acceptable piece of work after one week and shall be awarded a maximum of 50%.

14.3.2   **SECOND OFFENCE**: The student shall get a Dean's warning and shall be awarded a mark of zero for the submitted work.

14.3.3   **THIRD OFFENCE**: The Senate shall take disciplinary measures such as suspension or expulsion of the student who will have been awarded a mark of zero.

14.4   **Major Cases of Plagiarism**

14.4.1   In the case of plagiarism being discovered in a project at the end of the year the candidate shall be denied the opportunity to resubmit the project, but will be required to submit a new project.

14.4.1.1 The new project shall be submitted not later than June of the following year.

Think in other terms

14.4.1.2 The new project will be awarded a maximum mark of 50%

14.4.2   In the case of plagiarism being discovered in a project for the second time and after resubmission, a mark of zero shall be awarded and recorded, and the Senate shall take disciplinary action either to suspend or expel the student.

15.0   MISCONDUCT AT EXAMINATIONS

15.1   Subject to Ordinance 30, any candidate found using unauthorised material, or attempting to obtain information from other candidates or their papers, or otherwise guilty of misconduct during the examination shall be disqualified not only in that examination and subject, but in the whole examination, and further disciplinary action may be taken by the University.

16.0   PUBLICATION OF RESULTS

16.1   The Registrar shall be responsible for the publication of the results of University Examinations as approved by the Senate.

16.2   Results lists shall be published individually to the student's web portal, and where necessary, shall be posted on University Notice Boards.

17.0   ACADEMIC TRANSCRIPT

On leaving the University each student may obtain, on application to the Registrar, one copy of a formal transcript of his/her complete academic record at the University.

18.0   AWARD OF DEGREES

The award of Degrees of the University shall be subject to approval by the University Council.
Candidates completing the requirements for such award will be entitled to receive a formal certificate of the University, bearing the University seal and signed by the Vice-Chancellor and the Registrar, confirming the award.

Think in other terms

DEFERMENT AND LEAVE OF STUDIES POLICY

PURPOSE

The formulation of the policy on deferment of studies is an acknowledgement that students enrolled at the National University of Science and Technology (NUST) may apply for a deferment of studies and take leave from studies.The policy is developed with the objective of ensuring that students are able to apply for deferment or leave of studies. In addition this policy will facilitate efficient and effective management of deferment of studies by the University.

SCOPE

This policy shall allow the Deferment and Leave of Studies in all programmes offered by NUST. Students who have been formally offered a place to study at the University and have notregistered, have the option to defer the offer while students who have registered and havecommenced studies may apply to take Leave from studies at any time.

Applications by students with pending disciplinary cases shall be considered after finalisation of their disciplinary cases. Applications for Deferment and Leave of studies shall be consideredby the University according to their respective individual merits. Conditions listed on the offerLetter of Admission must be satisfied before an application for Deferment or Leave of Studiesis considered.

1. This Policy shall allow Deferment and Leave of Studies from the National University of Science and Technology Undergraduate and Postgraduate degree programmes.

2. **Definitions**

    Deferment: Postponement of studies for a period of up to 12 months, normally covering the Academic Year, for a person who has been offered a place, or a person who is allowed to proceed to the next part of the programme and has not registered.

    Leave of Studies: A period of 6 to 12 months covering the normal teaching period when a registered student is excused from formal study. Leave applies to students that have commenced studies.

    Offer: When an applicant is informed in writing that he has been offered a place in a programme to study.

    Programme: A plan of study lasting over a period of time which leads to the award of a diploma or a degree of the University.

Think in other terms

LIBRARY

1.0 INTRODUCTION
The Library is the nerve centre of academic activity, working to enrich the total study experience by utilising new and emerging technologies in the provision of information services. It creates learning spaces both physical and virtual using state of the art tools and methods to stimulate learning and respond to student needs.

2.0 HISTORICAL BACKGROUND
The NUST Library was established in 1992 with a small collection of 2000 books and two members of Staff. It has since grown to over 55 000 books, more than 54 electronic databases, 50 000 plus e-books and 50 members of staff. The Library computerised its systems by installing INNOPAC Millennium, an Integrated Library Management System in 2003 through the assistance from SIDA/SAREC which availed a grant to NUST.

3.0 PHYSICAL ADDRESS
The Main Library is located at 114 Fort Street, in the city centre of Bulawayo until the construction of a new-state- of- The-art Library is completed.

3.1 Physical expansion
Resources are not the only expansion witnessed at the NUST Library. Apart from the main Library, there has since been established 3 more branch libraries:

> 3.1.1 The Graduate School of Business Library
> 3.1.2 FOBE Library (Faculty of the Built Environment)
> 3.1.3 Faculty of Medicine Library (located at Mpilo Hospital in Bulawayo)

3.2 The Library is an institutional member of:
- ZIMLA (Zimbabwe Library Association),
- One of the inaugural Members of ZULC (Zimbabwe University Libraries Consortium),
- IFLA (International Federation of Library Associations and Institutions)
- AFLIA (African Library and Information Associations and Institutions) and
- EIFL (Electronic Information for Libraries)

Think in other terms

4.0 WHO CAN USE THE LIBRARY?

4.1.1   All full-time and part-time registered NUST students, NUST members of staff, visiting academics and NUST Members of Council are eligible for membership of the Library.

4.1.2   Students and staff from other Universities, researchers from both the private and public sectors can apply for readership.

4.2. **Is the Library easily accessible?**

Yes it is. The Library opens up to 2100hrs during the semester. Online services like electronic resources are accessible 24 hours a day through remote access.

5.0 SERVICES

5.1 Reference Services

The Reference Section or Help Desk provides personal assistance to library users. It is essentially concerned with helping patrons locate relevant information pertinent to their needs, either within or outside the Library. Queries range from patron registration, accessing past examination papers, using the Library catalogue and assistance in using the library's electronic databases.

5.2 Ask the Librarian facility

This is an e-mail based reference service for those seeking assistance with library and research related questions. This service is accessible via the Library website.

5.3 Library Chat facility

This is a virtual reference service that opens doors for students, faculty members and researchers to connect with the library's reference team and receive real time library and research assistance through chat. This service is accessible via the Library website.

5.4 E-Resources

The Library provides access to over 54 scholarly databases that comprise of e-journals and more than 50 000 electronic books. These resources can be accessed from within campus as long as you are on the NUST network. They are also accessible 'remotely OR off campus' as long as you are a registered NUST student or member of staff with a University I.D.

Advantages of using these resources are that:

- They are convenient, can be accessed from anywhere
- They provide both current and retrospective information in one click
- They allow multiple access to a single resource
- They are quicker to search or browse AND
- They come in mixed media, e.g images, video, audio and so on.

Think in other terms

The Library also provides access to other numerous e-resources like thesis and dissertations, past examination papers, subject guides and the Institutional Repository access is 24/7 round the clock.

5.5 Faculty Liaison
The Library has a team that works in partnership with academic units. Their role is to:

      5.5.1.   Provide information services
      5.5.2.   Keep faculties up to date with library developments and activities
      5.5.3.   Engage in collection development
      5.5.4.   Conduct e-resources training
      5.5.5   Conduct information literacy skills training
      5.5.6.   Ensure there is effective and efficient use of library resources by staff and students.

5.6 Institutional Repository
This is a digital depository of NUST's intellectual output. It

      5.6.1.   Creates global visibility to NUST's scholarly research.
      5.6.2.   Collects content in a single location.
      5.6.3.   Provides access to institutional research output by self archiving it.
      5.6.4.   Stores and preserves the other institution's digital assets.

5.7 Past Examination Papers
Past examination papers are accessible online from the Library homepage.

5.8 Information Literacy Skills (ILS)
The Library conducts ILS training programmes to equip students with the requisite skills necessary for the effective use of online information.

It enables students to:

- Identify the different sources of information
- Use online search strategies,
- Evaluate information and its sources critically
- Understand the economic, legal and social issues surrounding the use of information.

Faculty Librarians are responsible for organising and conducting training.

5.9 Circulation Services
The Circulation Services of the Library encompass activities offered at the circulation/issue desk and the reserve section of the library. The aim is to ensure the proper movement of library material among patrons. The following are some of the services in the unit:

Think in other terms

5.9.1 Short loan/Reserve Service

Books in high demand can be placed on Short term Loan or Reserve at the recommendation of academic staff.

5.9.2 Long Term Loans

Library material that may be required for constant use in a department can be placed on Long Term Loan at the request of the chairperson of the department.

5.10 Library Fines

Reading material borrowed from the Library should be returned on or before the due date. Overdue material attracts a fine at a rate to be determined by the Library from time to time. Different levels of fines shall apply on Ordinary Loans, Short term Loans, Library use Only/Reserved Material, Overdue items (15 days) or more and lost material.

5.11 Book Requests

Academic units are to make requests for books to be purchased at the beginning of the year or upon introduction of a new course. The Library will only consider requests that have been signed and authorised by the chairperson of the department.

5.12 Photocopying Services

The Library has outsourced photocopying services for the convenience of library users. A small fee is levied for the service. All photocopying is subject to the Copyright Act.

6.0 RULES AND REGULATIONS

6.1 General Rules

6.1.1 Users must present a valid University Identity Card, to the Security Guard upon entering Library premises.
6.1.2 For security reasons, bags, cases, etc, do not go inside the Library. Bags should be left at the baggage bay accessible through the side entrance.
6.1.3 Smoking, eating, and drinking are strictly prohibited.
6.1.4 Cell phones must be switched off or put on silent so that they do not distract others
6.1.5 Viewing of pornographic sites is prohibited in the library.
6.1.6 Readers are expected to observe silence in the library. Conversation and any other   behavior likely to disturb or inconvenience others must be avoided in the reading areas.
6.1.7 All losses of and damage to library materials must be reported to the Library promptly.

Think in other terms

6.1.8   All items taken in or out of the Library are subject to a security check.

6.1.9   The Library will confiscate any material not belonging to NUST Library if there is no proof it was borrowed legally from the lending institution.

6.1.10   Users are required to comply with the provisions of the Copyright Law. The Library and its resources are to be used for the purpose of Academic Learning and Research and not for the other forms of commercial gain.

6.1.11   Results for students with overdue material and unpaid fines will be withheld until payment is received in full.

6.1.12   Breaking into the University Library Computer system will attract a heavy fine or suspension from the library.

6.1.13   Personal belongings may be brought into the library at the user's own risk. The Library will not be held responsible for loss of, or damage to personal property.

6.1.14   Repeated infringement of the above rules would result in the Librarian suspending and or referring the matter to the University Proctor.

6.2   Borrowing Regulations

6.2.1   Only registered users can borrow material from the Library.

6.2.2   All items taken out of the Library must bear the current Library Due Date Stamp and a receipt.

6.2.3   Fines will accrue on all overdue material.

6.2.4   Library material shall not be issued to persons who hold overdue books or with outstanding fines.

6.2.5   Items not in demand may be renewed once/except for Short loan books.

6.2.6   All items are subject to RECALL if in demand.

6.2.7   Periodicals, Reference Books, Thesis, Dissertations and material stamped 'Library Use Only' may not be taken out the Library.

6.2.8   Members of staff going for staff development must return all books before proceeding for study leave.

6.2.9   Library users terminating membership of the Library must return all outstanding material and clear all fines before they can be cleared.

For more information, visit us at: *library.nust.ac.zw*

Think in other terms

FACULTY OF APPLIED SCIENCES

Dean
Dr D. J. Hlatywayo, PhD (Uppsala), BSc (Zambia), Dip (PRET), Cert. in Applied Meteorology

Senior Assistant Registrar
Mr W. D. Magagula, MSc in Disaster Management (UFS), Advanced Diploma Advanced Diploma in Disaster Management (UFS), Diploma in Development & Disaster Management (NUST), BSc in Education - Administration/Policy Making (UZ), Secondary School Teachers Certificate (GTC)

Administrative Assistant
Ms A. Daniel, MBA (NUST), Diploma (ICSA), Cert in Administration (Pitman), Postgrad Dip in Management (NUST)

Technicians
Tarusenga M, HND IT (HEXCO)

Moyo D, MSc. Computer Science (NUST), BSc (Hons) Computer Science (MSC)

FACULTY REGULATIONS FOR UNDERGRADUATE DEGREE PROGRAMMES

1.0   PREAMBLE

1.1   These regulations should be read in conjunction with the General Academic Regulations for Undergraduate Degrees hereinafter referred to as the General Regulations.

1.2   These regulations are in respect of programmes for the degrees offered in the Faculty of Applied Science listed in Section 4.2 below.

2.0   BACHELOR OF SCIENCE HONOURS DEGREE

The appropriate degree shall be awarded to a student who has successfully completed an approved Programme in accordance with these regulations.

3.0   DEFINITION OF TERMS

3.1   Semester

A semester shall normally comprise 15 weeks, 12 weeks of which shall be assigned to teaching, 1 week to revision and 2 weeks to examinations.

3.2   Module

A module is defined in the General Regulations as a separately examinable portion of a programme. In these Regulations the word 'module' without an adjective, shall refer to a portion consisting of four hours of formal instruction a week for a semester. Not more than three, but normally at least two, of those hours shall be lectures. This definition is extended by the introduction of the terms module, supporting module, co-requisite module, double module, half module, pre-requisite module and industrial training module. The Departmental Board responsible for a subject may designate, in the Special Regulations for that subject, certain modules as core modules and other modules as supporting modules. Core modules are modules which are considered to be essential for qualification in a particular subject while supporting modules are modules which are considered to give the student all the relevant interdisciplinary knowledge for studying the core modules.

3.2.1   A double module may consist of either eight hours of formal instruction a week for a semester or four hours of formal instruction a week for the two consecutive semesters of an Academic Year. In the former case not more than six, and normally, at least four of those hours

shall be lectures, while in the latter case, not more than three and, normally, at least two of those hours shall be lectures.

3.2.2   A half module shall consist of two hours of formal instruction a week for a semester.

3.2.3   A project module is a module in which a student is required to carry out, under the direction and supervision of a member of the academic staff, private studies or investigations related to a particular topic within a subject. In the Special Regulations for the subject of which it forms a portion, each project module shall be assigned a weighting based on the amount of time it occupies compared with a module. Weighting shall be in multiples of half modules.

3.2.4   An industrial training module is a module in which a student is required to work for a specified institution for a period of not less than four months and not more than ten months in one Academic Year. The student shall work under the direction and supervision of a member of the academic staff and delegated members of the specified institution for that period.

3.2.5   A pre-requisite module for a particular module is one that the relevant Departmental Board requires a student to pass prior to the start of the Academic Year in which he/she intends to study the particular module. A co-requisite module, for a particular module, is one which the relevant Departmental Board requires a student to take at the same time as, or at an earlier time than that module. Passing a co-requisite module cannot be made a condition for passing a module.

3.2.6   A practical module is a module in which a student is required to carry out, under the supervision of members of the academic staff, a set number of prescribed laboratory experiments.

(Through these regulations two half modules are equivalent to a module and a double module is equivalent to two modules).

3.3   Part

A Part is essentially a year of study. In the Special Regulations for each subject, each module shall be designated as a Part I, II, III or IV module, with the Part corresponding approximately to the level of maturity required for study of the module.

3.4   Full time study

In each year, other than the Industrial Attachment period, in order to be regarded as a full-time student, a student shall register for and attend a minimum of 12 modules.

In those years a full time student shall receive between 24 and 30 hours of formal instruction a week. During industrial attachment a student may register for failed modules which he/she is eligible to resist.

4.0   ENTRY REGULATIONS

4.1   In order to qualify for normal entry to a Bachelor of Science Honours Degree Programme in the Faculty of Applied Science, a prospective student must satisfy the Entry Regulations specified in the General Regulations and in so doing, must also meet the following Faculty Requirements:-

4.1.1   Have obtained a Pass at 'A' level in at least two of the following subjects or their recognized equivalents:-

Think in other terms

Biology, Chemistry, Mathematics, Physics, Computer Science, Physical Science and:-

4.1.2   Have obtained a Pass at 'O' level or 'A' level in a third subject chosen from those listed in Section 3.1.1. and
4.1.3   Have obtained a Pass in at least five 'O' level subjects including Mathematics and English

NOTE: There are restrictions on the combinations of certain subjects. See 3.1.4 of the General Academic Regulations.

4.2   While the above requirements apply to entry to the Faculty as a whole, the following specific qualifications, or their recognized equivalents, are NORMALLY required by the indicated subjects for entry to first year studies in that subject:-

BSc Degree in Applied Biology &

Biochemistry   -'A' level Biology and Chemistry plus any other
                                                science subject   at "A" Level;

BSc Degree in Biotechnology   - at least two science subject passes at 'A' Level
                                                in Biology and Chemistry.

BSc Degree in Applied Chemistry   - 'A' Level Chemistry and either 'A' level
                                                Mathematics or 'A' level   Physics

BSc Degree in Computer Science   - 'A' level Mathematics and Physics or 'A'
level   Mathematics and Computer Studies & any Science subject

BSc Degree in Informatics   - 'A' level Mathematics and any other Science or
                Commercial subject

BSc Degree in Applied Mathematics   - 'A' level Mathematics and any other 'A' level
                                                Science subject or Geography

BSc Degree in Applied Physics   - 'A' level Physics and 'A' level Mathematics

BSc Degree in Radiography   -   'A' level Physics and either 'A' level Biology or
                                                'A' level Chemistry or Mathematics

BSc Degree in Earth Sciences   - 'A' level Physics and 'A' level Mathematics

BSc Degree in Sports Science and Coaching - 'A' level Biology and either 'A' level Chemistry,
                                                Geography, Computer Science, Physics, or
                                                Mathematics;

BSc Degree in Environmental Science and

Health	- 'A' level Biology and any other Science subject;
BSc Degree in Forest Resources and Wildlife Management	- 'A' level Biology and either 'A' level Chemistry, Mathematics, Physics, Agriculture or Geography
BSc Degree in Statistics and Operations	- 'A' level Pure Mathematics/ Statistics/ Mechanics and a pass in any other science or commercial subject.
BCs Degree in Business Analytics	- 'A' level Pure Mathematics/ Statistics/ Mechanics and a pass in any other science or commercial subject.

4.3   Entry to all programmes in the Applied Science Faculty is competitive and in many cases the holding of the   minimum requirements shall not ensure admission.

All applicants satisfying departmental requirements shall not ensure admission. All applicants satisfying departmental requirements compete on the basis of the overall points obtained from the 'A' level grades or points in the subjects listed.

4.4   In case of equal overall points preference shall be given to higher points in the core subjects.

4.5   **Special Entry**

In addition to the Special Entry requirements as provided in the general regulations, the following are the Faculty requirements:

4.5.1   **Special Entry Requirements into Part I**

Higher National Diploma (HND) holders in a subject related to the intended subject of study at NUST and with a minimum of Grade C at 'A' level or an equivalent qualification in the subject of intended study may be admitted into Part I of that intended subject.

This shall include diplomas from;
a)   Teachers colleges;
b)   Polytechnic colleges**;**
c)   Technical colleges;
d)   Any other equivalent institution.

4.5.2   Applicants who have obtained a first degree at NUST or any other recognised institutions in an appropriate science subject.

4.5.3   **Special Entry Requirements into Part II**

4.5.4   Holders of HND or equivalent in the subject of intended study, e.g. Computer Science, with at least 2 years work experience.

Think in other terms

4.5.5   Holders of degrees with enough subject content to fulfil first year requirements of the subject of intended study from a registered institution (transcripts must be provided for the determination of content studied).

Examples are those who studied one of the following subject combinations and wish to do one of the other subjects in the combination;

Mathematics/Physics/Computer Science, Biology/Chemistry/Environmental Science

5.0   SPONSORED CANDIDATES

Applicants with HND diplomas related to their subject of intended study with teaching and/or technical experience at tertiary institutions who are sponsored (or Sponsorship supported or sourced) by their institutions may be admitted into Part I or Part II provided they meet the requirements as outlined in sections 1 and 2 above. Subject to interviews, their experience may also determine their admission into the appropriate part (Part I or Part II) of the intended subject of study.

Candidates applying for entry into Part I and Part II under sections 1, 2 and 3 may be subjected to an interview/test.

6.0   STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

6.1   Except in the case of special entry when a lesser period may be allowed, the Bachelor of Science Honours Degree Programme requires full time study over a period of four years. Normally a student shall be required to complete the programme in not more than five years from the date of the first registration for the programme.

6.2   Bachelor of Science Honours Programmes in the Faculty of Applied Science are offered in the following subjects areas:-

Applied Biology and Biochemistry
Biotechnology
Applied Chemistry
Applied Mathematics
Applied Physics
Radiography
Earth Sciences
Operations Research and Statistics
Business Analytics
Computer Science Radiography
Informatics
Sports Science and Coaching
Environmental Science and Health
Public Health

Think in other terms

In Special Regulations for each of these Departments there shall be a list of modules available for a programme in that subject. This list shall include all supporting modules for the Programme, including those taught by other Departments. The list shall contain at least 12 Part I modules; at least 12 Part II modules; a Part III industrial training module lasting two semesters, or a Part III industrial training module lasting one semester and at least 6 Part III modules taught during the first semester; at least 12 Part IV modules.

At each of Parts I, II, III (if appropriate) and IV, at least 50% of those modules shall be core modules.

6.3   A Bachelor of Science Honours Programme in a particular subject shall consist of either an industrial training module of 2 Semesters and at least 36 other modules or an industrial training module of 1 semester duration and 42 other modules. The modules are to be chosen from those listed in the Special Regulations for that subject, including all core modules listed for that subject.

6.4   Normally, in any year of the Programme, a student shall study 12 modules at least 4 of which are core modules in his or her chosen subject.

6.5   In the second and subsequent years a student may study modules whose pre-requisites he/she has satisfied, subject to the conditions in Section 4.2.

6.6   A student shall study an industrial training module.

6.7   In Part IV of a Bachelor of Science Honours Degree Programme a student must take at least one project module examined by a dissertation, the weighting of that module being that of 2 modules but not more than 6 modules.

6.8   When a student needs no more than 6 modules to complete the Degree Programme and he/she has already completed four years of full time study he/she may study the remaining module in a further part-time year.

6.9   **Selection of Modules**

6.9.1   For each Part II or higher level module all pre-requisites and co-requisites that apply to that module shall be listed in the Special Regulations for the relevant subject. A student shall not be admitted to a module unless he/she has passed all pre-requisites for that module prior to the start of the Academic Year in which he/she intends to study that module.

6.9.2   Subject to the restrictions imposed by 4.9.3 a student may, in the second and subsequent years, study module(s) whose pre-requisites he/she has satisfied, including approved modules offered by other departments. These modules from other departments may be additional modules or may replace up to a total, during the entire programme, of at most six modules from the list of his/her chosen subject.

Note that it may be possible to allocate weightings different from one, half and two to a module from another Faculty. The weighting shall depend on the structure of the module, although normally a module shall only be approved if it is fully compatible with these regulations.

6.9.3 A student's selection of a module for a degree programme is subject to the approval of the Dean of Applied Science and the Chairperson of all relevant departments and to the following conditions:-

6.9.3.1 The student must satisfy the entry requirements for the subjects from which other modules are taken.

6.9.3.2 The module combination is feasible in terms of the timetable.

6.9.3.3 The student must not be enrolled for more than eight modules at any time during a semester.

6.9.3.4 The chosen modules shall enable the student to complete the Programme in as close to the minimum period of four years as is possible.

6.9.3.5 Each module is taken in the year corresponding to the Part to which it is assigned or in a later year.

6.9.3.6 The total weighting of project modules in the Programme does not exceed six modules.

7.0   ASSESSMENT OF CANDIDATES

7.1   For modules other than Industrial Training Modules, Practical Modules and Project Modules:-

7.1.1   Each module shall be assessed by module-work assessment and a formal examination.

7.1.2   Each formal examination shall be held during an examination period at the end of a semester, normally that of the semester in which the module is completed.

7.1.3   The formal examination for a module shall have a duration of three hours while that for a half-module shall have a duration of two hours. A double module shall have a four hour formal examination.

7.1.4   Modules may contain a practical component. Where there is a practical component, that component shall be assessed by module-work assessment only and the practical assessment mark shall constitute between 15 and 25 per cent of the overall assessment for that module. The weighting of theory module-work assessment mark to formal examination mark shall conform to the bounds laid down in the General Regulations. However the total contribution from the practical assessment mark and the theory module work mark shall not exceed 40 per cent of the overall mark for that module.

7.2   Project Modules

The assessment of project modules shall be based on dissertation and oral presentation by the student. Normally a dissertation shall be submitted at the end of the revision period of the semester in which the module is completed.

7.3   Industrial Training Modules

Each Industrial Attachment Module shall be assessed by continuous assessment and by the assessment of a final report, written by the student. The continuous assessment mark shall constitute 50% and the final report mark shall constitute 50% of the overall assessment.

Think in other terms

The module-work assessment shall be based on an assessment of the student's professional performance by his supervisors and on reports written by the student at the end of each phase of the Industrial Attachment Module.

The final report shall normally be submitted not later than the end of the month following completion of the industrial training module.

7.4   **Practical Modules**

The assessment of practical modules shall be based on the submission of laboratory reports. Students must write the reports in a prescribed manner on each laboratory experiment performed during the semester in which the module is being offered and present the reports to the academic supervisor for grading. Marks obtained from all the laboratory reports shall be used for compiling the final overall mark for the practical module.

8.0   DETERMINATION OF RESULTS OF MODULES

The weighting of modules shall be based on the notional study hours (NSH) credit system in which all learning activities of a student of average ability, taking place in and outside scheduled contact sessions, are taken into consideration (1 credit = 10 notional hours). A student must attain a prescribed minimum number of credits to qualify for the award of a degree.

8.1   For modules other than Industrial Training Modules, Practical Modules and Project Modules:

8.1.1   The appropriate Departmental Panel of Examiners shall determine for each module work and each student a theory assessment mark, a practical assessment mark (where appropriate), a formal examination mark, an overall theory mark and an overall mark for the module and shall determine whether the student has passed or failed the module. The Departmental Panel shall submit the overall theory mark, the practical assessment mark, the overall mark and the results to the Faculty Board of Examiners.

8.1.2   To pass a module that has both theory and a practical component a student must obtain an overall mark of at least 50%, and a practical assessment mark of at least 40%.

8.1.3   To pass a module a student must obtain at least 35% in the Final Examination and achieve an aggregate of at least 50%.

8.2   **Project Modules**

For each project module the appropriate Departmental Panel of Examiners shall determine, for each student, an overall mark and whether the student has passed or failed the module. The Departmental Panel shall submit the mark and the results to the Faculty Board of Examiners.

8.3   **Industrial Training Modules**

8.3.1   For each Industrial Attachment Module the appropriate Departmental Panel of Examiners shall determine, for each student, a module work assessment mark, a final report mark, an overall

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Think in other terms

mark and whether the student has passed or failed the module. The Departmental Panel shall submit these marks and the result to the Faculty Board of Examiners.

8.3.2   To pass an Industrial Attachment Module a student must obtain an overall Mark of at least 50%, a continuous assessment mark of at least 50%, a mark of at least 50% in the assessment of the final report and oral assessment.

8.4   **Practical Modules**

To pass a practical module a student must obtain a final overall mark of at least 50%. The overall mark for the module shall be determined solely from the marks obtained for the written laboratory reports submitted during the period of the module.

9.0   REPEATING OF MODULES

9.1   A student may repeat only a module that he/she fails except that if a student is allowed to repeat Part I and is unable to register for sufficient modules to be regarded as a full-time student, he/she may repeat one or more of the Part I modules previously passed, provided that he/she is registered for all Part I modules that he/she failed. Normally a student shall only be allowed to repeat a module once.

9.2   If a student fails a module but passes the practical assessment for that module, he/she may, when repeating that module, be exempted by the relevant Departmental Board from attending the practical component of the module and allowed to rewrite the formal examinations at an appropriate time.

Where a student is so exempted, the practical assessment mark for the Module shall be carried forward to the assessment of the repeated module.

9.3   If a student fails a practical module of the Part, he/she shall be required to repeat the module at an appropriate time as recommended by the Departmental Board.

9.4   A student may be allowed to repeat the industrial training module if he/she has failed the module but has obtained at least 40% in the overall mark for that module. If he/she has passed the continuous assessment, then in repeating the module he/she shall only be required to submit a new version of his/her final report. In that case the module work assessment mark shall be the assessment of the repeated module.

10.0   PROCEEDING AND DISCONTINUING

10.1   Each Degree Programme is divided into parts which are, essentially, years of study. In each Part, a student shall normally study at least 12 modules, at least 6 in each semester.

10.2   In order to proceed from Part I to Part II a student must have:

10.2.1 Passed all Part I registered modules and all practical modules as appropriate, and pass on aggregate, or

10.2.2 Passed at least all Part 1 modules including at least 4 Part II core Modules and all practical modules as appropriate, in his/her chosen subject and satisfied the pre-requisites for at least 6 Part II core modules.

Think in other terms

10.3   A student who, in the first year, passes at least 50 % of the modules but is not permitted to proceed to Part II may be permitted to repeat Part I. In repeating Part I a student may, for each module that he/she failed, either repeat that module or an alternative Part I module and may study any Part II module whose pre-requisites he/she has satisfied.

10.4   A student who fails a practical module in his/her chosen subject (if appropriate) shall not be permitted to proceed to Part II. He/she shall be required to repeat any failed practical module during the long vacation.

10.4.1 A student who obtains less than 50% in the overall mark for the repeated practical module shall be required to discontinue.

10.5   In order to proceed from Part II to Part III a student must have:

10.5.1 Passed all Part II registered modules and all full practical modules in his/her chosen subject if appropriate, and pass on aggregate or;

10.5.2 Passed at least 17 modules including each Part I core module and at least 4 Part II core modules and full practical modules if appropriate, in his/her chosen subject.

10.5.3 Satisfied the pre-requisites for at least 4 Part III modules if appropriate, or at least 6 Part IV modules, in his/her chosen subject.

10.6   A student who, having been permitted to proceed to Part II, but not permitted to Industrial Attachment (Part III) module at the end of the following year may be permitted to repeat Part II.

10.7   A student who fails any practical module in his/her chosen subject if appropriate, in Part II shall not be permitted to proceed to Part III. He/she may be allowed to repeat the failed practical module during the long vacation.

10.7.1 A student who obtains less than 50% in the overall mark for the repeated practical module shall be required to discontinue.

10.8   In order to proceed from Part III to Part IV a student must have passed her continuous assessment component of his/her Industrial Attachment module and obtained an overall mark of at least 50% in the Industrial Attachment Module.

10.9   A student who obtains less than 40% in the overall mark for an Industrial Attachment Module shall be required to discontinue.

10.10   The required period for the completion of a programme should be 8 years.

10.11   A student whose progress is delayed by failure in pre-requisite modules may be permitted to repeat the pre-requisite modules as a part-time student. If the modules are passed at the next sitting the student shall be allowed to resume his/her full-time studies and the repeat year shall not count towards the five years. Otherwise he/she shall be required to discontinue.

11.0   AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

11.1   To be eligible for the award of a Bachelor of Science Honours Degree a student must:

11.1.1 Pass each module listed for his/her chosen subject.

11.1.2 Pass all Part I modules, all Part II modules, all practical modules if appropriate, the Part III Industrial Training Module and all Part IV modules, including a project module.

Think in other terms

11.1.3 Pass the modules constituting his/her programme on aggregate. The modules constituting his/her programme shall be the core modules and such other modules which combine with them to make a total of 30 modules and a 1-year Industrial Training Module.

11.1.4 Each Departmental Board shall, having recommended that a student has passed his/her programme, recommend the division in which he/she has passed that Programme. In classifying the pass the Board shall consider the weighted aggregate mark for all Part II modules, the industrial attachment module and all Part III modules if appropriate, and all Part IV Modules.

11.2   Modules shall be weighted as follows :-

Part II -   30% of the weighted aggregate mark.

Part III -   20% of the weighted aggregate mark of the Industrial attachment   module,

 IV   -   50% of the weighted aggregate mark.

11.3   The Bachelor of Science Honours Degree Certificate and the student's transcript shall record that the student has been awarded the Bachelor of Science Honours Degree, with the subject of specialization enclosed in parentheses, and the classification accorded to the Degree.

12.0   NOTIFICATION OF RESULTS

A list of results shall be published in accordance with Section 16 of the General Regulations.

13.0   SPECIAL REGULATIONS FOR EACH DEPARTMENT

(see Special Regulations)

MASTER OF SCIENCE DEGREES

Refer to the General Regulations of NUST

MASTER OF PHYLOSOPHY AND DOCTOR OF PHILOSOPHY DEGREE REGULATIONS

Refer to the General Regulations of NUST

GUIDELINES TO MASTER OF PHYLOSOPHY AND DOCTOR OF PHILOSOPHY DEGREE PROGRAMMES (HIGHER DEGREES BY RESEARCH)
1.0 PREAMBLE

The following guidelines refer specifically to Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) degrees done through research that lead to a thesis supervised by one or more experienced academic(s). They set the procedure which a candidate who wishes to register for a higher degree (MPhil or PhD) in the Faculty of Applied Science is expected to follow. These guidelines should be read in conjunction with the regulations for higher degrees.

 Research Project Proposal Guidelines

2.0   QUALIFICATIONS

A prospective candidate for an MPhil degree should normally be a holder of a B.Sc. (Hons) degree in the First or Upper Second Division whilst a prospective candidate for a PhD should be a holder of an MSc degree (Distinction or Merit) / MPhil in the broad field they are seeking admission into.

3.0   RESEARCH TOPIC IDENTIFICATION
3.1   The candidate should have an idea or a research topic and must identify a Department that is relevant to the subject matter.
3.2   The candidate must discuss the idea with the Department's Chairperson and Professor in the first instance. The candidate must then read widely in the area around the topic.

3.3   Project Supervision
3.3.1   The candidate's discussion with the Chairperson will lead to the development of the idea into a research proposal that has a title and (where possible) hypotheses.
3.3.2   The candidate may identify possible supervisors.
3.3.3   The Department will recommend a supervisor

3.3.4   Normally, there shall be two supervisors to each project, a main supervisor plus a co-supervisor. At least one of them must be on the academic staff list at NUST.

3.3.5   The candidate may elect to have one or two associate supervisors chosen   by virtue of their expertise in specific areas that the candidate wishes to investigate.

4.0   THE RESEARCH PROPOSAL CONCEPT NOTE

4.1   Formulation of a Concept Note

4.1.1   A candidate is expected to produce a concept note of the proposal, which should be circulated to the Department through the Chairperson.

4.1.2   The Chairperson shall arrange for a seminar at which the candidate will explain to the Department the research proposal.

4.1.3   The Department will decide on the relevance of the topic and its acceptability to the Department and then advise on the prospective supervisors.

4.2   Contents of the Research Proposal Concept Note

4.2.1   The Research Proposal Concept Note should not be more than five pages long and comprise the following sections:

(i)   Introduction to the topic and why it needs research,
(ii)   Problem statement,
(iii)   Objectives,
(iv)   Hypotheses (where possible),
(v)   Methods to be used in the data collection.
(vi)   Likely scientific tests to be used in the analysis and
(vii)   a list of the cited literature (Harvard referencing).

4.2.2   The brevity of this first proposal, is to enable members of the FHDC and the Academic Board (AB) to get the best chance to read it.

4.2.3   Sections (i) and (v) are expected to be the longest, and jargon should be kept to a minimum in an effort to broaden comprehension of the proposal.

5.0   REQUIREMENTS BY THE HIGHER DEGREES COMMITTEE

5.1   Assuming the Department accepts the candidate's research proposal, and that the candidate has presented a seminar, the following papers shall be forwarded to the Faculty Higher Degrees Committee through the FHDC Secretary:

(i) Completed Application Forms by the candidate:

a) Application for Admission to Full-Time/Part-Time MPhil/PhD

Think in other terms

Studies
b) Postgraduate Admission Application
c) Minutes from the Department relating to the application
d) Research Proposal Concept Note by the candidate
e) Names of supervisors and their curriculum vitae

6.0   FACULTY HIGHER DEGREES COMMITTEE EXPECTATIONS
6.1   In its deliberations the FHDC may return the proposal to the candidate, through the Department, for whatever amendments that may be necessary. Here the Committee is especially concerned with the clarity of exposition of the topic, the precision of the proposed title, appropriateness of the data collection methods and the statistics to be used as well as the correctness of the referencing system.

6.2   The Committee shall also pay attention to the language, namely, spelling, grammar and punctuation. Candidates should use UK English spelling in their work.

7.0   THE ROLE OF THE ACADEMIC BOARD
7.1   When the FHDC is satisfied with the Research Proposal Concept Note and the proposed supervisors, it will recommend for provisional registration of the candidate to the Academic Board - a Committee of Senate.
 7.2   The Academic Board will determine the suitability of the research topic in the proposal and decide on whether the applicant should be admitted as a student or   not.

8.0   REGISTRATION: Provisional and Full Registration
8.1   The candidate shall be advised of the need to register as a student through an offer letter from the Senior Assistant Registrar, Admissions and Student Records Section.

8.2   The candidate will only be regarded as a student after successfully completing the registration procedures.
8.3   Registration shall be normally back-dated to the date when the proposal was approved by the Faculty Higher Degrees Committee.

9.0   SUBMISSION OF FULL PROJECT PROPOSAL
9.1   The student shall submit a full project proposal to the FHDC within six months of his/her provisional registration. This should be about 10-15 pages long, occasionally more.
9.2   The same sections as listed in 3.2 will be used, with the addition of sections on Literature review, and Justification of the research. This long project proposal must be read and corrected by the main supervisor before forwarding it to the FHDC.
9.3   After acceptance by the FHDC, the proposal will be forwarded to the Academic Board for full registration, together with a summary of 4-5 pages.

Think in other terms

10.0 UPGRADING FROM MPHIL TO PHD

10.1   A candidate with a Bachelor's (Honours) Degree must first register for an MPhil .

10.2   A candidate may seek permission from the Department to upgrade to a PhD .

10.3   A candidate may apply to upgrade the MPhil to a PhD provided she/he broadens the scope of the research to show greater depth of scholarship, and to turn it into an original and substantial contribution to the chosen field. This should be done in consultation with the main supervisor.

10.4   The candidate shall demonstrate the ability to carry out PhD research work by publishing at least one paper in peer reviewed or recognized Journal.

10.5   A seminar by the candidate shall be delivered to the Faculty at which the Faculty Higher Degrees Committee shall decide whether or not to accept the new proposal for upgrade and if so to recommend it to the Academic Board

10.6   An MPhil normally takes 18 to 36 months to complete by full time study and as such candidate will be allowed to convert/upgrade to PhD if their period of study still falls within the 18 to 36 months' time.

11.0 STRUCTURE OF THE MPHIL/PHD THESIS FOR SUBMISSION

This section must be read in conjunction with General Academic Regulations for Master   of Philosophy and Doctor of Philosophy degrees.

11.1   There are two acceptable ways of structuring a thesis for submission. The traditional way is to prepare it as one integrated, whole document, with one   Introduction, one Literature Review, one Study Area and Methods, etc. The   current way is to prepare the thesis as a series of chapters each of which may be   a stand-alone portion of the thesis. NUST accepts both forms of thesis writing.

11.2   The greater portion of the work submitted must have been done after the registration for the MPhil or PhD degree and consist of the candidate's own account of research.

11.3   The thesis shall be written in English (UK spelling).

11.4   Work already published, including that published in joint names, may be included in the appendix of the thesis provided the main author was the candidate himself/herself and this has been certified by his/her Supervisor. A   series of publications alone shall not be acceptable as a thesis regardless of their number.

12.0 GENERAL STRUCTURE AND LAYOUT

The report shall contain the following:

12.1   **The Preliminaries:**

12.1.1 **Title page**

The inner Title page shall bear the University logo in colour (no more than 25% of the   page), the name of the University (font size-12 bold), the name of the Faculty (font size -12 bold), the approved title of the thesis (font size 14 bold), the candidate's full name (font size - 14 bold), and an inscription " A thesis

submitted in fulfilment for the degree of ….." (font size-12 bold)   followed by Department of …….., (font size- 12 bold) and year (font size - 12   bold).

The outer Title page shall duplicate the inner Title page except that it shall not bear the University logo.

12.1.2 **Abstract**

This should be short and informative. It shall cover what was done, what the results were and the conclusions or inferences that was reached. It shall be on one page only and shall be single spaced. There shall be no paragraphing in the abstract.

12.1.3 **Table of contents**

The table of contents appears soon after the abstract, it shall index these preliminaries in lower case Roman numerals. It shall index, titles of divisions e.g. Introduction, Literature review etc. and subdivisions of the thesis in Arabic numerals. Each heading shall be single spaced and double spacing used to separate the headings from each other.

12.1.4 **Lists of Tables, Figures, Appendices and Abbreviations**

These shall appear on separate pages following the Table of Contents. Each Table or Figure heading should be single spaced with double space separating each Table or Figure heading from the other. No terminal punctuation is used.

12.1.5 **Declaration**

Each thesis shall have a declaration of where the work was done. If parts of the work was not done by the candidate, the reasons why it was not done by the candidate must be stated as well as where that part was done. The declaration page follows immediately after the abstract page followed by an Acknowledgement page.

The declaration may be of the form:-

I, …….., declare that the work described in this thesis was carried out in the Department   of ……., NUST, from (date) – (date). This work represents my own work and has not   been reproduced from someone's work. Where use has been made of the work of others, it has been duly acknowledged in the text.

Signed: ………………………….   Date:…………………

Student No:……………………...

12.1.6 **Acknowledgements**

This section shall give due credit to persons who would have made significant contributions to the research e.g. supervisors, technical staff, financers, etc. No religious statements should be made in this section. Double spacing should be used for typing this section and should not be longer than one page.

12.1.7 **Dedication**

This section may come before the Title page. This may contain religious statements.

13.0   THE TEXT

The text should be printed on International A4 size paper in Times New Roman, size 12   fonts, double spaced and right justified. There shall be a margin of 40 mm on the left   hand   side of the page to allow for binding and 10 mm on the right hand side of the   page. There   shall also be a 20 mm margin on the top and bottom of the page.

13.1   **Introduction**

An introduction should describe the background of the project i.e. historical and theoretical background, the scope of the project, the objectives of the project defining the current problem to be investigated and the hypothesis of the project (where applicable).

13.2.   **Literature review**

The literature review presents the relevant theory and up-to-date knowledge available in the literature related to the problem. Appropriate sections and sub-sections dealing different aspects of the work may be required here.

13.3   **Materials and Methods**

The methods used shall describe in sufficient detail such that another worker of similar competency could repeat the work. (In the Sciences, experimental methods detailing the analytical methods and laboratory techniques should be detailed. Do not list apparatus used but mention them in the text. It is useful to identify equipment used down to the model.). Statistical methods used in the   study shall also be included here.

13.4   The results should be a factual description of experimental data generated through observation and measurement by the candidate. The results should not be cluttered by an attempt to interpret or discuss them. Tables and Figures should have headings which fully describe their contents and should not duplicate each other. The headings of Tables should be written at the top

Think in other terms

whilst that of the Figures should be written at the bottom. There is no limitation on the size of the figures/graph and tables but these should not spill over to the next page.

In quantitative work, it is important to show the degree of uncertainty and the methods used to calculate these should be mentioned here. Appropriate units for all quantities should be included here.

The Scale Rule that permits flexibility and rational convenience in stating quantities should be followed. When a quantity is quoted to two or more significant figures, the choice of unit should preferably allow its numerical component to fall between 1 and 100, but when only one significant figure is available, it should normally lie between 1 and 10. For example, 32.8 mg rather than 0.0328 g or 3280 µg; and 10-20 plants m^{-2} rather than 100 000-200 000 plants ha^{-1} should be written. The student should familiarize himself/herself with multiples and submultiples for SI units i.e. hecto, kilo, mega etc. or nano, micro, milli etc. Words should be used for numbers up to ten and numerals for larger numbers (eg six metals were chosen and 12 fish sacrificed).

13.5   **Discussion**

This is the most important part of the thesis and should be treated as such. The results obtained in the study should be related to existing knowledge and interpretation and deductions drawn in a critical, objective and logical manner. Results should be compared with published or other available values for similar work citing the references.

13.6   **Conclusion**

Often times, the study may not have conclusions as unsolved aspects of the study emerge. It is therefore pertinent to include concluding remarks in the discussion and also recommendations for further study. However, conclusions and recommendations can be stand-alone sections.

14.0   THE REFERENCES

Candidates must adhere strictly to the following guidelines in listing their references. (**List in alphabetical order; no numbering required**) Use **either** full journal name **or** accepted abbreviation of the journal but be consistent and not use both. Each reference is single spaced but double spaces separate references. Punctuation should be consistent and should follow the system shown below.

Think in other terms

14.1 Citing in Reference list

14.1.1 From a journal:

Chuma, C., Orimoogunje, O.O.I., Hlatywayo, D.J. and Akinyede J.O. 2013. Application of remote sensing and geographical information systems in determining the groundwater potential in the crystalline basement of Bulawayo metropolitan area, Zimbabwe. Advances in Remote Sensing, 2, 149-161.

14.1.2 From a Conference/Workshop Proceedings:

Siwela, A.H. and Caley, A.D. 1989. Aflatoxin contamination of stored groundnuts in Zimbabwe. In Aflatoxin contamination of groundnuts: Proceedings of the International Workshop, Hall, SD. (Ed.). ICRISAT Centre, India. Patacheru, A.P. 502 324, India pp 59-63.

14.1.3 From a book or book chapter:

Dhlamini, Z. 2009. Agricultural Biotechnology. In : Biosafety of Genetically modified Organuisms: Basic concepts, methods and issues. Chowdhurry MKA, Hoque MI and Sonnino A (Eds). FAO , Rome pp 1-50. .

14.1.4 From a book of Abstracts:

Ngwenya, N.R. 1994. Physico-chemical, nutritional and microbiological changes during Marula (Slerocanya birrea) fruit juice fermentation. East, Central and Southern Africa Food Science and Technology Conference. 20-22 September. Victoria Falls, Zimbabwe. pp 5.

14.1.5 From a Thesis/Project:

Chiyaka, C. 2007. Development and analysis of mathematical models of the immunoepidemiology of malaria. PhD. thesis, National University of Science and Technology, Zimbabwe. 272 pp.

14.1.6 From the world wide web/Internet page:

Mackenzie, K.S., Kubena, L.F., Denvir, A.J. ,Rogers, T.D. , Hitchens, G.D., Bailey, R.H., Harvey, R.B., Buckley, S.A. and Philips, T.D. 2003. Aflatoxicosis in turkey poults is prevented by treatment of naturally contaminated corn with ozone generated by electrolysis [on line]. Available from: http//www.ozoneapplications.com [Accessed 17 April 2003]
NB. It is important to indicate the date of access.

Think in other terms

14.1.7 E-journal article

Sturve, J., Stephensen, E. and Forlin, L. 2005. Effect of redox cycling compounds on DT-diaphorase actitivty in liver of rainbow trout (Oncorhynchus mykiss). Comparative Hepatology, [on line] **4**: Accessed 15 January 2007. Insert page numbers as usual, if known.

14.1.8 E-book

Dronke P. 1968. Medevial Latin and the rise of European love-lyric.[On line]. Oxford, Oxford University Press. Available from: netlibrary http:/ wwwnetlibrary.com [Accessed 6 March 2008]. Insert page numbers as usual, if known.

14.1.9 Internet Blog

Rotheram, B. 2008 Straws in the wind. Sounds Good 11 June [Internet blog]. Available from : < http://web.mac..com/simonft/Sounds Goog/Blog/Blog.html> [Accessed 24 June 2008].

14.1.10 Newspaper article

Although it is generally discouraged to quote newspapers, often times the newspaper may be the only source of information. Sunday News (or author if any) 2004. Government re-introduces DDT use for mosquito control. Sunday News (issue number or page if any) 10 January.

14.1.11 References in text

References in the text are cited as Black and White (1990) or (Black and White, 1990). A series of references in the text should appear in chronological order, e.g., (White and Black 1989; Black and White 1990; Black 1991). References having three or more authors are cited Black et al., 1990. References to papers by the same authors in the same year are distinguished by letters a, b, c, etc. (e.g., 1988a, or 1990 a,b,c).).

Author's initials should only be used when two or more authors being cited have the same surname and have published in the same year, in which case they should be identified by initials in order to avoid confusion. Publications having no obvious authors are cited as (Anon, 1990) in the text and bibliography. At the end of the manuscript, references are listed alphabetically. **No numbering is required**. References with three or more authors should be placed in chronological order after taking account of the names of the first and second authors. The candidate must ensure that references cited in the text agree with those listed in the bibliography.

Think in other terms

Secondary citing or referencing is discouraged but may be used to a limited extent. This is when an author cites a piece of work mentioned or quoted within another author's work but has not actually seen the original source themselves. In the text cite both the original source and the secondary source where you actually read about it, using the words 'quoted in' or 'cited in'.

15.0 APPENDICES

The appendices contain material that would clutter the text such as forms used to collect data, raw data such as absorbencies, calculations, derivations, notes, published papers submitted in support of thesis, extensive computer output or other similar material.

16.0 LENGTH OF THE THESIS

16.1.1 The length of the thesis shall be determined in consultation with the supervisor but the following shall generally apply:

16.1.2 An MPhil thesis shall normally be between 80 and 100 pages long including the reference list but excluding the appendices.

16.1.3 A PhD thesis shall normally be between 100 and 200 pages long including the reference list but excluding the appendices.

17.0 SUBMISSION OF THESIS

Three spiral bound copies of the thesis (for easy handling) shall be submitted for examination.

18.0 BINDING FINAL COPIES OF THE THESIS

18.1 The final thesis shall be bound in **sky-blue** hard cover, lettered boldly in gold down the back or spine indicating the degree (starting 20 mm from the top edge) name (centre of spine) and year (ending 20 mm from the bottom edge). The **sky-blue** front cover shall bear the title of the thesis at the top, name of candidate in the centre and year at the bottom.

18.2 Four hard copies of the thesis and a soft copy shall be submitted to the Department for distribution to various sections. It is usually polite for the candidate to bind extra copies for supervisor(s) not forgetting himself/herself.

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GENERAL ACADEMIC REGULATIONS FOR HIGHER DOCTORAL DEGREES

(*EFFECTIVE FROM 2018*)

1.0 APPLICATION OF THESE REGULATIONS
1.1   The Senate shall be the final authority for the interpretation of these regulations.
1.2   The Senate reserves the right to alter, amend, cancel, suspend or replace any of these regulations.
1.3   The Senate has the power to exempt any candidate from any of the regulations.

2.0   DEFINITION OF TERMS
In these regulations, the following terms shall be used as described:

This University: means the National University of Science and Technology and its predecessors and shall include an associated or affiliated institution to this University.
Published: means material printed in a referred periodical or journal, or as a pamphlet or as a book.
Graduate of this University: means a person who has been awarded a Bachelors or Masters or Doctoral degree of the University.

3.0   DEGREES OFFERED BY THE UNIVERSITY

3.1   The National University of Science and Technology awards the following higher doctorate degree:
Doctor of Science (D Sc)

3.2   This degree is the highest academic award of the National University of Science and Technology and is only awarded to persons who have published work of an exceptionally high standard, which would earn them authoritative standing in the field of research that forms the basis of the application for consideration.

4.0   ELIGIBILITY OF APPLICANT
4.1   An applicant must have published work of an exceptionally high standard that would confer authoritative standing in the discipline in which the application is located and the particular field or fields of research on which the application is based.
4.2   An applicant must be a graduate of this University or another university in the tenth or a subsequent year after the date of the award of the applicant's first degree or its equivalent.
4.3   An applicant who is not a graduate of this University shall, in addition to being a graduate of another university, have been employed by this University for a period of not less than five years and have been engaged in research, relevant to the application, in association with this University.

Think in other terms

4.4   For eligibility for this specific degree the following is intended as a general guide:
An applicant for the D Sc degree would normally have conducted and published in the Sciences. Without derogating from the generality of the term Sciences, the D Sc degree would normally be awarded to successful applicants from the disciplines in Science, Agricultural Science, Engineering, Health Sciences and Veterinary Science.

5.0   APPLICATION FOR CONSIDERATION
5.1   An eligible applicant may make an application at any time for the appropriate Degree. Such an applicant shall submit with the application the following:
5.1.1   A full curriculum vitae;
5.1.2   An academic justification of the basis of their application; and
5.1.3   The academic evidence substantiating their application for the appropriate degree. Such evidence shall consist of published works, containing original contributions to the advancement of knowledge in the appropriate field or discipline.
5.2   Where work is submitted that is not in the applicant's sole name, the applicant shall indicate the extent of his/her contribution in terms of initiation, direction and conduct of the work.
5.3   An applicant shall indicate what part, if any, of the work including joint work submitted in support of the application has been submitted for the Award of a Degree in this or another university by the applicant or by a co-author.
5.4   The application shall be submitted to the office of the Registrar.

6.0   PROCESSING OF THE APPLICATION
6.1   Upon submitting the application the applicant shall be registered as a candidate for the award of the designated degree and shall pay the prescribed application fee.
6.2   Upon receipt of an application for the award of the degree, the application including all the supporting evidence shall be submitted to the Higher Degrees Committee of the Faculty responsible for the discipline in which the application is based. Such Higher Degrees Committee shall, having made a preliminary consideration of the application, transmit it for consideration to an appropriate Department of the Faculty.
6.3   The Departmental Board of the Department charged by the Faculty Higher Degrees Committee to consider the application shall make recommendations as to the merits of the application to the Faculty Higher Degrees Committee. The Departmental Board concerned shall submit with its recommendations, a list of persons it recommends as external and internal assessors.
6.4   Upon receipt of the resolution of the Departmental Board the Faculty Higher Degrees Committee shall consider the application and recommendations of the Departmental Board and shall make recommendations on the merits of the application and on the list of persons recommended as assessors. The Higher Degrees Committee may, at its discretion, make further recommendations on the list of assessors.
6.5   The resolution of the Department, the Department's list of persons recommended as assessors, the recommendations of the Faculty Higher Degrees Committee on the application and

that Committee's recommendations on the list of assessors shall be transmitted via the Registrar to the Senate.

6.6   The Senate shall determine whether the application merits submission to assessors.

6.7   Having determined that an application merits submission to assessors Senate shall appoint the assessors.

6.8   In the event that the Higher Degrees Committee of the Faculty or the Departmental Board to which the matter is assigned do not consider that the application has been made to the appropriate Faculty or Department, they shall transmit the application and the supporting evidence with their reasons for declining to consider the application to the Registrar for re-assignment to an appropriate Faculty and Department, provided that Senate may determine that the matter shall be considered by a particular Faculty and/or Department.

7.0   REGISTRATION

If the application is approved by Senate, the candidate shall be informed of the acceptance of the application for consideration for the appropriate degree and shall be registered upon payment of the prescribed registration fee as a candidate for the award of the appropriate degree.

8.0   ASSESSMENT OF A CANDIDATE

8.1   After registration, as prescribed in Section 6, as a candidate for the appropriate degree, the assessment of the evidence submitted by the candidate shall be made by three (3) assessors, appointed in accordance with Section 5 of these regulations, provided that at least two (2) of the assessors shall be external assessors and, normally, at least one (1) shall be an internal assessor.

8.2   The assessors shall each submit a formal written report on the application and its merits to the Registrar. Such report shall contain a recommendation as to whether or not the candidate should be awarded the appropriate degree.

9.0   DETERMINATION OF THE RESULT

9.1   The Senate shall appoint a Board of Examiners, or delegate the responsibility to the Academic Committee, to consider the application in conjunction with the assessors' reports.

9.2   The Board of Examiners shall report to the Academic Committee its recommendations together with all the relevant documents availed to it.

9.3   The Senate shall determine whether or not the candidate should be awarded a higher doctorate degree.

10.0   AWARD OF THE DEGREE

A higher doctorate degree of the National University of Science and Technology shall be awarded without classification.

11.0   PUBLICATION OF THE RESULT

The Registrar shall notify the candidate of the result of the application as decided by Senate.

Think in other terms

12.0   APPEAL AGAINST PUBLISHED RESULT

The decision of the Senate shall be final and no appeal against the published result shall be considered.

13.0   AWARD OF A DEGREE CERTIFICATE OF THE NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

13.1   The award of a degree Certificate of the National University of Science and Technology shall be subject to approval by the University Council.

13.2   A successful applicant for such an award will be entitled to receive a formal certificate of the University, bearing the seal of the University and signed by the Vice-Chancellor and the Registrar, confirming the award.

13.3   If, subsequent to the award of a degree to a candidate, it is discovered that there were gross irregularities and impropriety involved in the award the University Council, on the recommendation of the Senate, reserves the right to withdraw the award and cancel the certificate.

13.4   Once a Degree Certificate has been issued as the original, no duplicate of the same certificate shall be provided. Instead, the student shall be issued with a letter, signed by the Registrar, confirming that the candidate was awarded the degree of the National University of Science and Technology and was issued with an original and authentic degree certificate. A prescribed fee shall be levied for this service.

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DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

Lecturer and Chairperson
J. Mbanga, *BSc (Hons), MSc (UZ), PGDHE (NUST)*

Associate Professor
A.H. Siwela, AssocDipAppBiol, BAppSc (RMIT Aus); MPhil (UZ); PhD (NUST)

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Anita Dube, BSc (Hons) (NUST), MSc, (NUST)

Linly Banda, BSc (Hons) (NUST), MSc, (NUST)

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Sanele Mnkandla, BSc (Hons) (KZN) SA, MSc, (UKZN), SA

Chief Technician

A. Maunganidze, DipAppBioTech, BSc (Hons) (NUST)

Senior Technicians
J.M. Zakeo, Part II City & Guilds UK, BTechEd (Hons) (NUST)

N. Dube, BSc (Hons) (NUST)

Makhosazana Nyathi, BSc, UZ, MSc, (NUST)

UNDERGRADUATE PROGRAMME REGULATIONS

BSC (HONS) DEGREE IN APPLIED BIOLOGY & BIOCHEMISTRY

1.0 Degree Profile: **BSc (Hons) Degree in Applied Biology & Biochemistry**

Institution:	National University of Science and Technology
Type of degree:	Honours
Credit load:	506 Credits
Level:	SADC-QF - Level 8
Accreditation organisation(s):	Zimbabwe Council For Higher Education
Period of reference:	From 2018

PURPOSE OF THE PROGRAMME:

To produce high quality graduates who are able to use their knowledge and practical skills to provide solutions to real problems and to contribute towards industrial development in the field of Applied Biology and Biochemistry.

PROGRAMME CHARACTERISTICS

Areas of Study: The programme comprises but is not limited to the following areas in terms of teaching and research; cell biology, plant and animal physiology, Biochemistry, Food technology, Quality assurance, Process engineering Molecular genetics, Biotechnology and Nutrition, Food security.

Specialist Focus: The programme provides a sound academic and practical foundation for future- and self- employment in the various fields of Applied Biology and Biochemistry.

Orientation: Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.

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CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability: Production Managers, Quality controllers, Laboratory technicians in the food industry (brewing, baking, dairy etc), Pharmaceutical, Agricultural (seed production houses, feed manufacturers, egg and chicken industries), Medical (Laboratories at diagnostic and medical centres). Research scientists in research institutions, lecturers at Universities and polytechnics, biology educators in the education sector. Some can proceed and pursue higher degrees. Some can become consultants or become entrepreneurs in biology related businesses.

Further Studies: PhD, MPhil in Biology, Biochemistry, Microbiology, Biotechnology, MSc in Applied Microbiology and Biotechnology,

TEACHING AND LEARNING

Teaching and Learning Methods: Lectures, tutorials, laboratory classes, seminars, group work, industrial visits, industrial attachment, research project, individual independent study.

Assessment Methods: Written and oral examinations, tests, laboratory reports, seminar presentations, industrial attachment report, final year research project report, continuous assessments.

2.0   REGULATIONS

The Regulations for the Bachelor of Science Honours degree, hereinafter referred to as the BSc (Hons) in Applied Biology and Biochemistry   complement   and   are   subordinate   to University General Regulations for undergraduate degrees and Faculty of Applied Science regulations.

2.1   **Expected Learning outcomes**

On successful completion of this degree programme, the graduates shall be expected to:

2.1.1   Be participants of the global community who understand and can contribute to the debate, research and experimentation on contemporary issues in the area of Applied Biology and Biochemistry.

2.1.2   Be able to design, conduct, analyze, and communicate (in writing and orally) their academic research.

2.1.3   Recognize and be able to apply basic ethical principles to basic and applied biological and biochemical practice and shall understand the   role of biological/biochemical   science, scientists and practitioners in society.

2.1.4   Display sufficient practical skills and knowledge in Biology and Biochemistry to be

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sought-after practitioners in industries (brewing, dairy, baking, pharmaceutical),research institutions, tertiary education, manufacturing industries and in the medical sector in Zimbabwe, the region and the world at large.

2.1.5   Demonstrate a decisive approach in the evaluation of scientific data and information, including the capacity to apply relevant statistical   analysis and use of statistical software.

2.1.6   Apply relevant Applied Biology and Biochemistry techniques to solve real problems in the

industry.

2.1.7   Provide the students with the knowledge and skills to create employment in varied areas of Applied Biology and Biochemistry.

2.2   Entry Requirements

2.2.1   Normal entry
In order to qualify for normal entry candidates must satisfy the Entry Regulations specified   in the General Academic Regulations and in so doing must also meet the following requirements:-
The candidate must have obtained passes in A' Level Biology and "A" Level Chemistry
 or their equivalents plus any other science subject.

2.2.2   Special entry
Candidates who have successfully completed a National Diploma in Biological Sciences and Biotechnology or its recognized equivalent may apply for entry into Year I. Candidates shall normally have 2 years' post qualification working experience and shall normally undergo interviews.

2.3   Duration of the Programme and Mode of Study

2.3.1   Full time Study
When offered on a conventional basis the BSc (Hons) in Applied Biology and Biochemistry degree shall follow the normal academic year as outlined in the General University Regulations and the duration of study shall normally be four years.

2.3.2   Structure of the programme
The programme shall consist of 36 taught modules, plus 28 weeks industrial attachment. Year III of the programme shall consist of Industrial Attachment which shall culminate in the submission of an Industrial Attachment report in line with the General Regulations. In their final year students are expected to complete and pass a research project. All modules and research project are compulsory and students shall be required to pass them.

2.4   **Assessment of candidates**

2.4.1   Candidates shall be assessed through continuous assessment, practical assessment and a final written examination for each taught module. A student registered for the BSc (Hons) in Applied Biology and Biochemistry shall be required to pass all the modules for which they have registered.

2.4.2   Continuous assessment shall constitute 20%, practical assessment 20% and examination 60% of the overall mark.

2.4.3   During industrial attachment a student may register for failed modules he/she is eligible to re-sit. The industrial attachment module shall be assessed by continuous assessment, an oral examination and by the assessment of a final report written by the student. The continuous assessment mark shall constitute 50%, attachment report 40% and oral examination 10% of the overall assessment.

2.4.4   On submission of a satisfactory research project the student shall be required to defend his/her work before a panel of Departmental Examiners. The project module shall be assessed by oral presentation which shall constitute 10% and a dissertation which shall constitute 90% of the overall assessment.

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
SBB 1101	Man And The Environment	10
SBB 1103	Cell Biology	10
SBB 1105	Plant Physiology	10
SCS 1100	Introduction To Computers	10
SCH 1116	Organic Chemistry	10
SMA 1112	Preparatory Mathematics	10
SBB 1204	Genetics	10
SBB 1206	Animal Physiology	10
SBB 1207	General Microbiology I	10
CTL 1101	Conflict Transformation And Leadership	10

YEAR II

Module Code	Module Description	Credits
SBB 2101	Biochemistry: Chemistry Of Biomolecules	12
SBB 2102	Biochemistry : Metabolic Processes I	12
SBB2104	Introduction To Enzymology And Immunology	10
SBB 2105	General Microbiology II	10
SBB 2107	Food Chemistry	12
SBB 2109	Principles Of Fermentation Technology	10
SBB 2203	Analytical Biochemistry	12
SBB 2206	Food Microbiology	12
SBB2211	Principles Of Quality Control	10
SBB 2214	Molecular Genetics And Biotechnology	12
SCH 2108	Principles Of Process Engineering	10

Think in other terms

| SORS 2210 | Applied Statistics For Biological Sciences | 10 |

YEAR III

Module Code	Module Description	Credits
SBB 3001	Industrial Attachment	120

YEAR IV

SBB 4103	Principles Of Nutrition	12
SBB 4109	Advanced Applied Microbiology	12
SBB 4101	Advanced Biochemistry And Molecular Physiology	12
SBB 4111	Biochemistry: Metabolic Processes II	12
SBB 4106	Food Technology I: Non Alcoholic Fermentations	12
SBB 4202	Enzyme Biotechnology	12
SBB 4204	Advanced Cell Biology	12
SBB4207	Food Technology II: Alcoholic Fermentations	12
SSB 4208	Biotechnology Of Pharmaceutical Product	12

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MODULE SYNOPSES

YEAR I

SBB 1101 Man And The Environment   **10 Credits**

The module looks at layers of the atmosphere, air pollution, photochemical smog, biomes, ecosystems and habitats, food chains and webs, resource depletion, recycling and renewable energy, agrochemicals, portable water, sewage systems and effluent, differentiation, environmental impact assessment, oil spills s well as environmental ethics.

SBB 1103 Cell Biology   **10 Credits**

The module explores the cell concept, structure and function of cell organelles , cell junctions, cell matrix, cytoskeleton, cell membrane structure and function, electron and light microscopy, microtomy, somatic and gamete cell division, cell culture, cell differentiation and specialization and cells in Biotechnology.

SBB 1105 Plant Physiology   **10 Credits**

The module examines the plant Cell Structure function and regeneration, plant water relations, mineral nutrition and ion transport, respiration, photosynthesis, physiological principles of plant's growth and development, stress physiology and some new direction of plant physiology.

SCS   1100   Introduction To Computers   **10 Credits**
Offered by Department of Computer Science

SCH   1116   Organic Chemistry   **10 Credits**
Offered by Department of Applied Chemistry

SMA   1112   Preparatory Mathematics   **10 Credits**
Offered by Department of Applied Mathematics

SBB 1204 Genetics   **10 Credits**

The module is about the pre-Mendelian theories of genetics DNA and its genetic role. Mendelian genetics; monohybrid and dihybrid inheritance, allelic interations; multiple allelism, codominance and incomplete dominance, lethal alleles, gene interactions; epistasis, modifiers, suppressors, complementary genes, penetrance and expressivity, extranuclear inheritance, statistics and genetics; use of probability theories in genetics, the chi-square test, pedigree analysis, Bayes theorem and genetic counselling. It also looks at linkage analysis, Cytogenetics;

variations in chromosome structure and number as well as population genetics; genetic variation, the Hardy-Weinberg equilibrium and quantitative genetics.

SBB 1206 Animal Physiology 10 Credits
The module looks at energy changes in living cells, Respiration and gaseous exchange, digestion and nutrition, endocrine control and hormone action, homeostasis: Nervous system, excretion, animal cell culture, cardiovascular systems, circulation, hemodynamics, growth and aging as well as locomotion.

SBB 1207 General Microbiology I 10 Credits
This introductory module deals with the study of different prokaryotic organisms, their morphology anatomy classifications, ecology, metabolism and control along with a brief survey of human diseases caused by them. Lab work would emphasize their identification and growth methods.

CTL 1101 Conflict Transformation And Leadership 10 Credits
The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

YEAR II

SBB 2101 Biochemistry: Chemistry Of Biomolecules 12 Credits
The module introduces the student to Macromolecular chemistry. The chemistry of water, carbohydrates, amino acids, proteins and nucleic acids are studied in preparation for studying metabolic processes.

SBB 2102 Biochemistry : Metabolic Processes I 12 Credits
The module acquaints students with the modern concepts in Bioenergetics (biological oxidation and oxidative phosphorylation); coupling of biological reactions, Role of ATP in thermodynamically unfavourable reactions, mechanisms of oxidative phosphorylation; pathways for ATP formation in substrate and respiratory chain, carbohydrate metabolism and its regulation (glycolysis, citric acid cycle, pentose phosphate pathway, gluconeogenesis, irreversible steps and their bypass, regulation of gluconeogenesis, Cori cycle, glycogen degradation and synthesis) as well as lipid metabolism and its regulation (degradation and synthesis of glycerol and fatty acids).

SBB2104 Introduction To Enzymology And Immunology 10 Credits
This module aims at giving the student an overview of the major characteristics and properties of enzymes and the mechanism of enzyme reactions and regulation of enzyme activity. The module

introduces student also to the general processes of immune response, structure of immunoglobulins, mechanism of action of B- and T- cells.

SBB 2105 General Microbiology II   10 Credits

This module deals with detailed treatment of microbial growth, kinetics and environmental factors affecting growth, regulation of metabolism, solute transport, interaction of mixed cultures, antibiotics, sterilization and disinfection and enumeration of bacteria.

SBB 2107 Food Chemistry   12 Credits

Food Chemistry is a major aspect of Food Science and is the science that deals with the composition and properties of food and chemical changes it undergoes under different environmental conditions and processing. Hence some of the components that shall be looked at in this module are the lipids, proteins, carbohydrates food colour pigments and other additives.

SBB 2109 Principles Of Fermentation Technology   10 Credits

The scientific, technological and economic principles involved in selection and application of microbes, substrates and equipment to industrial fermentations are studied in this module.

SBB 2203 Analytical Biochemistry   12 Credits

The module introduces students to practical techniques used in biochemical research as well as terms that are the language of the practicing biochemist. Topics covered include measurement of pH, extraction of biomolecules and techniques used in elucidating their structures (e.g. Centrifugation, Chromatography, Electrophoresis, Spectrophotometry, radioisotope techniques).

SBB 2206 Food Microbiology   12 Credits

This module deals with microorganisms responsible for contamination, and spoilage of foods. Food preservation and Food processing. Food-borne infections and intoxication shall be examined as well as the microbiological analysis of foods including data interpretation.

SBB2211 Principles Of Quality Control   10 Credits

The module deals with quality in food processing, probability and sampling methods, quality control plans for factories, sanitation (personal, storage and transport) and product principles.

SBB 2214 Molecular Genetics And Biotechnology   12 Credits

The module deals with Advanced aspects of expression and transmission of genetic information; gene transfer in plants and animals, probes and their application; cutting and joining DNA molecules; recombination techniques; DNA libraries and basic cloning techniques.

SCH 2108 Principles Of Process Engineering   10 Credits

Offered by Department of Applied Chemistry

Think in other terms

SORS 2210   Applied Statistics For Biological Sciences   10 Credits
Offered by Department of Applied Statistics and Operations Research

YEAR III
SBB 3001   Industrial Attachment   120 Credits

YEAR IV

SBB 4103 Principles Of Nutrition   12 Credits
The module explores the history of human nutrition; factors that influence food availability and consumption patterns; macro and micronutrients; sources, digestion and metabolism; nutrients with antioxidant functions; nutritional requirements in humans; role of age, sex and lifestyle on nutritional requirement, determining nutritional status in humans, dietary reference values (DRVs), diet planning, nutritional evaluation of food. It also looks at macro and micronutrient malnutrition; diet therapy; food fortification nutritional epidemiology and food labelling.

SBB 4109 Advanced Applied Microbiology   12 Credits
The module examines the ecological and metabolic diversity of microorganisms and their Bio-geo chemical roles in nature and in artificial habitats such as sewage are taught. Metabolism of hydrocarbons and aromatic compounds as well as growth on reduced C-1 compounds shall be included in the module.

SBB 4101 Advanced Biochemistry And Molecular Physiology

12 Credits

This module deals with advanced aspects of mechanisms of enzyme action; blood clotting, metabolism of liver and biotransformation reactions, biochemistry and Molecular, physiology of muscle contraction, neurotransmission and hormone action.

SBB 4111 Biochemistry: Metabolic Processes II   12 Credits
The module deals with ketone body formation, metabolism of cholesterol and steroids, Amino acid metabolism and their conversion to specialized products, Nucleic acid metabolism, Protein synthesis, regulation and integration of metabolism shall also be covered.

SBB 4106 Food Technology I: Non Alcoholic Fermentations   12 Credits
The module covers the principles of processing , preservation, packaging and storage of various categories of foods of plant and animal origin as well as non-alcoholic fermented foods are studied. Major food processing sectors that include the dairy, meat, canning, cereals, fruit, vegetable, oils and fats industries are explored.

SBB 4202 Enzyme Biotechnology   **12 Credits**

The module gives the student an overview of applications of Biotechnology, introduction to enzyme biotechnology, the production and purification of enzymes and methods of enzyme and cell immobilization, the use of immobilized enzymes analytical chemistry, medicine on the synthesis of fine chemicals and food production.

SBB 4204 Advanced Cell Biology   **12 Credits**

Following from SBB 1103, mitotic and meiotic cell divisions are also studied in this module. Molecular anatomy of genes and chromosomes Gene rearrangements, gene regulation and development are also studied. Other topics also include: cell cycle, cell signalling, cell aging and death, molecular biology of cancer, cellular immunology, tissue culture techniques, cell culture.

SBB4207 Food Technology II: Alcoholic Fermentations   **12 Credits**

The module gives an overview of methods of production, quality control and legislation on alcoholic beverages, principally beer (including opaque beers), wines and spirits. In the production of distilled alcoholic beverages, aspects of distillation and product recovery will be focused on as well as principles of production of matured and unmatured spirits.

SSB 4208 Biotechnology Of Pharmaceutical Product   **12 Credits**

The module includes advanced topics in production of vaccines, antibiotics, and hormones using traditional and genetic engineering techniques and hybridoma technology.

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BSC (HONS) DEGREE IN BIOTECHNOLOGY

1.0   Degree Profile: BSc (Hons) Degree in Biotechnology

Institution:	National University of Science and Technology
Type of degree:	Honours
Credit load:	504 Credits
Level:	SADC-QF - Level 8
Accreditation organisation(s):	

PURPOSE OF THE PROGRAMME

To produce high quality graduates equipped with appropriate knowledge, skills and values to be effective in the application of modern techniques and concepts in various fields of Biotechnology.

PROGRAMME CHARACTERISTICS

Areas of Study: The programme comprises but is not limited to the following areas in terms of teaching and research; environmental biotechnology, industrial biotechnology, medical biotechnology and agricultural biotechnology.

Specialist Focus: The programme provides a sound academic and practical foundation for future- and self- employment in the various fields of Biotechnology.

Orientation: Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability: Production Managers, Quality controllers, Bio-engineer, Entrepreneur, Laboratory technicians in the food industry (brewing, baking, dairy etc), Pharmaceutical, Agricultural (seed production houses, feed manufacturers, egg and chicken industries), Medical (Laboratories at diagnostic and medical centres). Research scientists in research institutions, lecturers at Universities and polytechnics, biotechnology educators in the education sector. Some can proceed and pursue higher degrees. Some can become consultants or become entrepreneurs in biotechnology related businesses.

Further Studies: PhD, MPhil in Biotechnology, Biochemistry, Microbiology, Biology, MSc in Applied Microbiology and Biotechnology.

TEACHING AND LEARNING

Teaching and Learning Methods: Lectures, tutorials, laboratory classes, seminars, group work, industrial visits, industrial attachment, research project, individual independent study.

Assessment Methods: Written and oral examinations, tests, laboratory reports, seminar presentations, industrial attachment report, final year research project report, continuous assessments.

Purpose The programme is designed and modelled to equip students with the practical uses of biotechnology knowledge and to inculcate in the students an entrepreneurial and problem-solving ability. It emphasizes biotechnologies and applications relevant to biotechnology based industries and institutions such as biomedical, agricultural, biopharmaceutical, biotechnological, food industries and the environment.

Think in other terms

Objectives	1. To provide the students with a broad, sound and balanced knowledge in a range of areas of Biotechnology in a stimulating and supportive environment that is enriched by research.
	2. To provide the students with appropriate laboratory skills and field experience.
	3. To prepare the students for post-graduate research work in Biotechnology or other Biology-related disciplines.
	4 To create in the students an appreciation of the importance of Biotechnology in agricultural, industrial, economic, environmental, technological and social development.
	5 To provide students with a higher level of experience in independent analysis, criticism and research in their chosen field of expertise
Expected Learning outcomes	1. Participate on the global community who understand and can contribute to the debate, research and experimentation on contemporary issues in the area of Biotechnology.
	2. Design, conduct, analyze, and communicate (in writing and orally) their academic research.
	3. Recognize and be able to apply basic ethical principles to basic and applied biological and biochemical practice and shall understand the role of biological/biochemical science, scientists, and practitioners in society.
	4. Display sufficient practical skills and knowledge in Biotechnology to be sought-after practitioners in industries (brewing, dairy, baking, pharmaceutical), research institutions, tertiary education, manufacturing industries and in the medical sector in Zimbabwe, the region and the world at large.
	5. Demonstrate a decisive approach in the evaluation of scientific data and information, including the capacity to apply relevant statistical analysis and use of statistical software.
	6. Apply relevant Biotechnology techniques to solve real problems in industry.
	7. Provide the students with the knowledge and skills to create employment in varied areas of Biotechnology.
	8. Recommend the use and adoption of biotechnology to solve the

Think in other terms

challenge currently being faced by Zimbabwe, Africa and other developing countries around the world.

9. Analyze the opportunities for the use of biotechnology in business to bring about transformation in their own livelihoods and that of many others through poverty alleviation, better healthcare and job creation.

2.0   REGULATIONS
These regulations shall be read in conjunction with the Faculty of Applied Science and the NUST General Academic Regulations**.**

3.0   ENTRY REQUIREMENTS
3.1   Normal Entry
Applicants must have obtained at least two science subject passes at 'A' Level in Biology and Chemistry.

3.2   Special entry
Candidates who have successfully completed at least a National Diploma in Biotechnology or its recognized equivalent may apply for entry into Part I. Candidates should normally have 2 years post qualification working experience and may be required to attend and pass an interview.

3.3   Mature entry
Applicants who are at least 25 years of age on the first day of the academic year in which admission is sought and who are not eligible for entry under the Normal or Special Entry Regulation may apply for mature age entry provided that they have passed at least 5 'O' level subjects including English Language and Mathematics. They should demonstrate potential suitability for university studies by virtue of their attainments or relevant work experience. Normally applicants should have completed their full-time school or college education at least 5 years before the start of the academic year in which admission is sought. Applicants may be required to attend interviews.

4.0   DURATION
The Programme runs over a period of four years.

5.0   STRUCTURE OF THE PROGRAMME
The programme consists of four parts which includes one year Industrial Attachment taken in Year III. In Year IV, a student shall carry out and complete a research project. In the second semester of Year IV, a student will be able to specialize in a specific field of Biotechnology by choosing four elective modules in the area of Industrial, Medical, Environmental or Agricultural Biotechnology. Elective modules will only be offered subject to availability of teaching staff.

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5.1   **Electives**

Elective modules are grouped into four disciplines and a student shall be expected to select a discipline.

Table 1: Elective Modules

DISCIPLINE	Environmental Biotechnology	Industrial Biotechnology	Medical Biotechnology	Agricultural Biotechnology
Elective 1	SBT 4201	SBT 4203	SBT 4204	SBT 4204
Elective 2	SBT 4202	SBT 4204	SBT4205	SBT 4207
Elective 3	SBT 4203	SBT 4205	SBT 4206	SBT 4208
Elective 4	SBT 4204	SBT 4207	SBT 4207	SBT 4209

6.0   ASSESSMENT

6.1   The overall pass mark in any module shall be 50%.

6.2   Modules shall normally be assessed through continuous assessment (20%), practical assessment (20%) and a final written examination (60%).

6.3   A Module which does not offer practical work shall be assessed at 25% for continuous assessment and 75% for the written examination.

6.4   A student who fails a module(s) may proceed to the following year subject to the Faculty of Applied Science and the NUST General Academic Regulations.

6.5   A student shall earn all and be credited with full credits for any given module when they have successfully completed the module.

6.6   During Industrial Attachment a student may register for failed modules and sit for examinations. The Industrial Attachment module shall be assessed by continuous assessment (50%), an oral examination (10%) and a final written report (40%).

6.7   A student shall be required to carry out and submit **a project report** during the final year of the programme. The project shall be worth 24 credits. The student shall be required to give an oral defence of their project work before a Departmental Panel of Examiners. The oral presentation which shall constitute 10% and the written report shall constitute 90% of the overall module assessment.

6.8   To be eligible for an award of the degree, a student must attain a minimum of **504 credits.**

7.0   WEIGHTING

The contribution of each Year to the overall degree class shall be computed as follows:

Year II – 30%

Year III – 20%

Year IV – 50%

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PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
SBT 1101	Principles Of Microbiology	10
SBT 1102	Animal & Plant Physiology	10
SBB 1103	Cell Biology	10
SCS 1100	Information Technology & Computer Applications	10
SCH 1116	Organic Chemistry	10
ILI 1108	Communication Theory & Practice	10
SBT 1202	Introduction To Biotechnology	10
SBT 1201	Chemistry Of Biomolecules	10
SBT 1203	Biophysics & Instrumentation	10
SBB 1204	Genetics	10
SCH 1217	General Chemistry	10
CTL 1201	Conflict Transformation & Leadership	10

YEAR II

Module Code	Module Description	Credits
SBT 2109	Principles Of Fermentation Technology	12
SBB 2104	Introduction To Enzymology & Immunology	12
SBT 2101	Molecular Genetics	12
SBT 2102	Bacteriology & Mycology	12
SBT 2103	Virology	10
SBT 2104	Molecular Cell Biology	10
SBB2211	Principles Of Quality Control	10
SCH 2108	Principles Of Process Engineering	10
SBT 2201	Research Methods & Statistics	10
SBT 2202	Introduction To Analytical Biotechnology	12

Think in other terms

| SBT 2203 | Introduction To Recombinant DNA Technology | 12 |
| SBT 2204 | Biotechnology Regulation & Biosafety | 10 |

YEAR III

Module Code	Module Description	Credits
SBT 3000	Industrial Attachment	120

YEAR IV (132 Credits)

Module Code	Module Description	Credits
SBT 4010	Research Project	24
SBT 4101	Bioinformatics	12
SBT 4102	Business & Biotechnology	12
SBT 4103	Plant Biotechnology	12
SBT 4104	Molecular Systematics	12
SBT 4105	Animal Biotechnology	12

ELECTIVE MODULES

Module Code	Module Description	Credits
SBT 4201	Fundamentals Of Environmental Microbiology	12
SBT 4202	Bioremediation	12
SBT 4203	Biotechnology For Biofuels & Bioenergy	12
SBT 4202	Enzyme Biotechnology	12
SBT 4205	Biotechnology & Pharmaceuticals	12
SBT 4206	Medical Biotechnology	12
SBT 4207	Industrial Biotechnology	12
SBT 4208	Plant Pathology	12
SBT 4209	Advanced Plant Biotechnology	12

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MODULE SYNOPSES

YEAR I

SBT 1101 Principles Of Microbiology   **10 Credits**
This module looks at the historical development of microbiology; the scope of microbiology, Prokaryotic cell structure; microscopy and specimen preparation including staining methods and associated theoretical principles; microbial nutrition; classification of microbes; general properties and principles of classification of microorganisms as well as sterilization concepts and techniques.

SBT 1102 Animal & Plant Physiology   **10 Credits**
The module explores cell communication, hormonal control, sensory and nervous systems, muscle structure and diversity, muscle fibre types and regulation of contraction, evolution of digestive systems, nutrition, regulation of digestion and gut function, circulatory and respiratory systems, excretory system, plant form and function, transpiration, plant mineral nutrition, solute transport, phloem translocation, photosynthesis light reactions, photosynthesis carbon metabolism in; C3 and C4 plants, crassulacean acid metabolism, photorespiration, assimilation of mineral nutrients; nitrogen and sulphur, water stress physiology, plant growth regulators; auxins, gibberellins, cytokinins, ethylene and abscisic acid, control of flowering and the role of phytochrome in photo morphogenesis.

SBB 1103 Cell Biology   **10 Credits**
The module examines the cell concept; structure and function of cell organelles; cell junctions, cell matrix, cytoskeleton, cell membrane structure and function, electron and light microscopy, microtomy, somatic and gamete cell division, cell culture, cell differentiation and specialization as well as cells in Biotechnology.

SCS 1100 Information Technology & Computer Applications   **10 Credits**
The module is on data and Information, the Computer, hardware functional components, computer software, computer networking, computer security and emerging computer technologies.

SCH 1116 Organic Chemistry   **10 Credits**
The module looks at structure and bonding, Alkanes, Alkenes, Alkynes, introduction to mechanisms of reactions. Stereochemistry- Isomers and Stereoisomers, Benzene and its

derivatives, Cyclohexane, Carbohydrates. Amino acids, Spectroscopy-Ultraviolet/Visible Spectroscopy, Infrared Spectroscopy, Nuclear Magnetic Resonance as well as Mass Spectroscopy.

ILI 1108 Communication Theory & Practice   10 Credits
The module is an overview of Library Services, understanding information literacy, information sources, search strategies, evaluation information sources, use of information, legal and ethical issues and study skills

SBT 1202 Introduction To Biotechnology   10 Credits
The module is an introduction to the field of biotechnology. Topics include the history of biotechnology, areas of biotechnology, traditional vs. modern biotechnology, overview of recombinant DNA technology, DNA, genes and gene expression, transgenic plants and animals, introduction to green biotechnology, production of biological molecules, gene therapy and careers and employment in the biotechnology and biopharmaceutical industries.

SBT 1201 Chemistry Of Biomolecules   10 Credits
The module explores the molecular and macromolecular structure of water, Carbohydrates. Classification, Lipids classification. Fatty acids' prostaglandins; triacyaglycerols; phospholipids; steroids, Amino Acids. Structure, Physical and chemical properties Proteins. It also looks at classification function, bonds responsible for protein structure. Orders of protein structure, connective tissue proteins, collagen; elastin and proteoglycans; Nucleic acids. Nucleotides, Nucleosides Structure of DNA, DNA conformation, DNA supercoiling. Structure of messenger RNA, transfer RNA and ribosomal RNA.

SBT 1203 Biophysics & Instrumentation   10 Credits
The module examines the general Biophysical methods – Measurement of pH, Radioactive labelling & counting, Autoradiography, Separation & Identification of Materials - concept of Chromatography. Centrifugation – Basic Principle of Centrifugation, Microscopy – Light microscopy, Bright & Dark Field microscopy, Fluorescence microscopy, Phase Contrast microscopy, TEM, SEM, X-Ray Crystallography, X-ray diffraction, Concept of different crystal structure, determination of crystal structure Spectroscopy. NMR Spectroscopy and Absorption Spectroscopy.

SBB 1204 Genetics   10 Credits
The module is on cell division, Mendelian Genetics, Control of Gene Expression and Developmental Genetics, Organization of the Gerome in prokaryotes and eukaryotes, Bacterial Genetics, Human Genetics and Population genetics.

SCH 1217 General Chemistry   10 Credits
The module looks at the fundamental ideas of chemistry, Stoichiometry, Atoms and sub atomic particles, Electronic structures of atoms, Periodicity and chemical bonding, Chemical

Think in other terms

thermodynamics, Chemical kinetics, Chemical equilibrium, Ionic equilibrium and Nuclear chemistry.

CTL 1201 Conflict Transformation & Leadership   **10 Credits**

The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

YEAR II

SBT 2109 Principles Of Fermentation Technology   **12 Credits**

The module is an introduction to fermentation processes with particular emphasis on those relevant to developing countries such as Zimbabwe. Aspects of microbial physiology and metabolism relevant to industrial fermentations. Industrial micro-organisms, Fermentation media. Fermentation equipment: Design of fermentators and facilities for process control are looked at. Solid state and submerged culture fermentations: Collection and purification of fermentation products, Treatment and disposal of fermentation effluents and Some features of selected fermentation processes are also covered.

SBB 2104 Introduction To Enzymology & Immunology   **12 Credits**

The module has the major characteristics of enzymes, Mechanism of enzyme reactions, Inhibition of enzyme reactions, Regulation of enzyme activity, Immunolobulins, Structure, Different classes of immunoglobulins, General processes of the immune response. Mechanism of action of T-cell mediators of the immune response Plasma B cells, Memory B cells, Mechanism of action of macrophages and Immune Deficient diseases –e.g. SCID, HIV.

SBT 2101 Molecular Genetics   **12 Credits**

The module explores the evidence of DNA as the genetic material, DNA structure and function, RNA structure and function, Central dogma of genetics, DNA replication, Transcription, Translation, Prokaryotic and eukaryotic gene structure, genetic variation – mutation and recombination, Regulation of gene expression in porkaryotes and eukaryotes, Epigenetics, Natural plasmids, Biology of restriction as well as modification endonucleases and restriction.

SBT 2102 Bacteriology & Mycology   **12 Credits**

The module is about microbial growth; Mathematical description, Measurements, Batch cultures, continuos cultures Effect of environmental factors on microbial growth, control of microorganisms, Culture systems: pure cultures, mixed culture systems, Bacterial genetics, recombination, conjugation, transformation, Fungi culture techniques, media, terrestrial fungi major groups, phylogenetics, general characteristics, life cycles, importance in medicine, agriculture, industry and the ecology of fungi.

Think in other terms

SBT 2103 Virology   **10 Credits**

The module examines the basic virology, capsid structure, genomes, complex viruses, Viral genome size and its effect on virus structure, structural mechanisms employed by viruses to enter host cells, How viruses maximise the protein coding potential of their genomes, virus replication cycles, bacteriophages, virus classification, viruses and biotechnology as well as the mechanisms viruses use to evade host defence responses.

SBT 2104 Molecular Cell Biology   **10 Credits**

This module is an introduction to the study of cell and molecular biology, Interactions between cells and their environment, Cytoplasmic membrane systems, The cytoskeleton and cell motility, The cytoskeleton and cell motility, Cellular reproduction, Cell signalling and Signal transduction, Cancer, Nature of the Gene and Genome and the molecular anatomy of genes and chromosomes.

SBB2211 Principles Of Quality Control   **10 Credits**

The module explores the concept of Quality in Food Processing, Process Control ,Statistical Quality Control, Good Manufacturing Practice (GMP),Good Laboratory Practice (GLP), Probability and Probability Distribution.

SCH 2108 Principles Of Process Engineering   **10 Credits**

The module highlights the fluid Mechanics, Fluid in Motion, Heat Transfer, Mass Transfer, Process Engineering Operations -Evaporation, Distillation, Liquid-liquid extraction, Leaching and Dehydration.

SBT 2201 Research Methods & Statistics   **10 Credits**

This is an introduction to the process of conducting research. research design introduction - Steps in the Process of Research. Writing a research proposal - Identifying a hypothesis and/or research problem, specifying a purpose, creating research questions. Reviewing literature. Ethics of research and informed consent. Introduction to Qualitative and Quantitative Research – Sampling, Collection, Techniques, interpretation. Sampling Concepts and Sampling Methods. Descriptive Statistics. Inferential Statistics - Drawing inference from data, Modelling assumptions, Identifying Patterns, Regression analysis, T-test, Analysis of Variance, Correlations and the Chi-square.

SBT 2202 Introduction To Analytical Biotechnology   **12 Credits**

The module loos at the molecular biology techniques (DNA and RNA extraction, molecular markers, real-time, multiplex and nested PCR, chromatographic techniques, electrophoretic techniques, centrifugation techniques, colorimetry, spectrophotometry and mass spectroscopy, Immunological techniques ELISA, immunoprecipitation, SDS-PAGE, western blot, and flow cytometry as well as Sequencing methods (nucleotide and protein).

Think in other terms

SBT 2203 Introduction To Recombinant DNA Technology   12 Credits
The module has the properties and applications of DNA modifying enzymes, introduction to cloning, Types of cloning and expression vectors, Labelling and detection of nucleic acid sequences, Gene libraries, applications of Polymerase Chain Reaction, Site directed mutagenesis, creation of transgenic organisms, synthetic biology vs Genetic Modifying Organisms, applications of recombinant DNA technology in agriculture, medicine and industry as well as the gene editing technologies.

SBT 2204 Biotechnology Regulation & Biosafety   10 Credits
This module examines the biosafety guidelines and regulations, Purpose of biosafety in terms of protection of ecosystems, public health, farm animals and plants, Biological risk assessment, Bio-containment facilities, practices and personal protective equipment, Microorganisms levels of containment, Decontamination and disinfection, Waste disposal, Biosecurity, Overview of the legal and socioeconomic impacts of biotechnology, Bioethical concerns on biotechnology products, Intellectual Property Rights (IPR) – implications, procedures and types, effects of IPRs on developing countries as well as Patents, applications in biotechnology, examples of patents in biotechnology, impacts of patents.

YEAR III

SBT 3000 Industrial Attachment   120 Credits

YEAR IV   (132 CREDITS)

SBT 4010 Research Project   24 Credits
The final year research project shall be carried out on an individual basis. In this module students are expected to demonstrate through application, the skills acquired throughout the programme. Students shall be expected to produce a final year project report as outlined in the guidelines for this module and shall be expected to defend their work in front of the Departmental panel of examiners.

SBT 4101 Bioinformatics   12 Credits
This module explores the use of Bioinformatics databases and software as research and educational tools. Students will use data mining tools to extract DNA and protein sequences from primary and secondary databases. Software tools will be used to compare and analyze these sequences and construct gene and protein models for solving research problems related to molecular evolution, drug discovery and genetic bases for development and disease. Major topics include- Protein Analysis, Nucleic acid sequence analysis, Data Mining, Post-Transcriptional Modifications Functional & Structural Proteomics, sequence alignments, primer design.

Think in other terms

SBT 4102 Business & Biotechnology   **12 Credits**
The module examines the innovation and entrepreneurship, Law and regulations, Finance, Strategy, What is a biotech business?, Development and management of biotech businesses, managing the transition from a small entrepreneurial firm to a large, sustainable, professionally managed but still entrepreneurial corporation, being an entrepreneur and promoting entrepreneurship in a large corporation.

SBT 4103 Plant Biotechnology   **12 Credits**
This is an introduction to plant cell, protoplast and tissue culture, plant gene structure and genomic organization; transformation in plants, nuclear and plastid transformation; development of transgenic plants; molecular markers and marker-assisted selection in plants as well as GMO regulation.

SBT 4104 Molecular Systematics   **12 Credits**
The module looks at the molecular methods for studying DNA and protein sequence variation between individuals and among populations, Sequencing of target genomics regions for systematics (ribosomal DNA – 16S, ITS, 18S, mitochondrial sequences e.t.c), Measures of similarity from molecular marker and sequence data, clustering techniques, dendrograms and ordination techniques, parsimony, distance and maximum likelihood approaches for defining operational taxonomic units, Introduction to metagenomics, next generation sequencing of metagenomic samples, tools and approaches for analysing and interpreting metagenomic datasets (EBI metagenomics, MEGAN, MG-RAST), comparative metagenomics, metatranscriptomics and metaproteomics.

SBT 4105 Animal Biotechnology   **12 Credits**
The module deals with the mammalian cell culture, gene transfer methods in animals, transgenic animals, molecular techniques in animal diseases (detection, diagnosis and MDR profiling), animal propagation, conservation biology/ embryo transfer techniques, genetic modification in medicine, ethics and genetically engineered organisms.

ELECTIVE MODULES

SBT 4201 Fundamentals Of Environmental Microbiology   **12 Credits**
This module highlights the microbial cell structure and function; microbial growth; microbial metabolism and its regulation; microbial energetics; microbial metabolic diversity; microbial diversity - phylogenetic, physiologic and metabolic; microbial habitats – air, water, soil and extreme environments; microbial ecology; microbial ecosystems – aquatic and terrestrial; interactions among microbes; microbial interactions with the environment; biogeochemical cycles - carbon, nitrogen, sulphur, iron and oxygen; the microbiology of solid and liquid waste treatment; microbiology of portable water treatment.

Think in other terms

SBT 4202 Bioremediation   **12 Credits**

The module covers a history of bioremediation; intrinsic and extrinsic bioremediation; *in-situ* and *ex-situ* bioremediation; environmental pollutants – organic and inorganic; pollutant availability; bioremediation process requirements; bioremediation strategies applicable to polluted aquatic, atmospheric and soil environments; important bacterial and fungal bioremediators; mechanisms of microbial catabolism of pollutants; the bioremediation of common xenobiotic organic pollutants: PAHs, PCBs, Pesticides, petroleum hydrocarbons, DDT; the bioremediation of heavy metals; Phytoremediation; Application of recombinant DNA technology in bioremediation; Pollutant biomonitoring and the limitations of bioremediation.

SBT 4203 Biotechnology For Biofuels & Bioenergy   **12 Credits**

The module looks at biofuels versus fossil fuels; Biofuels feedstock: lignocellulosic biomass, energy crops; Conversion and utilisation of biofuels feedstock; First generation biofuels: bioethanol; Second generation biofuels: lignin modification and degradation, cell wall degrading enzymes, lignocellulosic bioethanol, biodiesel (Jatropha), processing technology for FAME, biogas, Third generation biofuels: Hydrogen and biological processes for hydrogen production, Algae-based hydrogen production and water splitting, Microbe fuel cells; Traditional and molecular breeding of energy crops; metabolic engineering of energy crops; Commercialisation of biofuels; Biofuels and food security conflict; Bioenergy Industry Development and Government Policy.

SBT 4202 Enzyme Biotechnology   **12 Credits**

This module reviews the methods employed in bioseparations to obtain increased purity of biological products. It examines the methods of protein purification including protein precipitation, chromatographic and affinity methods, aqueous two-phase systems, protein and enzymes including genetically engineered organisms, industrial use of soluble enzyme products, carbohydrases, proteases and lipases in food industries, brewing and detergents, Methods of enzyme immobilization - Advantages and Disadvantages, Comparison of enzyme reactor designs for soluble and insoluble enzymes, Methods of using immobilized cells, both viable non-viable, for biotrans formations, Enzyme and cell based biotrans formations for production of pharmaceutical and fine chemicals, The use of enzymes in water-poor non-aqueous solvent, The use of enzymes and cells in aqueous two-phase systems. Enzymes in medical diagnostics and related analyses as well as biosensors utilizing enzymes and cells.

SBT 4205 Biotechnology & Pharmaceuticals   **12 Credits**

This module is an introduction to biopharmaceuticals, Definition of biopharmaceuticals, Drug and product development process and stages, Upstream and downstream processes, Product formulation, Role of regulatory authorities, The biopharmaceutical environment and quality assurance and control, Production and medical applications of selected biotechnology products such as Insulin, FSH, blood coagulating factors VIII and IX, tPA, interferons, monoclonal antibodies and Gene therapy.

Think in other terms

SBT 4206 Medical Biotechnology   **12 Credits**

The module is an introduction to the biology of disease and immunology, disease diagnostics and immunotechnology, monoclonal antibodies, hybridoma technology and monoclonal antibody production, drug development and gene therapy, vaccines and vaccine development, applications of gene profiling, micro-array techniques and DNA finger printing in medical science, stem cell technology and its potential applications, Gene therapy and diagnostic techniques in medicine.

SBT 4207 Industrial Biotechnology   **12 Credits**

The module looks at industrially relevant microorganisms and enzymes; isolation, characterisation, preservation and improvement of industrially important microorganisms; bioprospecting microbial enzymes from diverse environments, their characterisation and improvement; Fermentation processes: batch, continuous and fed-batch culture; fermenter design and operation; fermentation media; inoculum development, preservation and improvement; kinetics of growth and product formation; fermentation downstream processes; industrial processes for the production of microbial enzymes and microbial biomass, fuels and industrial chemicals, food and beverage products (alcoholic, dairy); biomining; production of bioplastics and biosurfactants; use of microbial enzymes in paper production and tannery industry; genetic engineering of plants and microbes for industrial processes.

SBT 4208 Plant Pathology   **12 Credits**

This module is an introduction to the importance of Plant Disease, Plant Disease – Concept, Description and Diagnosis, Cycle Terminology. Plant–Microbe Interactions – Cellular, Biochemical, and Molecular events that determine the diseased state. Gene-for-Gene Hypothesis and Disease Management: Host Resistance. Oomycota – Life Strategies of Plant Pathogens, Infection Processes. Ascomycota – Host Defenses, Systemic Acquired Resistance and Review of Concepts, Disease Dynamics. Basidiomycota – Disease dynamics, Host Resistance. Bacteria – Disease Management, Biological Control. Virus Diseases and Virus Vectors – Life of a Virus, Disease Management: Transgenic Viral Resistance as well as Nematodes – Disease Management, Protection and Eradication.

SBT 4209 Advanced Plant Biotechnology   **12 Credits**

The module looks at the advanced plant cell, protoplast and tissue culture. Plant genetic engineering for pest, pathogen and disease resistance, herbicide tolerance, quality traits, biotic and abiotic stress, plants as bioreactors in the production of plastics, fats/oils, fibres, proteins and biofuels and plant molecular breeding.

Think in other terms

MASTER OF SCIENCE IN APPLIED MICROBIOLOGY AND BIOTECHNOLOGY

1.0 Degree Profile : Master of Science In Applied Microbiology and Biotechnology

Institution:	National University of Science and Technology
Type of degree:	Masters
Credit load:	300 Credits
Level:	SADC-QF - Level
Accreditation organisation:	ZIMCHE
Period of reference:	2018

PURPOSE OF THE PROGRAMME

To develop in students a thorough understanding of the general and advanced principles in the field of Applied Microbiology and Biotechnology.

PROGRAMME CHARACTERISTICS

Areas of Study: Medical Biotechnology, Plant Biotechnology, Industrial Biotechnology

Specialist Focus: It is designed to provide graduates with the practical skills required to produce relevant cost-effective solutions in the development of local manufacturing, agricultural and food production industries, environmental pollution and monitoring and also medical technologies.

Orientation: Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability: Research and Academia, Fermentation industry, Food and dairy industry, Pharmaceuticals industry, Biopharmaceutical companies, Quality control, Environmental Assessment, Microbial waste

management, Medical and pathology laboratories, Water treatment plants.

Further Studies: PhD in Biology, Biochemistry, Microbiology, Biotechnology

TEACHING AND LEARNING

Teaching and Learning Methods: Lectures, tutorials, laboratory classes, seminars, group work, farm research project, individual independent study

Assessment Methods: Written and oral examinations, tests, seminar presentations, mini-research project report, final year research project report

2.0   REGULATIONS
The Regulations for the Master of Science Degree in Applied Microbiology and Biotechnology should be read in conjunction with the Faculty of Applied Science Regulations and the General Academic Regulations.

2.1   Entry requirements
The normal entry qualification shall be an Honours Degree with at least a 2.2 classification in Biological Sciences, Microbiology, and Biochemistry

2.2   Mode of study
2.2.1 The programme shall normally be offered over a period of eighteen (18) months [three (3) semesters] on full-time study and 24 months on block release. When running on fulltime a student shall register for four modules in the First Semester and four in the Second Semester making a total of eight modules in the first year of study. A student shall choose one elective module during the first semester and two electives during the second semester and shall be required to register for the Project Module at the start of the Third Semester.

2.2.2 When running on block release, the programme shall comprises of two blocks of 3 weeks of contact time in the first academic year and two blocks of 2 weeks of contact time for the second academic year. A student shall register for a total of eight modules in addition to a Project module. A student shall choose one elective module during the first academic year and two modules in the second year of study. A research project shall commence during Block 3 in the second academic year.

2.2.3 There are three fields of specialisation with elective modules from which to choose. The three elective modules chosen by the student shall all belong to one discipline or field of specialisation.

2.2.4 Part II shall consist of seminars in assigned readings, reports and a research project leading to a dissertation and an oral presentation.

2.3   Award of the degree
To be awarded the MSc degree, a minimum of 304 credits must be satisfied.

Think in other terms

2.4 Electives

Elective modules (given in Table I) are grouped into three disciplines of Medical Biotechnology, Plant Biotechnology and Industrial Biotechnology.

Table 1: Elective module clusters

Medical Biotechnology	Plant Biotechnology	Industrial Biotechnology
SBB 5213	SBB 5209	SBB 5204
SBB 6116	SBB 6115	SBB 6110
SBB 6117	SBB 6117	SBB 6114
-	SBB 6118	-

2.5 Assessment

A student shall be assessed through continuous assessment (20%), practical   assessment (20%) and a final written examination   (60%) for each taught Module.

2.5.1   The overall minimum pass mark in any module shall be 50%.

2.5.2   A student who fails one module may be allowed to proceed to the next Part of the degree programme whilst carrying the failed module.

2.5.3   A student who fails more than one module but passes at least 50% of the Modules may be allowed to repeat the Part.

2.5.4   A student who fails more than 50% of the modules or fails the same Part of the programme   twice shall be required to withdraw.

2.5.5   A student shall be required to submit two typed and spiral bound copies of the dissertation for assessment.

        A student who passes all 8 modules but fails the Research Project may be awarded a Postgraduate Diploma in Applied Microbiology and Biotechnology.

2.6 Weighting

The weighting of the programme shall be as follows:

Part I taught modules	45 %
Part II taught modules	15 %
Dissertation and seminar(s)	40 %

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PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
SBB 5101	Microbial Genetics	23
SBB 5102	Recombinant DNA Technology	23
SBB 5111	Environmental Microbiology	23
SBB 5211	Entrepreneurial Skills	23
SBB 5212	Analytical Biotechnology And Bioinformatics	23
SBB 5209	Plant Biotechnology (Optional)	23
SBB5213	Medical Microbiology And Biotechnology(Optional)	23
SBB 5204	Advanced Food Microbiology (Optional)	23

PART II

SBB 6110	Industrial Biotechnology (Optional)	23
SBB 6114	Environmental Biotechnology (Optional)	23
SBB 6115	Plant Pathology (Optional)	23
SBB 6116	Immunology (Optional)	23
SBB 6117	Virology (Optional)	23
SBB 6118	Advanced Plant Biotechnology (Optional)	23
SBB 6010	Research Project	116

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MODULE SYNOPSES

PART I

SBB 5101 Microbial Genetics   **23 Credits**
The module looks at gene organization in prokaryotes and eukaryotes, Molecular basis and mechanisms of mutations, Molecular evolution. Regulation of gene expression and metabolic pathways, allosteric proteins, protein-DNA interaction. Yeasts and molecular genetics of cell cycle control and epigenetics.

SBB 5102 Recombinant DNA Technology   **23 Credits**
The module explores gene cloning, vectors-plasmid, bacteriophage, cosmids, YAC, expression of heterologous proteins in *E. coli, S. cerevisiae*, plant and mammalian cells, design of a protein producer, application of RFLPS and PCR techniques, horizontal gene transfer versus vertical gene transfer as well as gene editing technologies and their applications.

SBB 5111 Environmental Microbiology   **23 Credits**
This module examines soil and water microbiology; role of microbes in marine, freshwater and terrestrial ecosystems, biogeochemical cycling; C N, P, S. population and community diversity; interactions between microbial communities. Microbiology of extreme environments, the role of microorganisms in biodegradation, classical and contemporary biochemical, molecular and genomic approaches to microbial physiology, metabolism and ecology and the use of genetically modified microorganisms in the environment.

SBB 5211 Entrepreneurial Skills   **23 Credits**
The module looks at the entrepreneurship and entrepreneurs, reading a Balance Sheet, The business plan. Managing markets, Managing finances. Legal aspect, general Management, conflict management skills, environmental policy and management, release and management of genetically modified organisms (GMO's) as well as biosafety regulations.

SBB 5212 Analytical Biotechnology And Bioinformatics   **23 Credits**
This module examines spectrophotometry, Chromatography GC-HPLC-MS, RIA, Electrophoresis (High molecular and restricted DNA, gel and capillary), DNA and RNA isolation, NA labelling, PCR- qualitative and quantitative, DNA – sequencing, chemical synthesis of polynucleotides. It also looks at protein isolation and purification

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(enzymes, antibodies, heterologous expressed proteins) in laboratory scale, scale-up of protein purification, proteomics – mass spectrometry-based workflows, experimental design, sample collection and preparation. The module is also an introduction   to bioinformatics databases and basic computational tools used in sequence alignment, analyzing genomics and proteomics sequence data.

SBB 5209 Plant Biotechnology (Optional)   23 Credits

The module looks at genetic modification and manipulation to increase and improve the production of plants; crop protection by gene manipulation; plants important   for agriculture, plant viruses, fungi as plant pathogens; molecular basis of pathogenicity-Molecular basis of disease   resistance; plant tissue culture; genetics of   host   plant resistance, breeding for resistance, hypersensitive response, systemic acquired resistance, manipulation of host-pathogen interactions; transgenic plants and the expression of heterologous proteins in plants.

SBB5213 Medical Microbiology And Biotechnology(Optional)   23 Credits

The module highlights medically important bacteria with emphasis on taxonomy, pathogenesis and isolation; identification of microbes – bio typing, quick   methods (classical and DNA probes, pulse-field electrophoresis) DNA; probes in medicine (inborn errors, surgical pathology   (HPV), oncology, forensic medicine); vaccines interferon, antibodies, hormones and laboratory diagnostics for tropical diseases.

SBB 5204 Advanced Food Microbiology (Optional)   23 Credits

The module explores the biodegradation and bio-deterioration of food; types of foodstuffs in relation to chemical composition and susceptibility to spoilage; principles and techniques employed to prevent and control spoilage; sample preparation and its role in microbial analysis; analytical microbiology techniques and their practical application; food poisoning, causative agents, sources of contamination and determination of contaminant level.

PART II

SBB 6110 Industrial Biotechnology (Optional)   23 Credits

The module looks at the application of microbial processes in industry; industrial microorganisms and their nutrition, physiology, growth, selection, isolation, screening, culture collections; production of microbial cells, primary and secondary metabolites, antibiotics, vaccine; immobilization of microbial cells and proteins (enzymes and hormones); application of immobilized products in the industrial production of food, medicines, fine chemicals, ethanol and in the environmental analysis and monitoring.

SBB 6114 Environmental Biotechnology (Optional)   23 Credits

 The module examines biological waste water treatment; aerobic processes (bio filters, bio

contractors, activated sludge), anaerobic conversions, (anaerobic digestion, septic tanks, biogas; biological treatment of industrial waste and reuse of solid organic waste; biomass utilization of starch and cellulose; application of fungi for degradation of lignocellulosics, biofuel production; biodegradation of xenobiotics; bioremediation technologies and soil bioremediation, recovery of minerals from low grade ores; biomining and biooxidation, bioremediation of heavy metal contaminated sites, Biofertilizers and Biopesticides, Bioprospecting.

SBB 6115 Plant Pathology (Optional)   23 Credits
This module looks at the plant pathology basics and epidemiology; host-Plant recognition symbiosis, pathogenicity and resistance; mechanisms of pathogenicity; symbiosis with bacteria, nitrogen fixation, mycorrhizae; deuteromycetes, Ascomycete and Basidiomycete diseases; bacterial and viral diseases, Nematode and insect related disease; seed borne, soil borne and post-harvest diseases; disease control strategies; resistance mechanisms and biological control.

SBB 6116 Immunology (Optional)   23 Credits
The module examines the advanced aspects of immune response, structure of immunoglobulins, complement, mechanism of action B-T-cells ; innate immunity.; polyclonal, monoclonal and synthetic antibodies; hybridoma technology; production and application of immunochemicals; recombinant antibody technology and animal cell culture techniques.

SBB 6117 Virology (Optional)   23 Credits
This module is about molecular structure and assembly of viruses (Tobacco mosaic virus, Tomato virus, HIV); function and role of virus encoded proteins and viral nucleic acids in symptom induction; herpesviruses in humans (Herpes simplex, Herpes zoster and Varicella, Epstein-Barr virus, Cytomegalovirus); measles, Mumps, poliomyelitis, Rubella; other neurotropic viruses and Prions (Rabies, Encephalitis virus, Creutzfeldt-Jakob disease, Kuru, Human T-cell Lymphotropic virus); other system viral diseases (Dengue, Colorado Tick fever, Yellow Fever virus, Haemorrhagic fever viruses (Marburg, Lassa, Ebola), Adenovirus, Coxsackie virus; respiratory syncytial virus, Influenza virus, Rotavirus. Viruses in birds and animals. Avian flu virus, Newcastle disease virus. Plant viruses and analytical virology.

SBB 6118 Advanced Plant Biotechnology (Optional)   23 Credits
This module looks at molecular markers and their applications in plant diversity studies and marker assisted breeding; reverse genetics techniques for functional genomics; principles and applications of plant genomics (based on new generation sequencing) transcriptomics, metabolomics.; molecular farming; plant synthetic biology enabled biofuels, metabolic engineering, chloroplast transformation. Biotechnology status and future status of economic crops; biosafety and International regulation of plant biotechnology.

SBB 6010 Research Project   116 Credits
The research project shall be in an area chosen by the candidate and approved by the

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student's supervisor and the Departmental Board. This process shall take place during their first block release period, at the start of Part II. The student may be placed for a minimum of 10 weeks in an industry, commercial organization or research institute working on the elected research project. The research work shall be completed and the dissertation submitted one week before the examinations at the end of the block release period of Part II. Submissions after that date shall receive no more than a basic pass mark of 50%, unless dispensation is sought from the Department.

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DEPARTMENT OF APPLIED CHEMISTRY

Lecturer and Chairperson
D. Dube, MBA (NUST, Z'bwe), MSc (Higher Institute of Chemical Technology, Bulgaria), CEd (UCE, Z'bwe)

Associate professor
Professor S. Sibanda, PhD (King's College, London, UK), BSc (Hons) (CNAA), CEd

Senior lecturers
C. T. Parekh, PhD (Manchester, UK), MPhil (Manchester, UK) MSc (South Gujarat, India), BSc (South Gujarat, India)

Lecturers
A. Maringa, PhD (Rhodes, SA), MSc (Wits, SA), BSc (Hons) (NUST, Z'bwe), PGDE (NUST, Z'bwe)

B. N. Yalala, PhD (Wits, SA), MSc (UWC, SA), BSc (Hons) (NUST, Z'bwe), QA Cert (City & Guilds), PGDE (NUST, Z'bwe)

D. Nyoni, PhD (Rhodes, SA), MSc (Rhodes, SA), BSc (Hons) (MSU, Z'bwe)

A. Ndiripo, PhD (Stellenbosch, SA), MSc (Stellenbosch, SA), BSc (Hons) (NUST, Z'bwe)

B. Nyoni, MEng. (NWU, SA), BSc (NUST, Z'bwe)

M. Moyo, MTech (Vaal, SA), BSc (Hons) (NUST, Z'bwe)

C. R. Madzivire, MSc (Cape Town, SA), BSc (Hons) (Cape Town, SA)

Staff Development Fellows
S. Mlilo BSc (NUST, Z'bwe)

Senior Secretary
F. Jonathan, Diploma in Business Management (NUST, Z'bwe), Diploma in Secretarial Studies (Hre Polytechnic, Z'bwe)

Chief Technician
C.Mpofu, BSc Chemistry/Physics (UZ, Z'bwe), City & Guilds QA Certificate

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Senior Technicians

E. Bere, BSc (Hons) (NUST, Z'bwe), MSc (BUSE, Z'bwe), PGDE (NUST, Z'bwe)

P. Nyama, BSc (ZOU, Z'bwe), BSc (Special Honours)(NUST, Z'bwe), HND (Hre Polytechnic, Z'bwe),City & Guilds

D. Nyama, BSc (General with Education (MSU) in collaboration with UZ, Z'bwe

UNDERGRADUATE DEGREE PROGRAMME

BACHELOR OF SCIENCE HONOURS IN APPLIED CHEMISTRY

1.0 Degree Profile : Bachelor of Science Honours In Applied Chemistry

Institution:	National University of Science and Technology
Type of degree:	Honours
Credit load:	544 Credits
Level:	SADC-QF - Level 8
Accreditation organisation(s):	Zimbabwe Council For Higher Education

PURPOSE OF THE PROGRAMME

To produce graduates capable of providing chemistry knowledge based solutions to scientific, technological, economic and social challenges.

PROGRAMME CHARACTERISTICS

Areas of Study: Classical chemistry, Polymer science and Chemical engineering Modules

Specialist Focus: Applied Chemistry

Orientation: Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability: Chemist in Pharmaceutical, mining, fertilizer, rubber, metallurgical and chemical industries etc.

Further Studies: MPhil and PhD in Chemistry, MSc by Module work.

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TEACHING AND LEARNING

Teaching and Learning Methods:	Lectures, tutorials, laboratory classes, seminars, group work, industrial visits, industrial attachment, research project, individual independent study.
Assessment Methods:	Written and oral examinations, tests, laboratory reports, seminar presentations, industrial attachment report, final year research project report, continuous assessments.

2.0   REGULATIONS

These regulations should be read together with the Faculty of Applied Science and the University General Regulations for undergraduate degrees.

3.0   ENTRY REQUIREMENT
3.1   Normal Entry

The applicant must have passed 'A' level Chemistry plus EITHER Mathematics or Physics.

3.2   Special Entry

The applicant who has successfully completed a National Diploma in Chemical Technology or its recognized equivalent may apply for entry into Part 1.

4.0   STRUCTURE

The Programme shall consist of thirty one modules plus industrial attachment and a research project. Part III consists of Industrial Attachment which will culminate in the submission of an Industrial Attachment report.

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
SCH 1101	Inorganic Chemistry I	10
SCS 1101	Introduction to Computer Science	12
SPH 1101	Mechanics and Relativity	10
SCH 1102	Organic Chemistry I	10
SCH 1103	Professional Studies	10
SPH 1106	Modern Physics for Chemists	10
SMA 1111	Mathematics for Science I	10

Semester II

CTL 1101	Conflict, Transformation and Leadership	10
SCS 1200	Data Concepts and Data Processing	10
SCH 1201	Inorganic Chemistry II	10
SCH 1202	Organic Chemistry II	10
SCH 1206	Analytical Chemistry I	10
SPH 1209	Engineering Material	10
SMA 1211	Mathematics for Science II	10

YEAR II
Semester I

SCH 2104	Physical Chemistry I	12
SCH 2106	Analytical Chemistry II	12
SCH 2107	Polymer Science I	12
SCH 2108	Transport Phenomena	12
SORS 2110	Introduction to Applied Statistics	10
SCH 2114	Industrial Inorganic Chemistry I	12

Semester II

SCH 2117	Heterocyclic Chemistry I	12
SCH 2204	Physical Chemistry II	12
SCH 2207	Polymer Science II	12
SCH 2208	Unit Operations	12
SCH 2211	Quality Assurance Management and Control	12

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| SCH 2215 | Industrial Organic Chemistry I | 12 |

YEAR III   **120**

| SCH 3010 | Industrial Attachment | 120 |

YEAR IV
Semester I

SCH 4108	Chemical Engineering Plant Design	12
SCH 4114	Industrial Inorganic Chemistry II	12
SCH 4115	Industrial Organic Chemistry II	12
SCH 4206	Analytical Chemistry III	12
SCH 4210	Project Development and Management	12
SCH 4010	Project	10

Semester II

SCH 4208	Reactor Technology	12
SCH 4214	Industrial Inorganic Chemistry III	12
SCH 4215	Industrial Organic Chemistry III	12
SCH 4217	Heterocyclic Chemistry II	12
SCH 4292	Chromatographic Separations	12
SCH 4010	Project	10
TOTAL		**544**

SERVICE MODULES

SCH 1116	Organic Chemistry for SBB, ESH, EFW, TXT	10
SCH 1120	Physical Chemistry for TCE	10
SCH 1217	General Chemistry	10
SCH 1221	Organic Chemistry for Engineers (TCE)	10

TOTAL CREDITS FOR THE PROGRAMME

Part I	142
Part II	142
Part III	120
Part IV	140
Total	**544**

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MODULE SYNOPSES

YEAR I

Semester I
SCH 1101 Inorganic Chemistry I(Structure And Bonding)   10 Credits
The module explores atomic and molecular orbitals; molecular shape and electronic structure; bonding in covalent and ionic compounds; principles of stoichiometry and mass and composition changes in chemical reactions.

SCS1101 Introduction To Computer Science And Programming   12 Credits
The module examines information society and the history of computers. The topics to be covered include data and Information, Number systems and arithmetic; data representation, Basic Computer Component:- CPU I\O units, Storage; *Brief Concepts of Computer Languages and Programming Techniques:* High\low level languages, compiler, interpreter, grammar, recursion, simple data structures (arrays, lists, trees, hash tables, queues and stacks), problem solving; *Algorithms:* Sorting, compression, numerical and encryption; Operating systems and its functions:- process and memory management, I\O, *Data Communication,* Job Control; processing:- File structures, organization and access, Databases; *Fundamentals of Networks as well as a* simple program, initialisation, printing, comments, keywords, constants, assignments and expressions.

SPH 1101   Mechanics And Relativity   10 Credits
This module looks at the following topics: Kinematics and Kinetics. Inertial frames of reference; motion in two and three dimensions.; dynamics of system of particles; interactions between bodies, ralative of motion; conservation of momentum and energy; motion of systems of particles with variable mass; collisions of particles; rotational Dynamics**:** Rotation of rigid bodies; moment of Inertia and its calculations for bodies of various shapes and about different axes; work and energy in rotational motion; angular momentum; and principles of conservation of angular momentum. It also looks at gravitation: Kepler's laws of planetary motion; gravitational potential; gravitation and gravity; effect of earth's rotation on "g"; gyroscope; motion of a satellite; coriolis force; the fundamental forces and their unification; inertial forces in linearly accelerating frame, oscillatory motion**:** Simple harmonic motion; mechanical oscillators; superposition of S.H.M's. Damped and forced S.H.M. together with lissajous and resonance. The properties of Matter Elasticity**:** Hooke's law. Modulli of elasticity and their inter –relationship; applications of elasticity; fluid mechanics**:** Fluid at rest; surface tension and capillarity the continuity equation, various types of flows; boundary layers and turbulence; steady state flow of fluids; bernoulli's equation; viscous flow and viscosity; friction: Nature of frictional forces; motion in frictional medium; rolling and sliding friction; relativity: Space-time frames of

reference; Galileo's principle of relativity; simultaneity of events; Einstein's Special theory of relativity; Lorenttz transformations as well as momentum and energy systems.

SCH 1102   Organic Chemistry I   10 Credits
This module introduces students to the structure and bonding in organic molecules, stereochemistry, organic reaction mechanisms, the chemistry of aliphatic hydrocarbons and the basics of organic spectroscopic analysis.

SCH 1103   Professional Studies   10 Credits
This module covers business Law; Modern Business; Management; Work Study Methods; Marketing; Zimbabwean Political Economy; Effective Communication and Industrial Safety.

SPH 1106   Modern Physics For Chemists   10 Credits
The module covers the yearicle nature of radiation - The photon; the Wave nature of yearicles - The matter wave; the Nuclear Models and an introduction to Elementary Yearicles.

SMA 1111   Mathematics For Science I   10 Credits
The module examines linear Algebra: Matrices, Operations, Inverses, Determinants, Eigen values, Eigenvectors, Solution of Linear Equations; *Functions*: Exponential, Logarithmic, Circular functions and their inverses; Calculus: Idea of limit and continuity. Differentiation; Leibnitz theorem; L 'Hospital's rule; Maxima and Minima; Asymptotes; Concavity; Curve sketching; Taylor's theorem; Power series. Integration - substitution, by years, reduction formulae and Applications.

Semester II
SCS 1200   Data Concepts And Data Processing   10 Credits
This module explores database management systems (DBMS), Database Models: Entity-relationship model; the relational model; the SQL language; database design: ER ro relational mapping; normalisation Aspects of physical database access: Database Transactions: Embedded SQL (PL/SQL); cursors. Distributed databases: Client-server database systems; higher-level and extended data models: Object-oriented data models are introduced. SQL3 and the requirements of multimedia databases.

SCH 1201   Inorganic Chemistry II   10 Credits
This module examines the nomenclature of Inorganic Chemistry. Periodic system; main-groups elements, Noble gases. . d- and f- Transition elements; redox reactions and co-ordination compounds.

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SCH 1202   Organic Chemistry II   10 Credits
Module introduces students to aromatic compounds, and the reactions, preparations, and spectroscopic identification of the common organic functional groups. An overview of the organic chemistry of carbohydrates and several other important biomolecules is included.

SCH 1206   Analytical Chemistry I   10 Credits
The module introduces students to Analytical Chemistry. Topics as Evaluation of Analytical Data, Chemical Equilibria (acid-base, redox, complex-formation, precipitation) and their application are dealt with.

SCH 1209   Engineering Materials   10 Credits
The module outline covers topics on Atomic Structures and Bonding, Chemical Reactions and Reactivity, Phases Crystal Classification, Elastic and Plastic Behaviour. Shaping, testing and behaviour of materials in service. It hives an outline of the different types of engineering materials i.e. non-ferrous materials, ceramics thermoplastics, thermosetting and composite materials as well as fabrication of materials.

SMA 1211   Mathematics For Science II   10 Credits
This module explores yearial Differentiation and Applications; multiple Integrals - definition, change of variables, Jacobian, applications; ordinary Differential Equations - separable, homogeneous, exact, linear, integrating factors; linear Differential Equations with Constant Coefficients.

CTL 1101   Conflict, Transformation And Leadership   10 Credits
The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

SERVICE MODULES
Semester I
SCH 1116   Organic Chemistry for SBB, ESH, EFW, TXT   10 Credits
The module outlines the structures and bonding in organic molecules; alkanes, alkenes, and alkynes. It is an introduction to organic chemical reactions and mechanisms; isomerism and Stereochemistry; benzene and its Derivatives; cyclohexane and carbohydrates; amino acids and the functions of various spectroscopes.

SCH 1120   Physical Chemistry For Engineers (TCE)   10 Credits
The module   examines the fundamental Concepts of Thermodynamics; the 1st Law of Thermodynamics; the 2nd and 3rd Laws of Thermodynamics; chemical Equilibrium; phase

Equilibria; ideal and Real Solutions; electrolyte Solutions; ions in solution; electrode Process; Chemical Kinetics; interfaces and colloidal Dispersions.

Semester II
SCH 1217   General Chemistry for SBB, ESH   10 Credits
The module covers the fundamental Ideas Of Chemistry; stoichiometry; atoms And Sub Atomic Particles; electronic Structures Of Atoms; periodicity and Chemical Bonding; chemical Thermodynamics; chemical Kinetics; chemical Equilibrium; ionic equilibrium; electrochemistry and nuclear chemistry.

SCH 1221   Organic Chemistry for Engineers (TCE)   10 Credits
The module explores structures and bonding in organic molecules; alkanes, alkenes and alkynes. It is an introduction to organic chemical reactions and mechanisms; isomerism and Stereochemistry; benzene and its Derivatives; cyclohexane and carbohydrates; amino acids and the function of various Spectroscopes.

YEAR II

Semester I
SCH 2104   Physical Chemistry I   12 Credits
This module introduces students to interactions and distributions, chemical thermodynamics, phase equilibria, solutions and mixtures.

SCH 2106   Analytical Chemistry II   12 Credits
The module introduces students to Instrumental Analytical Chemistry; spectrometric and Electrochemical methods of analysis and the respective instrumentation are discussed.

SCH 2107   Polymer Science I   12 Credits
The module provides an introduction to polymer classification; polymerization (mechanisms);polymerisation techniques; natural and synthetic fibres; natural rubber, extraction, synthetic rubber and vulcanisation of rubber.

SCH 2108   Transport Phenomena   12 Credits
The module includes: Introduction to Chemical Engineering, Dimensional Analysis, Transport Phenomena, Momentum Transfer (Fluid Statistics, Fluid Dynamics, Flow and Pressure Measurements, Pumping of Fluids), Heat Transfer (Heat Transfer by Conduction, Convection and Radiation Calculation of Heat Transfer Coefficients, Heat Transfer Equipment) and mass Transfer.

Think in other terms

SORS 2110   Introduction to Applied Statistics   10 Credits
The module looks at numerical methods: Errors , absolute and relative; the solution of nonlinear equations; the solution of linear systems; interpolation and polynomial approximations; curve fitting.; numerical differentiation and integration; approximate solution of ordinary differential equations; probability and Statistics: Probability, probability distributions, random variables, moments, principle of statistical inference, estimator and hypotheses testing.

SCH 2114   Industrial Inorganic Chemistry I   12 Credits
The module includes: Industrial Gases; Nitrogen industries; sulphur and sulphuric acid; phosphorus industries, ceramic industries. Introduction to nanoscience and nanotechnology.

Semester II
SCH 2117   Heterocyclic Chemistry I   12 Credits
The module introduces students to the structures, nomenclature, bonding, aromaticity, preparation, reactions and reaction mechanisms for monocyclic heterocyclic compounds. Synthesis of selected compounds which contain hetero atom(s) will be covered.

SCH 2204   Physical Chemistry II   12 Credits
Module deals with ions in solution, electrode processes, chemical kinetics, interfaces and colloidal dispersions.

SCH 2207   Polymer Science II   12 Credits
Module includes: Polymer solution and solubility properties, polymer structures and properties of polymers with details in crystallization, polymer morphology and the amorphous state of polymers. concept of molecular weight. Chemical analysis and thermal analysis.

SCH 2208   Unit Operations   12 Credits
Module includes: Material and Energy Balances, Unit Operations used in Chemical Industry, Binary and Multicomponent Distillation ; Evaporation; Liquid Extraction; Leaching and so on.

SCH 2211   Quality Assurance Management And Control   12 Credits
Module includes: Creativity and Creative thinking, Statistical Quality Control, TQM, ISO standards, Management of Quality in Chemical and Allied Industries.

SCH 2215   Industrial Organic Chemistry I   12 Credits
The module looks at coal and Wood Chemicals, Pulp and Paper Industry; destructive Distillation of Coal, Coking of Coal, Distillation of Coal Tar, Coal to Chemicals, Distillation of hard wood, Hydrolysis of wood cellulose derivatives Fire retardants. Manufacture of Pulp and Paper. It also looks at explosives: Raw materials, manufacture of Explosives as well as the types and use of Explosives

Think in other terms

YEAR III
SCH 3001   Industrial Attachment   120 Credits

YEAR IV

Semester I
SCH 4108   Chemical Engineering Plant Design   12 Credits
The module looks at the fundamentals of materials and energy balances; flow sheeting, computer-aided design, equipment selection and specification; techniques for Economic Analysis and Evaluations as well as costs of Process Equipment.

SCH 4114   Industrial Inorganic Chemistry II   12 Credits
Module includes: selected topics on salts and its compounds and chlor-alkali industries. It also looks at salt and salt compounds: Common Salts; Sodium sulfate; Sodium Bisulfite; Sodium Sulfite, Sodium Silicates as well as chlor-Alkali Industries: Manufacture of Soda Ash, Sodium bicarbonate, Manufacture of Chlorine and Caustic Soda; Bleaching Powder; Sodium Hypochlorite and Sodium Chlorite.

SCH 4115   Industrial Organic Chemistry II   12 Credits
The module deals with agrochemicals such as pesticides, natural as well as synthetic pesticides which include pyrethroids, nicotine, rotenoids, avermectins, organochlorine, organophosphates, carbamate, herbicides and repellent. It also looks at soaps and detergents industries.

SCH 4010   Project   10 Credits
The project is run over two semesters (Part IV, Semester I and Semester II). Students are expected to undertake a Chemistry related research project in any area of their choice. This is expected to enhance their research, laboratory and problem solving skills.

Semester II
SCH 4208   Reactor Technology   12 Credits
The module explore reaction rates, extents of reactions optimum yields; Generalised material and energy balances for batch, Single and multiple continuously stirred tanks, tubular and fixed bed reactor; Prediction of residence time distribution for continuously starred and tubular reactors as well as heterogeneous reaction. The catalyst reactors are discussed.

SCH 4206   Analytical Chemistry III   12 Credits
Module content includes the steps in an analytical investigation (selecting of a method of analysis, sampling, preliminary sample treatment, separation, measurement, assessment of

results), organisation and management of a chemical laboratory in industry. It also covers the quality control in industrial chemistry and the automation of Analysis.

SCH 4210   Project Development And Management   12 Credits
This module is on project development: Initiating the Project; Objects, Processes and Projects; Project Descriptions and Control Organising the Project; Limits of the Project; Project Management; Project Control Process; Organising the Project; Organisational function and limits, Control Communication, Project groups, planning functions, meetings etc. Forms and Specifications for the contents of Documents for Project Control; Reports; Document Files and Practicals.

SCH 4214   Industrial Inorganic Chemistry III   12 Credits
Module deals with selected topics on Metals and Metallurgical Processes; gold, PGMs, Diamonds, Iron and Steel as well as Copper Alloys.

SCH 4215   Industrial Organic Chemistry III   12 Credits
Module deals with selected topics on pharmaceuticals industries-natural and synthetic drugs including synthesis; Vitamins, hormones; Virus such as swine flu, bird flu, Zika virus, synthesis of Tamiflu; fermentation industries- ethanol, citric acid and lactic acid; textile industries-intermediate compounds and their synthesis require for manufacture of various types of dyes; polymer industries- industrial process for manufacturing LDPE, HDPE and polystyrene.

SCH 4217   Heterocyclic Chemistry II   12 Credits
This module further discusses porphorins and porphobilinogen; properties and preparation of condensed five membered ring systems, six-membered ring systems, condensed six-membered heterocycles; selected drugs and their synthesis. Natural products which contain heteroatom(s) will be covered.

SCH 4292   Chromatographic Separations   12 Credits
This module shall introduce students to chromatographic theory and also develop their knowledge and understanding of various chromatographic techniques and their applications in various matrices. The topics covered include: Introduction to Chromatographic Theory (chromatographic retention, peak shape, band broadening and column efficiency, column resolution), gas chromatography (instrumentation, mobile phases, columns and stationary phases, detectors and applications), HPLC (instrumentation, separation modes, mobile phases, stationary phases and applications); Planar chromatography and supercritical fluid chromatography.

SCH 4010   Project   10 Credits
The project is run over two semesters (Part IV, Semester I and Semester II). Students are expected to undertake a Chemistry related research project in any area of their choice. This is expected to enhance their research, laboratory and problem solving skills.

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MASTERS DEGREE PROGRAMME SPECIAL REGULATIONS

MASTER OF SCIENCE DEGREE IN ANALYTICAL CHEMISTRY

1.0 Degree Profile of Master of Science Degree in Analytical Chemistry

Institution: National University of Science and Technology
Type of degree: Masters
Credit load: 305 credits
Level: SADC-QF - level 9
Accreditation organisation(s):
Period of reference:

Purpose of the programme

This programme is designed to provide comprehensive training in analytical chemistry and its implementation. This industrially relevant programme shall provide a student with a strong background in the theory of analytical techniques and give a student the ability to apply these techniques to complex analytical problems. There is an opportunity to study a specialised module in the area of pharmaceutical and clinical analysis.

On completion of this programme students shall be able to identify, formulate, analyse and solve problems in the analysis of chemical compounds. They shall also be able to manage effectively advanced investigations in analytical chemistry, showing the abilities to plan, execute, communicate and critically review the success of an investigation**.**

PROGRAMME CHARACTERISTICS

Areas of Study: Spectroscopic methods, chemical, pharmaceutical and environmental analysis.

Specialist Focus: The characterisation and analysis of materials in the environmental, pharmaceuticals, metallurgical and chemical industries.

Orientation: Research and innovation oriented. Teaching and learning are

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professionally oriented and focused on practical aspects

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability: Chemist in Pharmaceutical, mining, fertilizer, rubber, metallurgical, chemical Research, Academia, Fermentation, Food and dairy industries. Quality control and Water treatment plants.

Further Studies: PhD in Analytical Chemistry

TEACHING AND LEARNING

Teaching and Learning Methods: Lectures, tutorials, laboratory classes, seminars, group work and individual independent study

Assessment Methods: Written and oral examinations, assignments, tests, seminar presentations, mini-research project report, final year research project report.

2.0   REGULATIONS
These Regulations shall be read in conjunction with the Faculty Regulations and General Academic Regulations.

3.0   ENTRY REQUIREMENTS
The normal entry qualification shall be an Honours Degree with at least a 2.2 classifications or better in Chemistry.

4.0   DURATION
The programme shall be offered over a period of 18 months (three (3) semesters) on full-time study and 24 months on block release (four   semesters)

5.0   STRUCTURE
5.1   Full-time Programme
The programme consists of 8 taught modules and a research project work leading to a dissertation. The first 12 months are devoted to 8 taught modules and equally divided into two semesters. The last 6 months are devoted to a research project and the writing of a supervised dissertation.

The research project may be undertaken in the Department, at an industry or any other institution approved by the Departmental Board. The dissertation shall normally be submitted at least one month before the end of the third semester of the Degree programme

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5.2   **Part-time Programme**

The programme consists of 8 taught modules and a research project work leading to a dissertation. The 8 taught modules shall be equally divided into the four (4) blocks. Each semester consists of two blocks and in each block, 2 modules shall be taught.

The research project shall commence at the anytime after the second semester examination. It may be undertaken in the department, at an industry or any other institution approved by the Departmental Board. The dissertation shall normally be submitted at least one month before the end of the fourth semester of the Degree programme

5.3   The weighting of modules shall be based on the notional study hours (NSH) credit system in which all learning activities of a student of average ability, taking place in and outside scheduled contact sessions, are taken into consideration (1 credit = 10 notional hours). A student must attain a prescribed minimum number of credits to qualify for the award of a degree or diploma.

6.0   ASSESSMENT

6.1   A student shall be assessed through Continuous Assessment (25%), and a written examination (75%) for all modules without a practical component; for a module that has a Practical component, Continuous Assessment shall comprise 20%, practical component, 20%, and the final written examination, 60% of the overall mark.

6.2   A student registered for the MSc in Analytical Chemistry shall be required to pass all the Modules for which they have registered.

6.3   The overall minimum pass mark in any module shall be 50%.

6.4   A student who fails a module shall be allowed to proceed to the next Part of the Degree programme whilst carrying the

failed module.

6.5   A student may be allowed to proceed carrying not more than 25% of the number of normally scheduled Modules in a particular year of a programme.

6.6   A Students shall be required to submit two typed and spiral bound copies of the dissertation for assessment.

On submission of a satisfactory dissertation, the student shall be required to defend his/her work before a panel of Departmental Examiners. The project module shall be assessed by oral presentation which shall constitute 25% and a dissertation which shall constitute 75% of the overall assessment.

7.0   WEIGHTING

The weighting of the programme shall be as follows:
Taught modules shall contribute 60% (185 Credits)
The research project shall contribute 40% (120 Credits)

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8.0   AWARDING OF A POST-GRADUATE DIPLOMA

Students who pass, or are credited with, all eight taught modules (185 Credits), but do not successfully complete the project, shall be   awarded a Postgraduate Diploma in Analytical Chemistry.

PROGRAMME SUMMARY

PART I
SEMESTER I

	Module Code	**Module Description**	**Credits**
SCH	5101	Research methodology and scientific writing	24
SCH	5102	Advanced data-driven chemistry	23
SCH	5103	Advanced sampling and sample preparation	23
SCH	5104	Advanced chromatographic separation and mass spectrometry	23

SEMESTER II

SCH	5205	Thermal analysis and electro analysis	23
SCH	5206	Spectroscopic methods	23
SCH	5207	Environmental analysis	23
SCH	5208	Pharmaceutical and clinical analysis	23

PART II
SEMESTER I

SCH	6111	Research project	120

MODULE SYNOPSES

PART I

SCH 5101 Research Methodology And Scientific Writing   24 Credits

The module looks at the nature and concept of research; type of research and tools of research; research design and conceptualization; survey of research and data collection techniques; scientific and technical writing and research ethics. In the seminar each student is required to carry out a literature review of an analytical topic assigned to him/her and make a presentation on their dissertation topic covering literature review, the scope and purpose of their research.

SCH   5102   Advanced data-driven chemistry   23 Credits

The module looks at data analysis: Modern data analysis techniques, Minitab, R, Origin, Sigma Plot. Practical predictive analytics, models and methods. Data visualization and communication; design of experiments, cheminformatics: Representations of chemical structures; sources of chemical information; molecular properties; molecular similarity and diversity; chemo metrics: Quantitative Structure-Activity Relationships (QSAR) and Predictive Models; combinatorial libraries; structure-based drug design; analysis of high-throughput screening data; advanced sampling and sample preparation; advanced chromatographic separation and mass spectrometry.

SCH5103   Advanced sampling and sample preparation   23 Credits

The module explores sampling theory and methodology: Theory of extraction; sample preservation and stabilization techniques; sample contamination and control; sample homogenization; standards, techniques and method development. It also looks at sampling and sample preparation applications: Quality control and assurance in sampling; sampling strategy for process control; sampling methods in food analysis; as well as advanced sampling methods; passive samplers, SPE, SPME.

SCH5104 Advanced chromatographic separation and mass spectrometry 23 Credits

The module examines fundamentals of Chromatographic Separation: Mechanisms of separation; gas and liquid; detection and data-analysis; fundamentals of Mass Spectrometry: Fundamentals of ion motion and selection; mass   spectrometry   instrumentation;   mechanisms   of   ionizations; ionization techniques; applications of chromatography and mass spectrometry: ambient mass spectrometry ; high resolution mass spectrometry as well as mass spectrometry based proteomics.

SCH5205 Thermal analysis and electro analysis   23 Credits

The module looks at thermal Analysis: Thermal gravimetric analysis; differential thermal analysis; differential scanning calorimetry; hyphenated analytical techniques e.g TA-MS, TA-FTIR, electroanalysis: Amperometric technique; voltammetric technique, potentiometric technique and electrolytic conductivity.

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SCH 5206   Spectroscopic Methods   23 Credits
The module is an introduction to spectroscopy; infrared, Raman, Nuclear magnetic resonance spectroscopy, X-ray diffraction; atomic absorption, inductively   coupled plasma spectrometry; atomic, X-ray,   molecular fluorescence and phosphorescence spectrometry as well as chemiluminescence.

SCH   5207   Environmental analysis   23 Credits
The module looks at fate and transport of chemical pollutants: Types of contaminants. Physical/chemical   distribution among phases/media; biogeochemical   processes in soils and groundwater; transport of contaminants; environmental analytical chemistry: Chemical analysis; biochemical analysis; air quality   standards; water and waste water quality standards as well as good laboratory practices. ISO17025.

SCH   5208   Pharmaceutical and clinical analysis   23 Credits
The   module   looks   at   drug   discovery   and   development: Pharmacokinetics   and pharmacodynamics; drug approval process; drug stability testing; design and   analysis   of clinical trials; formulation development and evaluation; advanced pharmaceutical compound analysis: Sample handling, storage and preparation; medical nanotechnology techniques; biological methods of drug analysis; advanced methods in analysis of biopharmaceuticals and quality assurance; GLP and GMP

PART II
SCH   6111   Research project   120 Credits

Students shall be encouraged to come up with research topics of their choice for their research projects. Such projects shall be approved by the Departmental Board before they embark on them.

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DEPARTMENT OF APPLIED MATHEMATICS

Lecturer and Chairperson
Mr Farikayi K. Mutasa, MSc Industrial Mathematics, NUST, BSc Hons Applied Mathematics, NUST, Postgrad Dip in Higher Education, NUST.

Associate Professor
Senelani Dorothy Hove-Musekwa, DPhil Mathematical Epidemiology, UZ, MSc Mathematical Modelling, UZ, B.A. Special Hons Mathematics, UZ, B.A Gen, UZ Graduate Certificate in Education, UZ.

Senior Lecturer
Sarudzai Showa, DPhil Applied Mathematics, NUST, MSc Mathematics, UZ, BSc Hons Mathematics, MSU.

Lecturers
Chipo Mufudza, PhD Statistics, Çukurova, MSc Mathematics, UZ, BSc Hons Applied Mathematics, NUST.

Edward. T. Chiyaka, MSc Mathematics, UZ, BSc Hons Mathematics, UZ, Postgrad Dip in Higher Education , NUST.

Masilin Gugoshava, DPhil Marine, Earth and Atmospheric Sciences, North Carolina State, MSc Industrial Mathematics, NUST, BSc Hons Applied Mathematics, NUST, Postgrad Dip in Higher Education, NUST.

Mbakisi Dube, MSc Applied Mathematical Modelling, NUST, BSc Hons Operations Research and Statistics, NUST, Postgrad Dip in Higher Education, NUST.

Mlamuli Dhlamini, MSc Industrial Mathematics, NUST, BSc Hons Applied Mathematics, NUST.

Nomatter Chiduku, MSc Industrial Mathematics, NUST, BSc Hons Applied Mathematics, NUST, Postgrad Dip in Higher Education, NUST.

Nothabo Dube, DPhil Plant and Soil Science, Texas Tech, MS in Statistics, Texas Tech, MSc Industrial Mathematics, NUST, BSc Hons Applied Mathematics, NUST, Dip in Secondary Teacher Education, Belvedere Teachers College.

Simbarashe Chipindirwi, MSc Mathematical Biochemistry, Lethbridge, MSc Mathematics, UZ, BSc Hons Applied Mathematics, NUST.

Tinashe B. Gashirai, MSc Applied Mathematical Modelling, NUST, BSc Hons Applied Mathematics, NUST.

Research Fellow
Noble Malunguza, DPhil Applied Mathematics, NUST, MSc Industrial Mathematics, NUST, BComm Hons Actuarial Science, NUST, Postgrad Dip in Higher Education , NUST.

Senior Technician
Peter Chiguvare, MSc Information Systems, NUST, MSc Operations Research, NUST, BSc Hons Computer Science, NUST, Microtech City and Guilds I and II, HND Computer Science, ZFETC, ND Computer Science, NID Information Processing.

Secretary
Judith Muzvidziwa, BComm Hons Office Management, GZU, HND in Office Management, Bulawayo Polytech, ND in Secretarial Studies, Masvingo Polytech.

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UNDERGRADUATE DEGREE PROGRAMME SPECIAL REGULATIONS

BACHELOR OF SCIENCE HONOURS DEGREE IN APPLIED MATHEMATICS

1.0 Bachelor of Science Honours Degree in Applied Mathematics

Degree Profile

Institution:	National University of Science and Technology
Type of Degree:	Honours
Credit Load:	480 credits
Level:	SADC-QF - Level 8
Accreditation Organisation(s):	Zimbabwe Council for Higher Education
Period of reference:	From 2018

PURPOSE OF THE PROGRAMME

To develop knowledge, skills and competences in the field of Applied Mathematics relevant to various employment capabilities and careers in the world of work and society. To prepare students for further studies and lifelong learning in Applied Mathematics.

PROGRAMME CHARACTERISTICS

Areas of Study:	Algebra; Calculus; Discrete Mathematics; Computational Mathematics; Modelling; Mechanics; Probability and Statistics; Optimization; Mathematical Analysis, Operations Research
Specialist Focus:	Use of mathematical techniques and models to obtain practical solutions to concrete problems
Orientation:	Research, teaching and learning are professionally oriented and focused on real life problems
Distinctive	Solving problems from many branches of science, engineering, information

Features: technology and commerce

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability   Careers in the retail and manufacturing industry; banking, finance and insurance industry; research institutions; non-governmental organisations; positions in academia, data mining

Further Studies: Master's and Doctoral studies in Applied Mathematics

PROGRAMME DELIVERY

Teaching and Learning Methods: Lectures, tutorials, computer laboratory classes, seminars, group work, industrial visits, industrial attachment, research project, individual independent study

Assessment Methods: Written and oral examinations, tests, seminar presentations, industrial attachment report, final year research project report.

PROGRAMME COMPETENCES

Generic:

1.   **Multidisciplinarity**: Ability to define and solve problems from multiple academic disciplines

2.   **Quantitative and innovative reasoning:** Capability to draw on big data and use analytics for informed decision making and strive to seek new ways of doing things

3.   **Communication skills**: Ability to communicate effectively and to present information orally and in writing and using ICTs to both expert and non-expert audiences

4.   **Analysis and synthesis**: Capacity for analysis using mathematical methods and synthesis using logical arguments and proven facts

5.   **Ethical commitment:** Professional integrity and awareness of impact of applied mathematics on society and the environment

6.   **Entrepreneurial skills:** Capability to identify and create new business ventures based on knowledge and new thinking paradigms

Discipline specific:

1.   **Deep knowledge:** Ability to analyse data in terms of underlying principles and knowledge and by means of appropriate mathematical methods

2.   **Production skills:** Ability to formulate and use mathematical models to better understand the real world for sustainable development

3.   **Technology development skills:** Ability to develop new technologies in applied

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mathematics with a view to enhance production efficiencies and outputs in industry

4. **Problem-solving skills**: Ability to solve a wide range of problems in applied mathematics by identifying their fundamental aspects and using both theoretical and practical methods

5. **Analytical and computational skills**: Ability to use data to analyse various phenomena and technological issues using appropriate computer packages

Intended Learning Outcomes

1. Ability to approach problems in an analytical and rigorous way, formulating theories and applying them to solve problems in business, engineering, the sciences, and other fields;

2. Ability to analyse and interpret data, finding patterns and drawing conclusions to support and improve business decisions;

3. Ability to develop mathematical and statistical models

4. Ability to breakdown a complex system into simple and understandable models

5. Ability to design and conduct observational and experimental studies

6. Ability to demonstrate knowledge and understanding of fundamental concepts in areas of applied mathematics

7. Ability to use mathematical and statistical packages to model and solve problems in applied mathematics

8. Ability to deal with abstract concepts and to think logically

9. Ability to present mathematical arguments and conclusions with accuracy and clarity

10. Ability to identify problems in industry and the community and develop appropriate solutions

11. Develop mathematical models to solve current practical problems

12. Communicate effectively and present information methodically and accurately using multi-media

2.0   REGULATIONS
These regulations should be read in conjunction with the Faculty of Applied Science and NUST General Academic Regulations.

3.0   Mode of Study
The BSc (Hons) Degree in Applied Mathematics is offered on fulltime over a period of four years. A student is required to register for the requisite modules, participate in an Industrial Attachment and carry-out a research project that will culminate in a thesis report. A student shall be required to earn a minimum of 480 credits to successfully complete the programme.

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PROGRAMME SUMMARY

Modules
Year I –
Semester I

Module Code	Module Description	Credits
SMA1101	Calculus	10
SMA1102	Linear Algebra	10
SCS1101	Introduction to Computer Science and Programming	10
SMA1103	Discrete Mathematics	10
SPH1101	Mechanics	10
SMA1108	Introduction to Computer Packages in Mathematics	10

Year I
Semester II

Module Code	Module Description	Credits
SMA1201	Calculus of Several Variables	10
SMA1204	Ordinary Differential Equations	10
SMA1202	Real Analysis	10
SCS1206	Visual Basic Programming Concepts and Development	10
SORS1201	Applied Statistics	10
CTL1101	Conflict Transformation and Leadership	10
Year I Total Credits		**120**

Year II
Semester I

SMA2102	Advanced Linear Algebra	10
SMA2103	Theoretical Mechanics	10
SMA2108	Computer Packages in Mathematics	10
SORS2103	Probability Theory	10
SORS2105	Linear Programming	10
SORS2104	Operations Research Techniques	10

Year II

Semester II

SMA2201	Complex Analysis	10
SORS2203	Optimisation	10
SORS2206	Survey Methods	10
SMA2206	Numerical Analysis	10
SMA2204	Partial Differential Equations	10
SMA2209	Mathematical Modelling	10
Year II Total Credits		**120**

Year III –
Semester I and Semester II

SMA3010	Industrial Attachment	120

Year IV
Semester I

SMA4103	Fluid Mechanics	10
SMA4135	Dynamical Systems	10
SMA4162	Numerical Methods for Differential Equations	10
SMA Elective		10
SMA Elective		10
SMA4010	Project	

YEAR IV
Semester II

SMA4211	Functional Analysis	10
SMA4236	Control Theory	10
SMA4241	Financial Mathematics	10
SMA Elective		10
SMA Elective		10
SMA4010	Project	20
Year IV Total Credits		120
Total Credits For The Programme		**480**

Year IV
Semester I
Electives

SMA4112	Modern Algebra	10
SORS4102	Statistical Inference	10
SMA4172	Mathematical Programming	10
SORS4106	Experimental Design and Multiple Regression	10
SMA4107	Time Series and Simulation	10

Year IV
Semester II

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Electives

SMA4234	Viscous Flow	10
SMA4213	Graph Theory	10
SORS 4207	Multivariate Analysis	10
SMA4253	Categorical Data Analysis	10
SMA4273	Queuing Theory and Stochastic Processes	10
SORS4210	Official Statistics	10

The choice of electives shall be offered subject to staff availability.

3. SERVICE MODULES

MODULES		Credits
SMA1111	Mathematics for Science I	10
SMA1112	Preparatory Mathematics	10
SMA1211	Mathematics for Science II	10
SMA1116	Engineering Mathematics IA	10
SMA1216	Engineering Mathematics IB	10
SMA2116	Engineering Mathematics II	10
SMA2217	Engineering Mathematics III	10
SMA3116	Engineering Mathematics IV	10

MODULE SYNOPSES

YEAR I

SMA1101 Calculus   **10 Credits**
The module looks at the limits of functions; one-sided and infinite limits; continuity; differentiation: definition, basic properties, Rolle's theorem, mean value theorem, Cauchy's mean value theorem, Leibniz's rule, applications, Taylor series as well as integration: definite integrals, antiderivatives, fundamental theorem of calculus, improper integrals, Gamma and Beta functions, definition of natural logarithm as integral of 1/x and exponential as inverse. It also covers area, volume of revolution, arc length, surface area; parametric equations: arc length, surface area; polar coordinates; graph sketching; area in polar coordinates; complex numbers; algebra of complex numbers; DeMoivre's theorem and exponential form.

SMA1102 Linear Algebra   **10 Credits**
The module explores vector Algebra: scalar and vector product. Collinear, coplanar vectors; applications; equations of lines and planes; matrices: products, sums, echelon form, rank, inverse; determinants: definition, properties, evaluation; systems of Linear equations, Gauss's method, Cramer's rule, homogeneous systems as well as vector Spaces: definition, linear independence, bases, subspaces.

SCS 1101 Introduction To Computer Science And Programming
10 Credits
The module examines information and Knowledge Societies, Evolution of Computers, Computer Organisation and Architecture: CPU; Memory; I/O, Number Systems and Conversions (Bin; Dec; Hex; Oct), Concepts of Computer Languages: high\low level languages; compiler; interpreter, Programming Techniques: grammar; recursion; Variables; Data types; Initialization; Comments; Keywords; Constants; Assignment, Programming constructs: branching; looping; recursion; Programming using data structures: arrays; lists; trees; hash tables; queues; stacks; files, Programming Algorithms for Problem Solving: Sorting; compression; numerical and encryption, Fundamentals Operating System, Fundamentals Data Bases as well as the Fundamentals of Networks.

SMA1103 Discrete Mathematics   **10 Credits**
This module looks at sets; union, Intersection, Compliment, Empty and Universal sets; number systems; natural Numbers, Integers, Rationals; induction; field axioms; order axioms; completeness; real numbers; decimal representation; irrationals; interval notation; inequalities; functions; definition; domain, range, inverse functions; logic; predicate calculus; truth tables; proportional calculus; methods of proof; contrapositive; converse; contradiction and combinatorics.

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SPH1101 Mechanics (10 Credits)

The module is on kinematics and Kinetics: Inertial frames of reference; motion in two and three dimensions; dynamics of system of particles; interactions between bodies, relative motion; conservation of momentum and energy; motion of systems of particles with variable mass; collisions of particles. Rotational Dynamics: Rotation of rigid bodies; moment of inertia and its calculations for bodies of various shapes and about different axes; work and energy in rotational motion; angular momentum; principles of conservation of angular momentum; gravitation: Kepler's laws of planetary motion; gravitational potential; gravitation and gravity; effect of earth's rotation on "g"; gyroscope; motion of a satellite; coriolis force; the fundamental forces and their unification; inertial forces in linearly accelerating frame; oscillatory motion; simple harmonic motion; mechanical oscillators; superposition of S.H.M's. damped and forced S.H.M., Lissajous Resonance. It also looks at properties of Matter:Hooke's law; modulli of elasticity and their inter –relationship; applications of elasticity; fluid mechanics: Fluid at rest; surface tension and capillarity; the continuity equation; various types of flows; boundary layers and turbulence; steady state flow of fluids; Bernoulli's equation; viscous flow and viscosity. Friction: Nature of frictional forces; motion in frictional medium and rolling and sliding friction. It also covers relativity: Space-time frames of reference; Galileo's principle of relativity; simultaneity of events; Einstein's Special theory of relativity; Lorentz transformations; momentum and energy systems.

SMA1108 Introduction To Computer Packages In Mathematics 10 Credits

This module shall be a practical module, dealing with the use of computers in a variety of fields through the use of software tools. This is an introductory module in scientific writing, computer algebra and data analysis. It is an introduction to scientific writing; mathematical package; spreadsheet and a statistical package.

SMA1201 Calculus Of Several Variables 10 Credits

The module explores cartesian coordinates in three dimensions; functions of several variables; quadric surfaces; curves; partial derivatives; tangent planes; derivatives and differentials; directional derivatives; Chain rule. Div, grad and curl; Maxima and minima; lagrange multipliers; double and triple integrals; change of order; change of variable; polar and spherical coordinates; line and surface integrals; green' theorem in the plane; divergence theorem; stokes theorem and applications.

SMA1204 Ordinary Differential Equations 10 Credits

The module looks at first order differential equations; separable, linear, exact; integrating factors; existence, uniqueness and applications; second Order Equations; linear equations and linear differential operators; linear equations and linear differential operators; linear independence, Wronskian; ordinary Linear Differential Equation with constant coefficients; undetermined coefficients; variation of parameters; applications; systems of equations; phase plane portraits for Linear systems; introduction to Non-linear systems; predator-prey and Lotka - Volterra

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equations; series solution of ordinary differential equations; method of Frobenius; legendre polynomials and Bessel functions.

SMA1202 Real Analysis   **10 Credits**
This module explore real numbers; completeness, Supremum and Infimum; maximum and Minimum; sequences; definition of convergence; uniqueness of limits; continuity of algebraic operations; bounded sequences; subsequences; bolzano-Weierstrass Theorem, cauchy sequences; series; definitions, elementary properties; series of positive terms; comparison test, ratio test, root test.; integral test; alternating series; absolute and conditional convergence; power series; limits of functions; continuity; taylor's theorem (with remainder); riemann integration.

SCS1206 Visual Programming Concepts And Development   **10 Credits**
The module examines the structure and Nature Of Visual Applications, user interface Contexts (webpage; business applications; mobile applications; games), Canonical uses (GUIs; mobile devices; robots; servers) , Events and event handlers, Separation of model, view, and controller, Visual Design Elements :Object; Controls; Windows; Forms; Dialogues; Templates; Panels; Panes; etc., user-centred development, interaction design: Physical capabilities; Cognitive models, Social models, Principles of good design and good designers, Accessibility, Principles of graphical user interfaces (GUIs), Elements of visual design, User interface standards, Functionality and usability requirements, Techniques for gathering requirements, Internationalisation, interaction styles and techniques, Representing information to users, Design, implementation and evaluation of non-mouse interaction.

SORS1201 Applied Statistics   **10 Credits**
The module is an introduction to Applied Statistics; Statistics: its definition and scope; Descriptive Statistics/Initial Data Exploration: summary statistics, measures of central tendency, mean, mode, median, measures of dispersion, range, variance, standard deviation, Graphical presentation of data, stem and leaf plots, histograms, box plots. Point Estimation/Tests of Hypothesis, interval estimation, $z-test$, $t-test$; Design and Analysis of Experiments, completely randomised designs, randomised complete block designs, Latin squares, factorial designs; Simple linear regression and Statistical computing.

CTL1101 Conflict Transformation And Leadership   **10 Credits**
The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

Think in other terms

YEAR II

SMA2102 Advanced Linear Algebra   **10 Credits**

This module highlights linear Mappings; Matrix representation; Change of basis; Kernel and image of linear mapping; Vector spaces, basis, dimensions; Eigenvectors and eigenvalues; Diagonalization. Basis of eigenvectors; Orthogonal bases; Method of Gramm-Schimdt; Inner product spaces; Cayley-Hamilton theorem; Jordan form and Quadratic forms.

SMA2103 Theoretical Mechanics   **10 Credits**

The module looks at frames of reference; Motion of particle in two or three dimensions; Work, power energy for variable forces; Conservative forces; Motion of a system of particles; Rigid body motion; Generalized coordinates; Lagrange's and Hamilton's equations.

SMA2108 Computer Packages In Mathematics   **10 Credits**

This module shall be a practical module, dealing with the use of computers in a variety of fields through the use of software tools. It is designed to complement the understanding of some Statistical and Mathematical concepts through practical use. Statistical packages, including data handling, descriptive statistics, distribution fitting, graphs and Mathematical packages including: Solution of equations, Limits, Differentiation and Integration; the Solution of first and second order differential equation and the Solution of systems of linear equations shall be covered.

SORS2103 Probability Theory   **10 Credits**

This module examines probability: random/statistical experiments, sample spaces, events, set theory; Axioms of probability; Laws of probability; Finite sample spaces; Conditional probability, independent events; Random variables and probability distributions; Discrete probability distributions; Continuous probability distributions; Discrete bivariate distributions; Continuous bivariate distributions; Marginal probability distributions; Independent random variables; Conditional probability distributions; Distributions of functions of a single random variable; Conditional probability distributions of mathematical expectations; expectations of discrete and continuous random variables; Expectation of a function of a single random variable; Expectation of a function of several random variables; Properties of expectations; Variance and covariance; Markov and Chebyshev inequalities; Moment generating functions; Properties of moment generating functions; Special Distributions: Bernoulli, Binomial, Geometric, Negative Binomial, Hypergeometric, Poisson, Normal, Gamma, Weibull, Exponential and Beta.

SORS2105 Linear Programming   **10 Credits**

The module looks at model formulation Solution methods: graphical, simplex, two phase, computer solutions; Duality and sensitivity analysis; Transportation: initial feasible solution methods—north-west corner, least cost, Vogel's methods; Balanced and unbalanced problems, unacceptable routes, degeneracy, Transhipment problems, Assignment problems; Integer Programming: model formulation; Solution methods: graphical, branch and bound method, cutting plane algorithm, implicit enumeration method; Goal programming: model formulation as well as Goal programming algorithms—the weighting and pre-emptive methods.

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SORS2104 Operations Research Techniques   **10 Credits**
This module explores project management: Critical path analysis. Deterministic activity times. Probabilistic activity times. Gantt charts. Resource scheduling. Cost crashing. Inventory Models: Deterministic demand models: Economic order quantity, Economic production lot size, Economic order quantity with backorders, Quantity discounts. Probabilistic demand models: Single period models, safety stock, Multiple period models. Inventory control: Material requirements planning, materials resource planning, product structure, gross requirements, net requirements. Network Analysis: Terms and definitions; Minimum Spanning Tree problem (Kruskal's Algorithm); Shortest Route problem (Dijkstra's Algorithm); Network Flow problems: Maximum network flow problem (Ford-Fulkerson Labelling Algorithm), Max-flow Min-cut Theorem, Integral flows; Heuristic Problem Solving: Ill structured problems, Heuristics- the human approach to problem solving, Satisfying, heuristic procedures and programs. A case study (e.g. solving a facility location problem) will be looked at.

SMA2201 Complex Analysis   **10 Credits**
The module will look at the analytic functions; Cauchy-Riemann Equations; Conformal Mappings; Line Integrals; Cauchy's Integral Theorem and Formula; Power series; Taylor series, Laurent series; Zeros and singularities; The Residue Theorem; Evaluation of real integrals and series.

SORS2203 Optimisation   **10 Credits**
The module looks at the deterministic and stochastic dynamic programming; Markov programming: value and policy iteration procedure; Advanced Linear Programming: The revised simplex algorithm, validity proofs of the simplex method, use of column generation to solve large-scale linear programming problems, bounded variables algorithm, parametric linear programming, Dantzig-Wolfe decomposition algorithm as well as the Karmarkar interior point algorithm.

SORS2206 Survey Methods   **10 Credits**
This module explores simple random sampling, sample size estimation; Systematic sampling; Sample survey and questionnaire design, postal and telephone questionnaires, interviewer-administered questionnaires; Errors in sample surveys; Ratio and regression estimators, separate and combined ratio estimators; Stratified populations and stratified simple random sampling, optimum allocation and Neyman allocation; Cluster multi-stage sampling and the survey method project.

SMA2206 Numerical Analysis   **10 Credits**
The module looks at errors in numerical analysis; Taylor Series; Solutions of equations in one variable: Bisection and Newton-Raphson methods; Fixed point iteration; Order to convergence; Direct and iterative methods of solving linear systems; Gaussian elimination with scaled partial

pivoting; Jacobi and Gauss-Seidel iterations; Convergence criteria; Interpolation and extrapolation; Lagrange interpolating polynomial; Newton interpolating polynomial; Richardson extrapolation; Integration;Trapezoidal rule, Simpson's rule. Gaussian quadrature and Numerical Solutions of Ordinary Differential Equations.

SMA2204 Partial Differential Equations   10 Credits
The module looks at Fourier Analysis; Fourier Series and Fourier Transforms. Laplace Transformations: Definition. Heaviside function; Convolution. Applications to the solution of Ordinary Differential Equations; Sturm-Liouville problems; Orthogonality; Partial Differential Equations; Classification of second order partial differential equations; The partial differential equations of mathematical physics; Derivation of the wave equation and heat equation in one dimension; Separation of variables; Fourier sine and cosine transforms and Fourier transform methods.

SMA2209 Mathematical Modelling   10 Credits
This module shall be a practical module, dealing primarily with the application of mathematical techniques encountered elsewhere in the degree programme. Whenever necessary, new mathematics shall be introduced. Topics covered may include: Introduction to Mathematical Modelling - Modelling methodology, modelling skills, dimensional analysis. Simple examples. Data Modelling: fitting curves and distribution to data; Simulation Modelling: use of random numbers in investigating simple stochastic situations. Use of Algebra, Statistical and Operational Research Computer Packages.

YEAR III
SMA3010   Industrial Attachment   120 Credits

YEAR IV
SMA4103 Fluid Mechanics   10 Credits
The module explores fundamental concepts; Fluids in equilibrium; The principle of fluid motion; Continuity equations; Bernoulli's equation; Momentum equation; Introduction to viscous flow; Laminar flow problem; Dimensional analysis; Potential flow and vorticity.

SMA4135 Dynamical Systems   10 Credits
The module looks at second order differential equations in the phase plane; First order systems in two variables; Linear systems; Nonlinear systems and linearization; Index of a point; Limit cycles; Poincare-Bendixon theory; Stability; Poincare stability; Liapunov stability; Liapunov's direct method and Liapunov functionals.

SMA4162 Numerical Methods For Differential Equations   10 Credits
The module looks at systems of Ordinary Differential Equations. Initial Value Problems. Numerical Integration using Runge - Kutta methods. Multistep formulas; Predictor corrector

Think in other terms

methods; Convergence and stability; Boundary value problems; Shooting methods; Finite difference methods; Partial differential equations; Finite differences; Parabolic equations;Crank-Nicolson methods; Elliptic equations – Dirichlet and Neumann problems; Hyperbolic equations; Methods of characteristics and Finite element methods.

SMA4010 Project   **20 Credits**
Projects may be carried out on an individual basis. Where possible the project shall be done in an industrial setting. The projects test students' ability to organise, complete and report on a significant piece of Applied Mathematics.

SMA4112 Modern Algebra   **10 Credits**
The module groups definitions and examples; Permutation and symmetric groups; Congruence; Lagrange theorem; Isormophisms and homomorphisms; Quotient groups; Fundamental homomorphism theorem; Rings; Integral domains; Characteristic; Ordered rings; Ring of integers; Fields; Rational numbers; Real numbers; Complex numbers.

SORS4102 Statistical Inference   **10 Credits**
The module looks at indicator function, exponential family of densities; Parametric Point Estimation: parameter space and point estimators; Methods of finding estimators, method of moments, maximum likelihood method, least squares method; Properties of point estimators; unbiased estimators, minimum variance unbiased estimators (most efficient estimators), consistent estimators, sufficient estimators, asymptotic normality of estimators; Confidence Intervals: One-sided confidence intervals; Methods for finding confidence intervals, pivotal quantity, statistical and Bayesian; Hypothesis Testing: definitions. Simple and composite hypotheses, test statistic, critical regions, type I and II errors, level of significance, power of a test; Neyman-Pearson lemma; Uniformly most powerful tests and Likelihood-ratio tests.

SMA4172 Mathematical Programming   **10 Credits**
The module explores dynamical programming; Elements; Recursive equations; Computational procedure and dimensionality; Deterministic and stochastic applications; Markov programming; Value and policy iteration procedure; Non-linear programming; Unconstrained optimisation; Equality and inequality constraints; Search methods; Separable, quadratic and stochastic programming; Geometric programming; Basic concepts; Necessary and sufficient conditions for optimality and Solution procedures.

SORS4106 Experimental Design And Multiple Regression   **10 Credits**
The module looks at the theory and applications of Statistics which include: Experimental Design and Analysis, 2^k Factorial Experiments; Confounding, complete and partial confounding; Orthogonal contrasts; Fractional Factorial Experiments, Aliasing; Multiple Linear Regression: Variable selection and model building; Multiple coefficient of determination, r^2; Mullow's C_p and S_p statistics; Covariance analysis; Stepwise regression methods; Forward selection, backward elimination, and stepwise regression.

Think in other terms

SMA4107 Time Series Analysis And Simulation   **10 Credits**

The module looks at time series: Smoothing techniques; Moving averages, simple exponential smoothing, decomposition, identification of trend, seasonal, cyclic and irregular components; Additive and multiplicative models, autocorrelation functions; Autoregressive moving average models; Statistical Process Control: x charts, range charts, statistical control, capable processes; Simulation: Simulation by hand, pseudo random numbers, data collection, distribution fitting, activity cycle diagrams, model development; Verification, validation, experimentation; Analysis of results; Method of common random numbers and the use of simulation package.

SMA4211 Functional Analysis   **10 Credits**

The module explores metric spaces; Definitions and examples; Open and closed sets, neighbourhoods; Convergence, completeness; Contraction mapping theorem; Application to linear systems, integral equations, differential equations; Normed spaces; Banach space; Finite dimensional spaces; Compactness and Reisz lemma; Lemma; Linear operators and functionals; Dual space; Hilbert spaces; Cauchy-Schwarz inequality, Pythagoras" theorem; Orthogonal complements and direct sums; Orthonormal sets; Fourier series and orthogonal polynomials; Self adjoint operators; Eigenvalues and eigenfunctions.

SMA4236 Control Theory   **10 Credits**

The module highlights the types of control; Feedback control and open loop systems; Principle of superposition; Transfer functions; Block diagrams; State space formulation; Direct solution; Solution using Laplace transforms; Stability; Asymptotic stability; Routh stability criterion; Liapunov's method; Nyquist stability criterion; Controlability and observability criteria; Optimal control; Variational calculus; Free end conditions; Constraints; Optimal control with unbounded continuous controls; Bang-bang control; Pontryagin's principles; Switching curves as well as Transversality conditions.

SMA4241 Financial Mathematics   **10 Credits**

The module is an introduction to financial derivatives, the Cox-Ross-Rubinstein model, finite security markets, the Black-Scholes model, foreign market derivatives, American options and exotic options.

SMA4213 Graph Theory   **10 Credits**

The module is an introduction to the abstract known as a graph; Definitions and characterisation of classes of special graphs; Distance and connectedness measures; Various algorithms applied to graphs and some of their proofs, classical and contemporary.

SORS4207 Multivariate Analysis   **10 Credits**

The module is about methodology and applications of multivariate analysis; Hotelling's T2, multivariate regression and analysis of variance; Classification and discrimination; Principal

components, clustering, multidimensional scaling as well as the use of computer packages, MANOVA.

SMA4273 Queuing Theory And Stochastic Processes   **10 Credits**
The module explores the Queuing Theory; Elements of queuing models, Queues as birth and death process, Poisson queuing models, non-Poisson queues, P;K; formula, Some simple generalizations such as series queues and applications of queuing theory; Stochastic Processes; Theory and applications of random processes, including Markov chains, Poisson processes, birth-and-death processes, random walks and recurrent events.

SORS4210 Official Statistics   **10 Credits**
The module looks at the functions of statistical services; National and International statistical agencies as well as methods of data collection. The module shall put more emphases on; Environmental statistics, Health statistics, Agricultural statistics, Industrial statistics, Economic statistics, Postal censuses and fieldworker surveys.

SERVICE MODULES
SMA1111 Mathematics For Science I   **10 Credits**
This module is recommended for students in Applied Sciences who have passed Mathematics at A-level. It looks at Linear Algebra: Matrices, Operations, Inverses, Determinants, Solution of Linear Equations; Calculus: Limits, continuity, derivatives; Techniques of differentiation; MacLaurin and Taylor series; Applications to extremal problems; Definite and indefinite integrals; Methods of integration; Numerical integration; Simpson's rule; Newton- Raphson method; Complex Numbers: Algebra of complex numbers; De Moivre's Theorem and Complex exponentials.

SMA1112 Preparatory Mathematics   **10 Credits**
The module is recommended for students in Applied Sciences who have not passed Mathematics at A-level it looks at Algebra: Quadratic equations; Laws of indices and logarithms; Partial fractions; Factor and remainder theorems; Binomial expansion; Complex numbers; Trigonometry: Definition of six trigonometric functions for any angle; Trigonometric identities; Compound angles; Matrices: Operations, Inverses; Determinants; Solution of Linear Systems; Functions: Exponential, Logarithmic, Circular functions and their inverses; Calculus: Idea of limit, continuity and derivative; Techniques of differentiation, maxima and minima; Definite and indefinite integrals; Methods of integration as well as application to areas and volume.

SMA1211 Mathematics For Science II   **10 Credits**
This module explores vectors; Equations of lines and planes; Vector and scalar products; Partial differentiation and Applications; Total derivative; Small changes; Maxima and minima; Double Integrals: Evaluation; Change of order; Change of variables; Differential Equations; First order ordinary differential equations; Linear and separable equations; Applications to radioactive decay, mixing problems, reaction rates; Second order linear equations with constant coefficients;

Think in other terms

Systems of first order equations; Numerical solution of ordinary differential equations: Euler, modified Euler and Runge -Kutta methods.

SMA1116 Engineering Mathematics IA   **10 Credits**
This module examines calculus in one Variable: Limits and continuity of functions; Differentiation; Leibniz's Rule; L'Hopital's Rule; Elementary functions including hyperbolic functions and their inverses; Integration - techniques including reduction formulae; Applications - arc-length, area, volumes, moments of inertia, centroids; Plane polar coordinates; Complex Numbers: Basic algebra; De Moivre's theorem; Complex exponentials; Linear Algebra: Vector algebra in 2 and 3 dimensions; Scalar and vector products and equations of lines and planes.

SMA1216 Engineering Mathematics IB   **10 Credits**
This module looks at the functions of Several Variables: Partial derivatives, chain rules; Applications - maxima and minima problems, Lagrange multipliers; Linear Algebra: Matrices - basic operations, rank, inverses; Systems of linear equations – Gauss elimination; Determinants and their properties; Eigenvalues and eigenvectors; Linear independence; Ordinary Differential Equations; First Order differential equations - separable, linear; Integrating factors; Linear second order equations with constant coefficients; Variation of Parameters; Systems of equations as well as Applications of differential equations to mechanics, physics and engineering.

SMA2116 Engineering Mathematics II   **10 Credits**
This module looks at multiple Integrals; Iterated integrals, change of order; Change of variable; Polar, cylindrical and spherical coordinates; Applications in three dimensions; Vector Calculus; Scalar and vector fields; Directional derivatives; Gradient, divergence and curl; Line and surface integrals; Theorems of Green, Gauss and Stokes; Fourier Analysis; Fourier Series; Half range series; Fourier integrals and transformations.

SMA2217 Engineering Mathematics III   **10 Credits**
This module outlines Laplace Transforms; Definitions; Basic ideas; Applications to ordinary differential equations; Statistics; An Introduction to Applied Statistics; Introduction to probability and distribution theory; Descriptive statistics/initial data exploration; Summary statistics, graphical presentation of data; Point estimation/test of hypothesis; Interval Estimation; Analysis of Variance and regression analysis.

SMA3116 Engineering Mathematics IV   **10 Credits**
This module highlights differential Equations; Power series solutions; Singular points; Frobenius method; Special functions and their properties; Legendre polynomials, Bessel functions; Partial Differential Equations; Solution of the partial differential equations (the wave equation, the one dimensional heat flow problem); Method of separation of variables; Numerical Methods; Errors, absolute and relative; The solution of nonlinear equations; The solution of linear systems; Interpolation and polynomial approximation; Curve fitting; Numerical differentiation and integration as well as the approximate solution of differential equations.

Think in other terms

MASTERS DEGREE PROGRAMME SPECIAL REGULATIONS

MASTER OF SCIENCE DEGREE IN APPLIED MATHEMATICAL MODELLING

1.0 Master of Science Degree in Applied Mathematical Modelling

Degree Profile

Institution:	National University of Science and Technology
Type of Degree:	Master of Science
Credit Load:	340 Credits
Level:	SADC-QF - Level 9
Accreditation Organisation(s):	Zimbabwe Council for Higher Education
Period of reference:	From 2018

Purpose of the Programme

To develop knowledge, skills and competences in the field of Applied Mathematical Modelling relevant to various employment capabilities and careers in the world of work and society. To prepare students for further studies and lifelong learning in Applied Mathematical Modelling.

Programme Characteristics

Areas of Study:	Mathematical Modelling, Numerical solutions of Differential Equations, Stochastic Differential Equations, Financial Mathematics, Functional analysis, Dynamical Systems, Mathematical Epidemiology, Forecasting, Fluid Mechanics.
Specialist Focus:	Use of mathematical techniques and models to obtain practical solutions to concrete problems
Orientation:	Research, teaching and learning are professionally oriented and focused on real life problems
Distinctive Features:	Solving problems from many branches of science, engineering, information technology and commerce

Career Opportunities and Further Education

Employability:	Careers in the retail and manufacturing industry; banking, finance and insurance industry; research institutions; non-governmental organisations;

positions in academia, data mining

| **Further Studies:** | PhD in Applied Mathematics or in interdisciplinary programmes related to Applied Mathematics |

Programme Delivery

| **Teaching and Learning Methods:** | Lectures, tutorials, computer laboratory classes, seminars, group work, industrial visits, industrial attachment, research project, individual independent study |
| **Assessment Methods:** | Written and oral examinations, tests, seminar presentations, industrial attachment report, final year research project report, continuous assessments |

Programme Competences

Generic:

1. **Multidisciplinary**: Ability to define and solve problems from multiple academic disciplines
2. **Quantitative and innovative reasoning:** Capability to draw on big data and use analytics for informed decision making and strive to seek new ways of doing things
3. **Communication skills**: Ability to communicate effectively and to present information orally and in writing and using ICTs to both expert and non-expert audiences
4. **Analysis and synthesis**: Capacity for analysis using mathematical methods and synthesis using logical arguments and proven facts
5. **Ethical commitment:** Professional integrity and awareness of impact of applied mathematical modelling on society and the environment
6. **Entrepreneurial skills:** Capability to identify and create new business ventures based on knowledge and new thinking paradigms

Discipline specific:

1. **Deep knowledge:** Ability to analyse data in terms of underlying principles and knowledge and by means of appropriate mathematical methods
2. **Production skills:** Ability to formulate and use mathematical models to better understand the real world for sustainable development
3. **Technology development skills:** Ability to develop new technologies in applied mathematical modelling with a view to enhance production efficiencies and outputs in industry
4. **Problem-solving skills**: Ability to solve a wide range of problems in the sciences, technology and industry, and other fields; by identifying their fundamental aspects and using both theoretical and practical methods
5. **Analytical and computational skills**: Ability to use data to analyse various phenomena and technological issues using appropriate computer packages

Intended Learning Outcomes

1. Ability to approach problems in an analytical and rigorous way, formulating theories

Think in other terms

and applying them to solve problems in problems in the sciences, technology and industry, and other fields;

2. Ability to apply mathematical techniques to problems arising from the planning, monitoring and management of large-scale systems such as health service, communication, energy distribution and transportation systems.

3. Ability to analyse and interpret data, finding patterns and drawing conclusions to support and improve business decisions;

4. Ability to develop mathematical and statistical models

5. Ability to breakdown a complex system into simple and understandable models

6. Ability to design and conduct observational and experimental studies

7. Ability to demonstrate knowledge and understanding of fundamental concepts in areas of applied mathematical modelling

8. Ability to use mathematical and statistical packages to model and solve problems in applied mathematical modelling

9. Ability to deal with abstract concepts and to think logically

10. Ability to present mathematical arguments and conclusions with accuracy and clarity

11. Ability to identify problems in industry and the community and develop appropriate solutions

12. Develop mathematical models to solve current practical problems

13. Communicate effectively and present information methodically and accurately using multi-media

2.0 REGULATIONS
2.1 Introduction
This programme is regulated by the Faculty of Applied Science and the General University Academic Regulations for Postgraduate Masters Degrees by Module-work.

2.2 Entry requirements
The minimum entry requirement shall be an Honours Degree in Mathematics with at least a Lower Second Class Division. Where an applicant holds an equivalent degree, Senate through the recommendations of the Department and Faculty of Applied Science shall make the final decision on the application.

3.0 DURATION
The programme shall run for 18 months full-time and when offered on Block-Release, it shall run over 24 months.

4.0 STRUCTURE OF THE PROGRAMME
4.1 Full-time Programme
A student in Part I shall register for four taught modules in each semester. In Part II (which consists of one Semester), a student shall register for a Project module leading to a Masters

Think in other terms

Thesis which shall be submitted to the Department at least a month before the end of the Semester in Part II.

4.2 **Block –Release Programme**

A student registered on the Block – Release Programme shall register for four taught modules per block whilst in Part I. In Part II a student shall register for a Project Module that shall commence at the beginning of that Part. The Project Module shall run over two Block periods of six months each and the Project report shall normally be submitted to the Department at least a month before the end of Part II.

4.3 A student shall be allowed to proceed to register for a Project Module if he/she has successfully completed all the taught modules.

4.4 A student who is credited with all eight taught modules, but has fails to successfully complete the dissertation may be awarded a Postgraduate Diploma in Applied Mathematical Modelling.

5.0 ASSESSMENT

5.1 Each module shall be assessed at the end of the semester through a written examination. Continuous assessment for the individual modules shall contribute 25% while the written examination shall contribute 75% unless otherwise stipulated as shown in 5.3. The Project Module shall be examined by dissertation and the student shall be required to give a defence to the authenticity of his/her project work before a Panel of Examiners. The dissertation shall normally be submitted for marking, one month before the end of the programme. The taught modules shall contribute 60% while the dissertation shall contribute 40% to the final overall mark.

5.2 A student shall be required to earn a total of 340 credits to be awarded the degree.

5.3 **Modules Assessed at 50% Module-work**

Module	Examination	Module-work
SMA5191	50	50
SMA5221	50	50

6.0 PROCEED AND REPEATING OF MODULES

6.1 A student may be allowed to repeat Part I if he / she has passed the number of modules as stipulated and allowed by the Faculty and General Academic Regulations. He / she may be allowed to proceed to Part II if he/she has successfully completed Part I.

6.2 A student who fails the project with a mark of at least 40% may be allowed to re-submit the project only once at a later date, normally within three months of notification of the result. The maximum mark for such work shall be 50%.

A student who fails a Project Report with less than 40% or after re-submitting the project has failed to satisfy the examiners, may be allowed to repeat the project or opt for the award of a

Postgraduate Diploma in Mathematical Modelling. In repeating the project, a completely new project work shall be undertaken. A repeat of a Project shall be allowed only once.

PROGRAMME SUMMARY

Modules	Credits
Part I	
Semester I	
SMA5111 Advanced Functional Analysis	25
SMA5161 Numerical Solution of Ordinary Differential Equations	25
Elective I	25
SMA5191 Introduction to Mathematical Modelling	25
Part I	
Semester II	
Elective II	25
Elective III	25
Elective IV	25
Elective V	25
Part I - Total credits	**200**
Part II	
Semester I	
SMA5010 Dissertation	140
Programme - Total credits	**340**

Elective Modules	Credits
SMA5131 Continuum Mechanics	25
SMA5141 Integral Equations	25
SMA5151 Variational Calculus	25
SMA5181 Stochastic Differential Equations	25
SMA5211 Advanced Dynamical Systems	25
SMA5221 Forecasting	25
SMA5231 Advanced Fluid Dynamics	25
SMA5241 Perturbation Methods	25
SMA5251 Industrial Statistics	25
SMA5261 Numerical Solution of Partial Differential Equations (pre-requisite is SMA5161)	25
SMA5281 Financial Mathematics (pre-requisite is SMA5181)	25
SMA5291 Mathematical Epidemiology	25

Electives on offer shall be subject to availability of expertise on the staffing.

MODULE SYNOPSES

YEAR

SMA5111 Advanced Functional Analysis   **25 Credits**

The module looks at metric spaces; Definitions and examples; Rn, C[a,b]; Inequalities of Holder, Minkowski, Cauchy-Schwarz; Open and closed sets, neighbourhoods; Convergence, completeness; Contraction Mapping Theorem; Applications to linear systems, integrals equations, differential equations; Normed spaces; Definitions and examples; Banach space; Finite dimensional space; Compactness and Riesz Lemma; Linear operators and functionals; Dual space; Second dual; Reflexivity; Weak convergence; Hilbert spaces; Definitions and examples; Cauchy-Schwarz inequality, Pythagoras's theorem; Orthogonal complements and direct sums; Orthonormal sets; Fourier series and orthogonal polynomials; Hilbert adjoint operator; Self-adjoint operators; Eigenvalues and eigenfunctions; Operators; General measure theory as well as Lebesgue Integral and L^p spaces with special emphasis on the case $p = 2$;

SMA5131 Continuum Mechanics   **25 Credits**

This module explores rigid deformable bodies; Concept of stress; Deformation and kinetics; Balance equations; Constitutive equations; Examples of complex material together with Solution of problems in elasticity and viscoelasticty;

SMA5141 Integral Equations   **25 Credits**

The module outlines iterative methods for linear systems; Initial and Boundary Value Problems for ODES; Methods for Fredholm Integral Equations of the second kind; Neumann series; Degenerate kernels; Quadrature methods; Expansion methods and Applications.

SMA5151 Variational Calculus   **25 Credits**

The module highlights calculus of Variations: Function of one variable and several variables, constrained extrema and Lagrange multipliers, Euler-Lagrange equations; Functions with higher-order derivatives and several dependent variables and independent variables as well as applications.

SMA 5161 Numerical Solutions Of Ordinary Differential Equations `   **25 Credits**

The module is an introduction to Matrix Analysis; Solutions of system of linear and non-linear differential equations, Linear and Non-linear initial value problems, Existence and uniqueness of solutions; Dependence of solutions on initial conditions; Numerical methods: - Euler, Runge-kutta methods; Multistep methods and variable step-size methods – Predictor-corrector methods; Refining of the step size convergence; Convergence and stability; Boundary value problems; Shooting methods for linear and nonlinear problems; Finite difference methods for linear and non-linear problems; Raleigh-Ritz method; Applications: growth models and epidemiological models.

Think in other terms

SMA5181 Stochastic Differential Equations   **25 Credits**

The module is about probability spaces; Random variables and stochastic processes, Ito integrals, Ito's formula and martingale representation theorem; Stochastic differential equations; Diffusions, Boundary value problems; Optimal stopping; Stochastic control and an introduction to jump diffusions.

SMA5191 Introduction to Mathematical Modelling   **25 Credits**

The model looks at the general principles of mathematical modelling and modelling skills needed for abstraction, idealisation, identification of important factors such as variables and parameters. Case studies shall be chosen from the following list hence Students shall study case studies from the following case studies.

Case 1: *Simulation modelling*; Discrete event simulation; Systems dynamics; Simulation software; Sampling methods; Model testing and validation.

Case 2: *Materials Science Modelling*: Understand the micro-level molecular and sub-atomic effects, subtle engineering of special compounds etc; The behaviour of non-typical materials or new materials like semiconductors, polymer crystals, composite materials, piezoelectric materials, optically active compounds, optical fibres etc; create a multitude of research questions, some of which can be approached with mathematical models and models to design and control the manufacturing processes.

Case 3: *Traffic and Transportation Modelling*: Roads, railway networks and air traffic contain many challenges for modelling; In railway industry, mechanical models about the rail-wheel contact, explaining the phenomena of wear, slippage, braking functions etc; The train itself is a dynamical system with a lot of vibrations and other phenomena; Analysis of traffic flow; Scheduling, congestion effects, planning timetables, derivation of operational characteristics etc.

Case 4: *Modelling in Food and Brewing Industry:* Mathematics has to do with butter packages, lollipop ice-cream, beer cans and freezing of meatballs; The food and brewing industry means biochemical processes, mechanical handling of special sorts of fluids and raw materials; The control of microbial processes and production chain.

Case 5: *Chemical Reactions and Processes Modelling*: Chemical processes modelled on various scales; The spatial structures and dynamical properties of individual molecules, to understand chemical bonding mechanisms etc; The chemical reactions are modelled use of probabilistic and combinatorial methods.

SMA5211 Advanced Dynamical Systems   **25 Credits**

The module explains systems of differential equations; Two-dimensional linear and almost linear autonomous systems; Finite difference equations; Steady states and their stability; Stability of

periodic orbits; Lyapunov methods; Bifurcation, one and two- dimensional systems; Discrete systems; Self-similarity and fractal geometry; Chaos detecting and route to chaos.

SMA5221 Forecasting   25 Credits
The module explores applications to business management; Multiple regression modelling; Binary choice models, multiple discrete choice models and limited dependent models as well as time series analysis: ARIMA, ARMA and VARMA models.

SMA5231 Advanced Fluid Dynamics   25 Credits
The module outlines the basic principles of fluid dynamics; Equations of continuity and motion; Dynamical similarity; Some solutions of viscous flow equations; Inviscid flow; Boundary layers; Instability and turbulent flows; Flow in rotating fluids; Geotropic flow, Ekman layer and Rossby waves; Stratified flow; Stratification and rotation.

SMA5241 Perturbation Methods   25 Credits
The module looks at the concept of asymptotic development; Elementary operations on asymptotic expansions; Equations containing a small parameter and or a region slightly perturbed from a regular figure; Solution in terms of the small perturbation parameter; Methods of regular perturbation; Examples of possibility of non-uniform expansions; Methods of singular perturbation: Poincare-Lighthhill-Kuo, matched asymptotic expansion and multiple scales. All the methods shall be illustrated by solving ordinary and partial differential equations.

SMA5251 Industrial Statistics   25 Credits
The module looks at principles of experimental design; Completely randomised designs; Randomised Block designs; Balanced incomplete Block designs; Latin square and crossover designs; Factorial designs; Fractional factorial designs; Response surface methodology; Nested designs; Split-plot designs; Repeated measures designs; Analysis of covariance; Quality control and reliability.

SMA5261 Numerical Solutions Of Partial Differential Equations   25 Credits
This module explores the elliptic Partial differential equations; Poisson Problem with Dirichlet, Neumann and Robin Boundary Conditions, finite difference method; Parabolic partial differential equations; Initial-boundary value problems, one-dimensional explicit and implicit methods, stability; First-order hyperbolic partial differential equations; Finite Element Methods and Variational Techniques: Introduction-functional, Green's theorem, divergence theorem, Euler-Lagrange equations, mixed boundary conditions, functionals for differential problems; Approximation of solution-Ritz method; Variational and weak forms in Hilbert (Sobolev) spaces; Finite Element Methods: Review of elliptic and partial differential equations, Laplace, Poisson, biharmonic and Lame's equations all with various types of boundary conditions;

Think in other terms

Lagrange basis functions; Applications and Fluid flow models, for example air quality modelling.

SMA5281 Financial Mathematics   **25 Credits**
The module is an introduction to financial derivatives, the Cox-Ross-Rubinstein model; Finite security markets; Market imperfections; The Black-Scholes model; Foreign market derivatives; American options; Exotic options; Continuous-time security markets; Arbitrages and equivalent Martingale measures; The one period model; Multi period models; The continuous model; Hedging and completeness; Self financing portfolios; Attainability of a claim; Complete markets; Ito representation theorem; Girsanov's first theorem; Option pricing; European options; American options; The Black Scholes option pricing formula; Optimal portfolio and stochastic control; Stochastic control theory; The Hamilton-Jacobi-Bellman equation; Girsanov's second theorem; Numerical analysis in finance (solving nonlinear partial differential equations arising in finance; Use of appropriate computer packages in finance e;g; Matlab) as well as levy processes in finance.

SMA5291 Introduction To Mathematical Epidemiology   **25 Credits**
The module looks at modelling Transmission Dynamics of Infectious Diseases: Basic concepts of epidemiological modelling; Epidemiological principles and concepts; Tools required to develop mathematical models to understand the transmission dynamics of infectious diseases and to evaluate potential control strategies. Topics to be covered include: history of mathematical epidemiology, Introduction to population modelling, Basic models of disease transmission, SI, SIS, SIR, SIRS, SIE, SIER, SIERS etc; Epidemiological measures and their relationship to disease transmission models; The reproductive number; Use of models to plan clinical trials as well as modelling of sexual, waterborne and vector borne transmitted diseases. The module also looks at immunological Modelling: focusing on modelling the pathogenesis of infectious diseases; The interaction of human and pathogen; The biochemical, pharmacological, immunological, and molecular biological understanding of how infectious agents and the human body interact; Development of models to study host susceptibility to particular pathogens, development of models to study host resistance to chronic or acute disease, development of models for basic studies of infectious organisms, as long as they are oriented toward understanding how the organism interacts with the host, development of models to study virulence factors, immune mechanisms, and genetic studies in the host and in the pathogens. Work on modelling pathogenesis of HIV, malaria, and tuberculosis shall be given higher priority.

SMA5010 Dissertation   **140 Credits**
The dissertations may be carried out on an individual basis. The dissertation normally involves work with some outside organization. The dissertations test students' ability to organise, complete and report on a significant piece of Mathematical modelling.

Think in other terms

DEPARTMENT OF APPLIED PHYSICS

Lecturer and Chairperson
Professor G. Azangwe, PhD(University of Aberdeen, UK), MSc Medical Physics, (University of Aberdeen, UK), BSc Applied Physics (NUST), CPhys, MIPEM, MInstP

Associate Professor
Professor J. Gwamuri, PhD (Michigan Technological University, USA), MSc In Lasers & Optics (NUST), Lic Ed (Physics & Electronics) (Cuba)

Senior Lecturers
Dr T. S. Dloldlo, PhD (Finland),MSc Eng. (Delft)

Dr P. Baricholo, PhD(NUST), MPhil (NUST), BSc Physics Education & Astronomy (Cuba)

Lecturers
Ms E. F. Maguranyanga, MSc in Radiography, Kent University, MBA, NUST, Higher Diploma of College of Radiographers (HDCR), London. Teachers Diploma of College of Radiography (TDCR), London. Health Teachers Diploma, Zimbabwe. MAHPC

Dr T. V. Chabata, MSc In Lasers & Optics (NUST), Lic Ed (Physics & Electronics) (Cuba)

Dr D.M. Murape, PhD Material Science (NMMU, South Africa, MSc Renewable Energy (UZ), BSc (Hons) Applied Physics (NUST), PGDHE, (NUST)

Dr I. K. Muchingami, PhD In Groundwater Studies (University of Western Cape, SA), MSc Geophysics (NUST), BSc (Hons) Applied Physics (NUST), PGDE (NUST

Dr B. Muchono, PhD (University of Johannesburg, SA), MSc in Applied Physics (UZ),BSc (Hons) Applied Physics (NUST)

Mr R . T. Mashingaidze, MSc Geophysics (NUST), BSc (Hons) Applied Physics (NUST)

Mr G. G. Nyambuya, MSc NWU (RSA), BSc (Hons) UZ,

Mr C. Chuma, MSc Geophysics (NUST),BSc (Hons) Applied Physics, (NUSTPGDHE (NUST), Post Graduate Diploma in Remote Sensing (ARCSSTEE, OAU, Nigeria)

Think in other terms

Mrs S. Nleya, MSc in Radiography (Radiotherapy) (Canterbury Christ Church University College, UK), DRC(T), (COR,UK), ZFETC, (Byo Polytechnic)

Mrs J. Tityiwe, MSc in Radiography (UK), DDR (UZ),PGDHE (NUST), FETC (Harare Polytechnic), CMU (Burwin, Canada)

Dr L. Sibanda, MTech in Radiography (RSA), BSc (Gen) (UZ), BSc (Hons) in Radiography (NUST)

Ms P. Mukwada, BSc (Hons) in Radiography (NUST), MSc in Radiography (NUST)

Mr S. T. Gashirai, BSc (Hons) in Radiography (NUST), MSc in Radiography (NUST)

Mr S. Gunda, BSc (Hons) in Radiography (NUST), MSc in Radiography (NUST)

Mr B. T. Rakata, BSc (Hons) in Radiography (NUST), MSc in Radiography (NUST)

Dr D. J. Hlatywayo, PhD in Geophysics, Sweden

Research Fellow
Mr M. Gumbo, MSc Geophysics (NUST), BSc (Hons) Applied Physics (NUST)

Senior Secretary

C Dambaza, Diploma in Management (NUST) Bachelor of Commerce (Hons) Degree in Management (NUST) National Diploma in Secretarial Studies (Bulawayo Polytechnic)

Chief Technician
Mr C. Dzingai, MBA (NUST), BSc (Hons) Applied Physics (NUST)

Senior Technicians
Mr H. Manuel, BSc (Hons) Applied Physics (NUST)

Mr Z. Zulu, MSc Physics (MSU), BSc (Hons) Applied Physics (NUST)

Technicians
Mr W. Chirume, BSc (Hons) Applied Physics (NUST)

Mr J. Dongo, BSc (Hons) Applied Physics (NUST)

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UNDERGRADUATE DEGREE PROGRAMME

SPECIAL REGULATIONS

BACHELOR OF SCIENCE HONOURS DEGREE IN RADIOGRAPHY

1.0 Degree Profile of Bachelor of Science Honours Degree in Radiography

Institution:	National University of Science and Technology
Type of Degree:	Honours
Credit Load:	480 credits
Level:	SADC-QF - Level 8
Accreditation Organisation(s):	Zimbabwe Council for Higher Education
Period of reference:	Accredited by ZIMCHE 2018

PURPOSE OF THE PROGRAMME

To develop knowledge, skills and competences in the field of radiography relevant to various employment capabilities and careers in the world of work and society. To prepare students for further studies and lifelong learning in radiography and related radiation sciences.

PROGRAMME CHARACTERISTICS

Entry Requirements	The programme is governed by the University General Academic Regulations for Undergraduate Honours Degrees. The minimum entry requirement is at least a pass in 'A' level Mathematics and a pass in 'A' level Physics.
Areas of Study:	Engineering Mathematics, Electronics, Physics, Radiographic Imaging, Psychology and Sociology, Professional Studies in Healthcare, Anatomy and Physiology, Information Management and Research Methods, Radiation Protection in Practice, Quality Management
Specialist Focus:	Application of imaging technics in diagnosis and treatment of disease. The program aims to meet patient needs by encompassing the technological

	developments and the evolving roles of healthcare practitioners.
Orientation:	Research, teaching and learning are professionally oriented and focused on real life problems
Distinctive Features:	Solving problems from many branches of science, engineering, information technology and commerce

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability:	Careers as diagnostic or therapy radiographers, applications specialists, inspectors, lecturers, research scientists.
Further Studies:	Master's and doctoral studies in Radiography or in related interdisciplinary programmes.

PROGRAMME DELIVERY

Teaching and Learning Methods:	Lectures, tutorials, clinical exercises, seminars, group work, case studies, industrial attachment, research project, individual independent study
Assessment Methods:	Written and oral examinations, tests, seminar presentations, industrial attachment report, final year research project report, continuous assessments

PROGRAMME COMPETENCES

Generic:

● **Multidisciplinarity**: Ability to define and solve problems from multiple academic disciplines and work with professionals from other disciplines.

● **Quantitative and innovative reasoning:** Capability to draw conclusions for analysis of different case studies and use information from previous cases to for informed decision making and strive to seek new ways of doing things.

● **Communication skills**: Ability to communicate effectively and to present information orally and in writing to both expert and non-expert audiences

● **Analysis and synthesis**: Capacity for analysis for selection of optimal treatment choices through use of evidence based patient management.

● **Ethical commitment:** Professional integrity and awareness of impact of the radiography profession on society and the environment.

● **Entrepreneurial skills:** Capability to identify and create new business ventures based on knowledge and new thinking paradigms

Discipline specific:

● **Deep knowledge:** Ability to analyse various cases presented and decide on the best imaging techniques to use.

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● **Production skills:** Ability to formulate and use protocols to better understand safer delivery of treatments

● **Technology development skills:** Ability to develop and adapt to new technologies in radiography with a view of improving patient care delivery.

● **Problem-solving skills**: Ability to solve a wide range of problems in radiography by identifying their fundamental aspects and using both theoretical and practical methods

● **Analytical and computational skills**: Ability to use data to analyse various phenomena and technological issues using appropriate computer packages

Intended Learning Outcomes

● Ability to approach problems in an analytical and rigorous way, formulating theories and applying them to solve problems in healthcare and other fields;

● Ability to analyse and interpret data, finding patterns and drawing conclusions to support and improve care delivery;

● Ability to develop and optimize scanning protocols

● Ability to breakdown a complex system into simple and understandable components

● Ability to demonstrate knowledge and understanding of fundamental concepts in areas of applied radiography

● Ability to present clinical cases with accuracy and clarity

● Ability to identify problems in hospitals and clinics and develop appropriate solutions

2.0 REGULATIONS

These Regulations shall be read in conjunction with the Faculty Regulations and General Academic Regulations.

3.0 ENTRY REQUIREMENTS

3.1 **Normal entry**

Applicants must have obtained a minimum of five passes in the General Certificate of Education, Ordinary Level, of an approved Examining Board or equivalent. English Language, Mathematics and a Science subject are obligatory. In addition, an applicant must have at least two passes at Advanced Level of the General Certificate of Education from an approved Board or equivalent. The applicant must have passed Physics and any one of

Chemistry, Mathematics or Biology at Advanced Level.

3.2 **Special entry**

Applicants who do not meet the above entry requirements may be considered under special entry with the approval of the University. Students who qualify under this regulation may apply to be exempted from certain modules and examinations. Permission may be given to complete the programme for the Bachelor's Degree in less than the normal required period provided that no student shall be allowed direct entry to the final part of the programme. Normally the exemption will not include the clinical practice component.

Think in other terms

3.3 **Mature entry**

3.3.1 Applicants who are 25 years of age at the time of applying for entry into the programme and are not eligible for normal entry may apply for mature entry.

3.3.2 Candidates must have passed at least five approved 'O' Level subjects including English Language and Mathematics and must have demonstrated potential suitability for University studies by virtue of their attainments and/or relevant work experience. Such experience shall be in the medical field.

3.3.3 Normally, applicants should have completed their full-time school or college education at least five years before the time of their application.

3.3.4 For both special and mature entry, applicants will be required to attend a formal interview as part of the final selection procedure.

4.0 PRACTICAL MODULES

Students shall undertake their clinical learning and practice in radiology departments and shall be assessed during the period of their attachment. They shall be attached to a radiology department in Zimbabwe, both during the semester and vacation periods. A student shall have no less than 95% attendance in the clinical practice in order to complete his / her clinical attachment for any Part of the Program.

In order to pass the clinical assessment, a student shall be expected to attain a mark of **at least 75%.** For grading purposes, the following shall apply:

Mark	Grade/Classification
75% - 79%	Pass
80% - 84%	2.2
85% - 89%	2.1
90% - 100%	1

Practical module-work shall be weighted against other modules in the program as follows:

Part I equivalent to 1 module
Part II equivalent to 1 module
Part III equivalent to 4 modules
Part IV equivalent to 6 modules

5.0   PROJECT MODULE

All students in Part IV must undertake a research project on a topic approved by the Department. The Project module is weighted as two modules.

6.0   DETERMINATION OF RESULTS

6.1   One three-hour written examination paper at the end of each semester shall contribute 75% and module-work 25% towards the final mark. To proceed to the next part of the degree program, the student must obtain a pass mark in the practical module.

6.2   Students are required to pass all modules they will have registered for on any part of the degree program. The pass mark for all the modules on the program shall be 50%. A student who fails a module shall be allowed to carry the module to the next academic year provided regulations are satisfied.

6.3   A candidate who on answering any part of the examination questions describes a "dangerous practice" shall be deemed to have failed that whole question for that particular examination paper. The weighting of the components for the degree classification shall be:

Part I 10%
Part II 20%
Part III 30%
Part IV 40%

PROGRAMME SUMMARY

Module	Code Module Description	Credits
SMA 1116	Engineering Mathematics 1A	10
SPH 1104	Modern Physics	10
SPH 1101	Mechanics and Relativity	10
SPH 1105	Electricity and Magnetism	10
SRA 1101	Fundamentals of Radiography	10
SRA 1102	Professional Studies in Healthcare	10
SRA 1202	Introduction to Psychology and Sociology	10
SRA 1216	Introduction to Radiobiology and Radiation Protection	10
SRA 1214	Occupational Health, Safety and Welfare Services	10
SRA 1204	The Appendicular Skeleton	10
SRA 1000	Practical	10
CTL 1101	Conflict Transformation and Leadership	10
SRA 2104	The Axial Skeleton	10
SRA 2105	The Respiratory System	10
SRA 2103	The Urinary System	10
SRA 2110	Radiographic Imaging and Instrumentation	10
SPH 2108	Analogue Electronics for Radiographers	10
SRA 2207	The Cardiovascular and Lymphatic System	10
SPH 2203	Instrumentation Physics	10
SPH 2201	Vibrations and Waves	10
SPH 2206	Digital Electronics	10
SCS1211	Programming and Program Design	10
SMA 1216	Engineering Maths 1B	10
SRA 2000	Practical	10
SRA 3108	The Digestive System	10
SRA 3103	The Reproductive System	10
SRA 3109	Specialised Imaging Techniques	10
SRA 3110	Research Methods	10
SRA 3116	The Neuro-Endocrine System I	10
SRA 3211	Ultrasound Imaging	10
SRA 3212	Radiography Practice & Different User Groups	10
SRA 3216	The Neuro-Endocrine system II	10

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SRA 3000	Practical	30
SRA 4213	Quality Management	10
SRA 4102	Applied Psychology and Sociology	10
SRA 4118	Image Reporting I	10
SRA 4218	Image reporting II	10
SRA 4010	Project	20
SRA 4000	Practical	60

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MODULE SYNOPSES

YEAR I

SRA 1101 Fundamentals Of Radiography   **10 Credits**

The module looks at medical terminology; Animal cell anatomy and physiology; An introduction to human microscopic and gross anatomy; physiology and pathology (Tissues ; organs, systems and the whole body); Topographical anatomy; Body cavities and their boundaries and subdivisions; Ionizing and non-ionizing radiation; Positioning terminology; Projection terminology; Principles of radiographic Image formation both in conventional film-screen imaging and digital radiography, principles of radiotherapy - Inter relation of x-ray tube, object and film: direction and centering of the x-ray beam in relation to the object; Two dimensional limitations of a radiographic image, requirement for at least two complementary projections for full demonstration of an object; Image quality (conventional film-screen system and digital imaging): Density, Unsharpness of the image, Contrast of the image, Noise; Introduction to exposure factor selection and an introduction to radiographic imaging and treatment; it is an overview of other imaging and radiotherapy modalities (CT, MRI, Ultrasound, RNI, brachytherapy; teletherapy) etc.

SRA 1102 Professional Studies In Healthcare   **10 Credits**

The module explores group Dynamics, Stages of group formations, Being an Effective team member; Study techniques; Communication Sk-ills as health workers; Communication with different stack holders; Types of communication channels; Experiential Learning; Reflection – definition, Types of reflection; The process of reflection; Decision-Making and Professional Judgement; Theories of Decision-making; Group decision making; Medico Legal Considerations; Records Relating to Patients; The Patient's Charter; The radiographer and professional organizations; Research; Introduction to research; The value of research in the health care sector as well as the research process and basic research skills.

SRA 1202 Introduction To Psychology And Sociology   **10 Credits**

The module looks at sociology: Introduction to sociology; Socialization; Social mobility and Social change; An introduction to sociology of health and illness; Sociological theories (Functionalist theories; Social Action theories; Structural theories; Marxist theories; Feminist theories Conflict versus Symbolic Interaction Theories) Social organization of health care services; The family and impact on health. It also looks at psychology: An Introduction to psychology; Perspectives in psychology (Biological, Behavioural, Cognitive, Psychoanalytic, Phenomenological); Individual differences; Personality and behaviour; Trait approach, Psychoanalytic approach, Behaviourist approach; Phenomenological approach; Humanistic psychology; An Introduction to Abnormal psychology as well as social psychology;

SRA 1204 The Appendicular Skeleton   **10 Credits**

The module outlines imaging equipment necessary for radiography of the upper limb; Osteology, arthrology, pathology, radiographic techniques and patient care required for radiography of the

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hand, pathological image appearances related to the above areas; Application of CT in imaging of the above areas; Osteology, arthrology, pathology, radiographic technique and patient care required for radiography of the humerus, elbow, shoulder girdle and shoulder joint of ambulant patients of all ages; Normal and common pathological radiographic anatomy related to the above areas; Role of imaging in patient management of upper limb; Exposure factor manipulation and effect on image quality; Osteology, orthology, pathology, radiographic technique and patient care required for radiography of the foot, lower ankle, lower leg, femur and hip of ambulant patients of all ages and the role of CT in imaging of the above.

SRA 1214 Occupational Health, Safety And Welfare Services   10 Credits

The module examines the hazardous Substances Act, Safety in processing areas, Design of the X-ray department and its impact on health and safety, infection control, Communicable diseases, Notifiable diseases, Fire hazards and precautions, Local rules, Health and safety regulations, The employer's responsibilities, The employee's responsibilities, Moving and lifting techniques, Correct methods and hazards of lifting and moving patients, Electrical hazards and precautions, Injury on duty, Design of the imaging/ radiotherapy departments, Consideration of their design which affect patient care, Facilities, amenities and safety factors to be included; Welfare issues and health insurance.

SRA 1216 Introduction To Radiobiology And Radiation Protection   10 Credits

The module covers ionising radiation, biological effects of ionising radiation, radiobiology, dosimetry, clinical dosimetry, principles of radiation protection, radioactive waste management, external radiation hazard, internal radiation hazard, ionising radiation regulations, Quality assurance in radiation monitoring, radiation protection, justification, dose limitation, dose optimisation, Non-ionising radiation, biological effects as well as sources and protection from non-ionising radiation.

SPH 1101 Mechanics And Relativity   10 Credits

This module highlights kinematics and Kinetics: Inertial frames of reference; Motion in two and three dimensions; Dynamics of system of particles; Interactions between bodies, relative motion; Conservation of momentum and energy; Motion of systems of particles with variable mass; Collisions of particles. It also looks at rotational Dynamics: Rotation of rigid bodies; Moment of Inertia and its calculations for bodies of various shapes and about different axes; work and energy in rotational motion; Angular momentum; Principles of conservation of angular momentum as well as

gravitation: Kepler's laws of planetary motion; Gravitational potential; Gravitation and gravity; Effect of earth's rotation on "g"; Gyroscope; Motion of a satellite; Coriolis force; The fundamental forces and their unification and inertial forces in linearly accelerating frame. The module also looks at oscillatory motion: Simple harmonic motion; Mechanical oscillators; Superposition of S;H;M's; Damped and forced S;H;M;, Lissajous Resonance and properties of Matter: Hooke's law; Moduli of elasticity and their inter-relationship; Applications of elasticity.

The module also highlights fluid mechanics: Fluid at rest; Surface tension and capillarity; The continuity equation; Various types of flows; Boundary layers and turbulence; Steady state flow of fluids; Bernoulli's equation; Viscous flow and Viscosity and friction: Nature of frictional forces; Motion in frictional medium; Rolling and sliding friction as well as relativity: Space-time frames of reference; Galileo's principle of relativity; Simultaneity of events; Einstein's Special theory of relativity; Lorentz transformations; Momentum and energy systems.

SPH 1104 Modern Physics   **10 Credits**
The module explores the particle nature of radiation: Planck's postulate and thermal radiation, Blackbody radiation, the photoelectric effect, the Compton effect, X-ray production and pair production; Interaction of radiation with matter-photon emission and absorption; Stationery states, discrete energy spectrum and the continuous energy spectrum; The Frank-Hertz experiment; Spontaneous and stimulated emission. The module also covers the Wave nature of particles: De Broglie's Postulate; The electron diffraction experiment; The wave-particle duality; The uncertainty principle; Matter waves and their properties; The Thomson and Rutherford atomic models; The stability of the atom and Bohr's Postulates and his model of the atom; Atomic spectra; The Hydrogen Atom; Correction for finite nuclear mass as well as the Nuclear Models: Nuclear properties, sizes and densities, masses and densities; The Nuclear Models - Liquid drop; The deuteron; Shell Fermi gas models; Binding energy nuclear forces; Magic numbers and the nuclear decay and nuclear reactions, e-capture, α and β emission; Fission and fusion and other nuclear reactions; The origin of elements and an introduction to Elementary Particles: Isospin, Pions, Leptons and Families of elementary particles.

SPH 1105 Electricity & Magnetism   **10 Credits**
This module examines the static Electric fields: Coulomb's Law; The electric field; Motion of point charges in electric fields; Lines of force; Electric dipoles in electric fields; Electric flux; Gauss's Law; Applications of Gauss law; Electric Scalar Potential of a system of point charges; Capacitors in circuits; Energy stored in a capacitor; Dielectrics; Applications of Static electricity in Industries;
Electric Current and Resistance: Electric conductors; Current and current density; Kirchhoff's Rules; DC Network Theorems; RC circuits; Wheatstone's bridge; More complex circuits; Measurement of current, Potential Difference and Resistance; Changing sensitivity of Instruments; Thermoelectricity;
Magnetic fields: The force between currents; Definition of magnetic field and Magnetic flux Density; Magnetic intensity, Magnets in magnetic fields and Magnetic dipole moment; Torque on a current loop in a uniform magnetic field; Motion of charges in magnetic fields; Biot-Savart Law; Ampere's Law; Magnetic field of a solenoid and a bar magnet; Induction and Inductance: Faraday's and Lenz's Law; Self and Mutual Inductance Generation of High voltages using principles of induction; Energy storage in inductors and B fields; Electric motors and generators and the Lorentz force. The module also looks at electromagnetic Oscillations and Alternating Currents: L-R, L-C, and L-CR circuits; Basic Alternating current circuits; Phasor notation;

Power in AC circuit; A-C network Theorems; AC bridges; Frequency filtering and tuning circuits; Transformers, capacitor and inductor circuits with generator as well as Eddy currents.

SMA1116 Engineering Mathematics IA   10 Credits
This module looks at calculus in one Variable: Limits and continuity of functions; Differentiation; Leibniz's Rule; L'Hopital's Rule; Elementary functions including hyperbolic functions and their inverses; Integration - techniques including reduction formulae; Applications - arc-length, area, volumes, moments of inertia, centroids; Plane polar coordinates; Complex Numbers: Basic algebra; De Moivre's theorem; Complex exponentials; Linear Algebra: Vector algebra in 2 and 3 dimensions; Scalar and vector products; Equations of lines and planes.

SMA1216 Engineering Mathematics IB   10 Credits
The module explores functions of Several Variables: Partial derivatives, chain rules; Applications - maxima and minima problems, Lagrange multipliers; Linear Algebra: Matrices - basic operations, rank, inverses; Systems of linear equations – Gauss elimination; Determinants and their properties; Eigenvalues and eigenvectors; Linear independence; Ordinary Differential Equations; First Order differential equations - separable, linear; Integrating factors; Linear second order equations with constant coefficients; Variation of Parameters; Systems of equations and applications of differential equations to mechanics, physics and engineering.

YEAR II

SRA 2103 The Urinary System   10 Credits
This module examines anatomy physiology and pathology of the urinary tract and pelvic cavity, Imaging of the Abdomen and Urinary tract, Plain radiography, Contrast examinations, CT, RNI, Ultrasound, Relevant Equipment and Imaging equipment for Abdomen, Role of imaging in patient management, Patient care and management, The use of resources and associated risk, Use of contrast agents/isotopes, Radiation doses, Imaging relevant i.e. exposure factors, film selection, intensifying screens, magnification and FFD methods of maintaining contrast etc. Phlebotomy, ;venepuncture, Equipment relevant; Technique: To include basic projections and specialised views, paediatric technique neonate and baby to be included, modifications of technique in accident and emergency patients, non-ambulant patients; C O P relevant to each section as well as the role of other imaging modalities in imaging the abdomen i.e. CT, USS, RNI, MRI etc.

SRA 2104 The Axial Skeleton   10 Credits
The module highlights the anatomy and physiology of the spine, pelvis and thoracic cage; Radiographic anatomy and common pathology of the spine, thoracic cage and pelvis e;g; metastatic, degenerative and inflammatory processes; The cause and nature of fractures of these areas such as crush impacted, pathological, comminuted and transverse; Patient care and management with particular reference to patients whose condition is comprised by age and/or trauma; Applied specialist communication techniques; The radiographic techniques for AP and

lateral projections of each anatomical area of the vertebral column; AP pelvis/hips, lateral hip, lateral neck of femur; Projections of sternum and ribs; The application of CT examinations to the diagnosis and management of conditions related to the pelvis and vertebral column, the protocols and procedures associated with such examinations; X-ray table design and use; Stationary and moving grids and their applications to imaging the spine and pelvis; Exposure factor manipulation and its effects on image quality.

SRA 2105 The Respiratory System   **10 Credits**

This module outlines anatomy physiology and pathology of the thoracic cavity, excluding heart and great vessels; Imaging relevant exposure factors, film selection, intensifying screens, magnification and FFD methods of maintaining contrasts etc; Equipment relevant, i;e; dedicated chest units; Technique: To include basic projections and specialised views, paediatric techniques neonate and baby, modifications of technique in accident and emergency patients, non-ambulant patients; C O P relevant to each section as well as the role of other imaging modalities in imaging the chest i;e; CT, USS, RNI, MRI, etc and the critical Pathways: - Patient Care and Management.

SRA 2107 The Cardiovascular And Lymphatic System   **10 Credits**

The module examines anatomy, physiology and pathology of the cardiovascular system, lymphatic and reticulo -endothelial system; Imaging relevant above systems; Special cassette, exposures, screens; Equipment relevant: Special angio units and associated details; Relevant technique; Role of other imaging modalities in imaging the cardiovascular system; Matching imaging methods to pathology i.e.; the use of a modality to produce the optimum image and the most effective health care within the available resources; The place of imaging in the patient's pathway through the hospital i;e; to emphasise the role that imaging has in influencing patient management; Patient care and management and basic life support cardiopulmonary resuscitation.

SRA 2110 Radiographic Imaging And Instrumentation   **10 Credits**

The module looks at the production of x-rays – characteristic x-rays, bremsstrahlung; Nuclear decay, the electromagnetic wave spectrum and significance in imaging, The x-ray tube design, types of x-ray tubes, x-ray generators- types and application, image intensifier and the fluoroscopy machines; The control panel, X-ray interaction processes with matter and their implications for imaging; Control of x-ray tube output, reciprocity law, reciprocity failure; The latent image, image quality metrics; Radiographic image receptors, historical image receptors - film/screen systems and image processing; Radiographic image digitisation; Modern image receptors; Computed radiography systems, Digital radiography (DR) systems; Image quality and dose optimisation in DR; Image post-processing, image viewing, digital image display, specifications of monitors (display units) in digital radiography, printers, image quality in digital radiography era and information management systems –PACS, HIS, RIS, telemedicine.

Think in other terms

SPH 2203 Instrumentation Physics **10 Credits**

The module looks at measurement Systems: Purpose, structure and elements; Static characteristics of measurement instruments, repeatability, tolerance, calibration, measurement standards, frequency response of measurement elements, error calculations and error compensation; Noise and interference in measurement circuits, random signals, probability density, spectral density and autocorrelation functions, noise reduction methods, economics, reliability and choice of measurement systems. It also looks at transducers: Principles and types; Capacitive, resistive, inductive, electromagnetic, thermoelectric, elastic, piezoelectric, piezo-resistive, electrochemical, gas, ion selective electrodes; signal conditioners and data acquisition: Applications and limitations of op-amps, instrumentation amplifiers, current transmitters, frequency to voltage converters, current to voltage converters, energy to voltage converters, phase locked loops, ADC and DAC application in instrumentation systems, analogue and digital recorders, digital printers; introduction to flow measurement: Velocity, volume flow-rate, mass flow-rate, types of flow meters - ultrasonic, Doppler flow meter, pulse transmission and reflection, medical imaging flow measurement; radiation Measurements: Photo-multiplier tubes, scintillators, ionisation chambers, infrared detectors, semiconductor detectors, nuclear instrumentation and standards.

SPH 2206 Digital Electronics **10 Credits**

The module looks at denary, Octal, Hexadecimal, Binary Numbers; Various codes used; Binary addition, subtraction, multiplication, division; logic Gates, Semiconductor Diodes & Transistor as switching devices NAD, NOT, NOR, OR and Exclusive 'OR* gates Boolean Algebra; Principle of Duality De Morgan's theorem; Half Adder and Full Adder; Karnaugh Map (2, 3, and 4 variables); Mini-terms and Maxi-terms; Use of K-Map using Mini-terms to simplify logic functions; Canonical forms of a function; Symmetric functions; Equivalence and Non-Equivalence Symmetry; Incompletely specified functions; Combinational gates; Logic gate Analysis and Synthesis, logic Technology: D-T and TTL logic; Fan in, fan out and noise margins; Logic Threshold; Interfacing logic devices. The module also looks at sequential Logic Systems: Flip-flops, 'SR*, JK, D and T type; Race around condition in clocked flip-flop; Master Slave flip-flop; Shift Registers; SIPO, SISO, PISO, and PIPO; Shift left to right; Schmidt Trigger; Types of memory used in computers; Counters: Synchronous and non-synchronous; Binary & Denary counters; Divide by n or Modulo 'n' counters; Up and down counters, series and parallel carry modes; ADC and DAC: Sample and Hold circuit, Resolution of conversion, Successive Approximation ADC, Counter Ramp ADC; Weighted Resistor ladder DAC; Counter Properties.

YEAR III

SRA 3103 The Reproductive System **10 Credits**

This module reviews the anatomy and physiology of the reproductive system; begin to critically assess the available optimum imaging modalities; review the range of pathologies most

commonly found within the reproductive system; match available imaging modalities to both patients' needs and pathology; the role of radiography in the application of therapeutic methods within the reproductive system; assess the critically image produced by a variety of imaging methods applied to the reproductive system and the risk associated with imaging and therapeutic methods applied to the reproductive system. The module looks at the illustrative module content: Anatomy, physiology and pathology of the male and female reproductive system; Imaging relevant to the reproductive system; Equipment relevant to the reproductive system; Technique of demonstrating the reproductive system: Relevant care of patient and the role of other imaging modalities in demonstrating the reproductive system.

SRA 3108 The Digestive System   **10 Credits**
This module reviews the anatomy and physiology of the gastrointestinal system; begin to critically assess the available optimum imaging modalities; review the range of pathologies most commonly found within the gastro-intestinal system; match available imaging modalities to both patient needs and pathology; the role of radiography in the application of therapeutic methods within the gastro-intestinal system; assess critically image produced by a variety of imaging methods applied to the gastro-intestinal system; review the risk associated with imaging and therapeutic methods applied to the gastro-intestinal system. The module looks at the illustrative module content: Anatomy, Physiology and Pathology of the gastro-intestinal tract (GIT) i;e; Alimentary tract i;e; division and boundaries, The tongue, The teeth, mouth oral cavity, Salivary glands, Pharynx, Oesophagus, Stomach, Small and large intestines, Liver, Biliary tract, Pancreas, Physiology of digestion i;e; mechanical and chemical processes of digestion, metabolism; Imaging relevant to the GIT; Equipment relevant to the GIT Technique of demonstrating the GIT; COP relevant; role of other imaging modalities in demonstrating the GIT.

SRA 3109 Specialised Imaging Techniques   **10 Credits**
This module deals with the principles and applications of radionuclide imaging, SPECT, PET, hybrid systems, bone mineral densitometry, mammography sport science imaging, molecular imaging and interventional techniques; clinical applications and protocols are discussed for each technology.

SRA 3116 The Neuro-Endocrine System I   **10 Credits**
The module explores the anatomy, physiology and pathology for the central and peripheral nervous system and organs of the endocrine system in all patients of all ages; Central Nervous System: Nervous tissue, brain, spinal cord meninges, cerebrospinal fluid, blood barrier system; Peripheral Nervous System: Cranial nerve, sensory, motor and integrative system, spinal nerves and plexuses, reflexes; Autonomic Nervous System: Structural and functional differences between somatic efferent and autonomic portions of the nervous system; Principal structural features of the autonomic nervous systems; Structure, physiology and neurotransmitters of the sympathetic and parasympathetic division of autonomic nervous system; Post synoptic receptors; Visceral autonomic reflexes and components; Hypothalamus; Meditation and autonomic nervous

system; The Eye and Ear: Special sense organ, structure and function physiology of binocular vision, lacrimal apparatus, nose, tongue, skin sensory function, normal and common pathological image appearances.

SRA 3210 Research Methods   **10 Credits**
This module introduces students to methods of experimental design, data acquisition and analysis. The biostatistics section seeks to impart a conceptual understanding of the statistics used in medical and health research, emphasizing the appropriate use of each test, specifically what each test measures, the underlying assumptions and the meaning of the calculated results. The second part of the module introduces and critically reviews various research designs related to experimental studies, quasi-experimental studies, clinical trials, survey research and qualitative methodology. Weekly tutorials provide an opportunity to take up practical exercises related to lecture material and to obtain feedback regarding research designs submitted in response to stated study questions.

SRA 3211 Ultrasound Imaging   **10 Credits**
The module explains the physical and biological principles of medical ultrasound; technological aspects of diagnostic ultrasound; informed choices in relation to equipment, technology and technique parameters; Carry out quality assurance procedures and discuss their implications; the role of medical ultrasound in the clinical management and care of patients; apply clinical information to the interpretation of images, discriminating between normal and abnormal anatomy and physiology and recognising common pathology; the role of other imaging modalities in relation to diagnostic ultrasound; Participate in a broad range of clinical procedures; Carry out standard clinical procedures with minimal supervision. The illustrative module content includes the physics of sound, Transducer design and principles of operation, Scan parameters and factors affecting selection, Patient care and management with particular reference to those whose condition is compromised in any way; Quality assurance procedures; The role of ultrasound in conjunction with other imaging modalities and image interpretation

SRA 3212 Radiography Practice and Different User Groups   **10 Credits**
The module enables students to adapt radiographic practice to the individual needs of children, the elderly, women, less privileged groups and people with physical and mental disability; assess the needs of specific groups in the provision of imaging services, for example, breast screening for women, the provision of play areas for children, religious or cultural specific needs; assess the implications for the continued provision of imaging services for specific groups following the introductions of concepts such as patient- focused care and the extended role of the radiographer; reflect on the experiences of individuals in the provision of imaging services to specific groups and use communication strategies to improve the delivery of imaging services to specific groups. The illustrative module content includes principles of good radiographic practice in relation to particular user groups; Specific needs of different user groups to promote good radiographic practice; Practical adaptation of radiographic practice to suit specific user groups; Equipment suitable for specific user groups; Patient centred care and user environment.

SRA 3216 The Neuro-Endocrine System II   10 Credits

The module allows students to discuss the features of imaging equipment required for diagnostic imaging of the neuro-endocrine systems; Relate anatomy, physiology and pathology to image appearances of the neuro-endocrine systems; Demonstrate an understanding of techniques and patient care required for patients of all ages and conditions during imaging of the neuro-endocrine systems; Develop further the academic qualities of reflection, criticism and analysis appropriate to the above performance indicators. The module looks at illustrative module content: Equipment relevant to imaging of the nervous system; Technique relevant for imaging central and peripheral nervous systems and organs of the endocrine system; Relevant care of patient; Role and application of radiography CT, MR, U/S and Nuclear Medicine in Imaging of the neuro-endocrine system.

YEAR IV

SRA 4102 Applied Psychology and Sociology   10 Credits

The module will enable students to relate the issues raised in the module to the hospital environment and in particular to the field of diagnostic medical imaging and therapeutic radiography, understand the processes that produce individual differences; relate individual differences to the functioning of groups; consider issues of gender, culture etc; especially as they relate to health and social care; recognise issues of dominance and submission in human relationships, relating these to health and illness and to radiographic practice. The module's illustrative content includes the Application of Applied Sociology and Psychology in health and illness; Culture and tradition and their impact on health; Diversity Issues in health care and illness: Health and Behaviour; Role of Behavioural factors in Disease and Disorder; Behaviour change; Personality and behaviour, and the implications of different theories for treatment of behavioural problems; Psychoanalytic approach, Behaviourist approach; Phenomenological approach (Humanistic psychology); Biological, Cognitive, and trait theories; Understanding Abnormal Behaviour and implications on health and illness; Industrial Psychology; Emotion and Behaviour; Perception and Behaviour; Psychosocial theories and development; Counselling and psychology; Positive psychology; Emotional intelligence; Interpersonal attraction, implications of the theories for liking and disliking patients; Conformity and compliance, Theories of motivation, Introduction and clinical relevance, Self-presentation and survival strategies.

SRA 4118 Image Reporting I   10 Credits

The module is a review of radiographic anatomy, image assessment image quality, pattern recognition in musculoskeletal system (MSK), professionalism and ethical issues in image reporting, use of computer aided diagnosis systems in MSK reporting, MSK radiographic pathology, MSK image reporting language, terminology and protocols, procedures in writing a radiographic report, practical image interpretation of the skeletal system.

SRA 4213 Quality Management   **10 Credits**

The module aims to critically analyse the content and use of quality assurance programmes in diagnostic imaging departments; understand how quality is directly related to patients' needs at departmental and organisational level; understand how local department quality programmes relate to broader organisational quality objectives; explore common quality assurance tools such as clinical audit; Examine quality models and the concept of TQM; Share with colleagues an understanding of the applications of quality initiatives in their clinical placements; Relate the operations of the imaging department to aspects such as departmental design, equipment selection, procurement and maintenance, human resources, inventory management; Recognise the value of inter-departmental and inter-professional collaboration to achieve organisational objectives. The illustrative module content includes operations in the imaging department, Design considerations in departments, Equipment selection and procurement, Equipment maintenance, Inventory control, Human resources in imaging departments, Organisational structure, Interdepartmental and Inter-professional collaboration; Quality assurance tests on equipment, The principles of quality, organisational quality, Evaluation quality, Quality and the Imaging Department as well as quality and the customer.

SRA 4218 Image Reporting II   **10 Credits**

The module is a review of chest radiographic anatomy, image assessment, image quality, pattern recognition in the chest, chest pathology and differential diagnosis, use of computer aided diagnosis systems in chest pathology, chest image reporting language and terminology, writing a chest radiographic report, Professionalism and ethical issues in chest image reporting s well as practical image interpretation of the chest.

BACHELOR OF SCIENCE HONOURS IN APPLIED PHYSICS

1.0 DEGREE PROFILE: Bachelor of Science Honours in Applied Physics

Institution:	National University of Science and Technology
Type of Degree:	Honours
Credit Load:	485 credits
Level:	SADC-QF - Level 8
Accreditation Organisation(s):	Zimbabwe Council for Higher Education
Period of reference:	2018

2.0 REGULATIONS

These regulations should be read in conjunction with the Faculty of Applied Science and the NUST General Academic Regulations.

3.0 ENTRY REQUIREMENTS

An applicant must have passed both Physics and Mathematics at 'A' level.

4.0 DURATION

The Programme normally runs over a period of four years.

5.0 STRUCTURE

5.1 A student shall register for the requisite modules that will earn him the required Credits for the Year. Normally, he / she shall register for 12 modules in a year leading to a total of 36 taught modules for the Programme. Each module shall be assessed through a Continuous Assessment (25%) that comprises of assignments and at least two tests and a three hour written examination (75%).

5.2 During Year III, a student shall proceed to go on Industrial Attachment for a minimum of 28 weeks. The Industrial Attachment Module is equivalent to 12 modules. At the end of the Attachment period, the student shall present both an Oral and Written Report of what he learnt when he / she was in the Industry, before a Departmental Panel of Examiners.

5.3 In Year IV, a student shall choose a specific field of study by electing to take two modules, one in the First Semester and the other, in the Second Semester.

Think in other terms

5.4   The student shall also register for the Research Project module at the start of Year IV. The area and topic of study shall be chosen by the student but should be approved by the Departmental Board who should assign a supervisor to the student for the work. The Research Project Module carries a weighting of two modules. The project shall be examined both Orally and by a Written Project Report which is the Honour's Degree Thesis. A student shall complete and hand in his project report, at least two weeks before the beginning of the Semester Final Examinations.

6.0   ASSESSMENT

6.1   For a module without a practical component, one three hour examination paper written at the end of the semester counts 75% and the continuous assessment counts 25%, towards the final mark. For a module with a practical component, a three hour examination paper written at the end of the semester counts 60%, the practical counts for 20% and the continuous assessment counts 20%, towards the final mark.

6.2   A students is required to pass all modules registered for in any part of the degree programme. A minimum of 485 credits are required for the award of a degree.

PROGRAMME SUMMARY

Part	Module Code	Module Description	Credits
	SPH 1101	Mechanics and Relativity	10
	SPH1104	Modern Physics	10
	SPH1105	Electricity and Magnetism	10
	SMA1101	Calculus	10
	SMA1102	Linear Algebra	10
	SPH 1114	Thermal Physics I	10
I	SPH 1201	Waves and Optics	10
	SPH 1202	Analogue Electronics	10
	SMA 1201	Calculus of several variables	10
	SCS 1211	Programming and programme Design for Physicists	10
	SMA 1204	Ordinary differential Equations	10
	CTL1101	Conflict Transformation and Leadership	10
			120
	SPH 2104	Thermal Physics II	10
	SPH 2101	Quantum Mechanics	10
	SPH 2106	Digital Electronics	10
	SPH 2115	Research Methodology	10
	SPH 2103	Classical Mechanics	10
	TEE 2112	Microprocessors	10
II	SPH 2202	Solid State Physics	10
	SPH 2203	Instrumentation Physics	10
	SPH 2205	Atomic Physics	10
	SMA 2201	Complex Analysis	10
	SMA 2204	Partial Differential Equations	10
	SMA 2206	Numerical Analysis	10
			120
III	SPH 3010	Industrial Attachment	**120**

Think in other terms

	SPH 4111	Statistical Mechanics	10
	SPH 4102	Nuclear Physics	10
	SPH 4113	Electromagnetism	10
		Elective I	15
IV	SPH 4201	Management and Quality Assurance	10
	SPH 4202	Lasers and Modern Optics	10
	SPH 4214	Material Science	10
		Elective II	15
	SPH 4010	Project	25
			125
Total programme Credits			**485**

Elective I

	SPH 4120	Geophysics I	15
	SPH 4130	Industrial Instrumentation I	15
IV	SPH 4150	Energy Physics I	15
	SPH 4160	Medical Physics I	15
	SPH 4170	Applied Optics I	15
	SPH 4180	Plasma Physics I	15
	SPH 4190	Astronomy and Astrophysics I	15

Elective II

	SPH 4220	Geophysics II	15
	SPH 4230	Industrial Instrumentation II	15
	SPH 4150	Energy Physics II	15
IV	SPH 4260	Medical Physics II	15
	SPH 4270	Applied Optics II	15
	SPH 4280	Plasma Physics II	15
	SPH 4190	Astronomy and Astrophysics II	15

The choice of electives shall be offered subject to staff availability. With the agreement of both Departments, students may also take a maximum of two modules from other Departments.

SERVICE MODULES

Part	Module Code	Module Title	Credits
I	SPH 1106	Modern Physics For Chemists	10
	SPH 1209	Engineering Materials	10

MODULE SYNOPSES

YEAR I

SPH 1101 Mechanics   **10 Credits**
The module explores kinematics and kinetics: Inertial frames of reference; Motion in two and three dimensions; Dynamics of system of particles; Interactions between bodies, relative motion; Conservation of momentum and energy; Motion of systems of particles with variable mass; Collisions of particles; Rotational Dynamics: Rotation of rigid bodies; Moment of Inertia and its calculations for bodies of various shapes and about different axes; Work and energy in rotational motion; Angular momentum; Principles of conservation of angular momentum. It also looks at gravitation: Kepler's laws of planetary motion; Gravitational potential; Gravitation and gravity; Effect of earth's rotation on "g"; Gyroscope; Motion of a satellite; Coriolis force; The fundamental forces and their unification; Inertial forces in linearly accelerating frame; oscillatory motion: Simple harmonic motion; Mechanical oscillators; Superposition of S;H;M's; Damped and forced S;H;M;, Lissajous Resonance; Properties of Matter: Hooke's law; Moduli of elasticity and their inter-relationship; Applications of elasticity. The module also looks at fluid mechanics: Fluid at rest; Surface tension and capillarity; The continuity equation; Various types of flows; Boundary layers and turbulence; Steady state flow of fluids; Bernoulli's equation; Viscous flow and Viscosity; Friction: Nature of frictional forces; Motion in frictional medium; Rolling and sliding friction; Relativity: Space-time frames of reference; Galileo's principle of relativity; Simultaneity of events; Einstein's Special theory of relativity; Lorentz transformations; Momentum and energy systems.

SPH 1104 Modern Physics   **10 Credits**
The module explores the particle nature of radiation: Planck's postulate and thermal radiation, Blackbody radiation, the photoelectric effect, the Compton effect, X-ray production and pair production; Interaction of radiation with matter-photon emission and absorption; Stationery states, discrete energy spectrum and the continuous energy spectrum; The Frank-Hertz experiment; Spontaneous and stimulated emission. It also covers the wave nature of particles: De Broglie's Postulate; The electron diffraction experiment; The wave-particle duality; The uncertainty principle; Matter waves and their properties; The Thomson and Rutherford atomic models; The stability of the atom and Bohr's Postulates and his model of the atom; Atomic spectra; The Hydrogen Atom; Correction for finite nuclear mass; the Nuclear Models: Nuclear properties, sizes and densities, masses and densities; The Nuclear Models - Liquid drop; The deuteron; Shell Fermi gas models; Binding energy nuclear forces; Magic numbers and the

nuclear decay and nuclear reactions, e-capture,$\alpha$and β emission; Fission and fusion and other nuclear reactions; The origin of elements as well as an introduction to Elementary Particles: Isospin, Pions, Leptons and Families of elementary particles.

SPH 1105 Electricity & Magnetism   **10 Credits**

The module highlights the Static Electric fields: Coulomb's Law; The electric field; Motion of point charges in electric fields; Lines of force; Electric dipoles in electric fields; Electric flux; Gauss's Law; Applications of Gauss law; Electric Scalar Potential of a system of point charges; Capacitors in circuits; Energy stored in a capacitor; Dielectrics; Applications of Static electricity in Industries; Electric Current and Resistance: Electric conductors; Current and current density; Kirchhoff's Rules; DC Network Theorems; RC circuits; Wheatstone's bridge; More complex circuits; Measurement of current, Potential Difference and Resistance; Changing sensitivity of Instruments and Thermoelectricity. It also covers Magnetic fields: The force between currents; Definition of magnetic field and Magnetic flux Density; Magnetic intensity, Magnets in magnetic fields and Magnetic dipole moment; Torque on a current loop in a uniform magnetic field; Motion of charges in magnetic fields; Biot-Savart Law; Ampere's Law; Magnetic field of a solenoid and a bar magnet; Induction and Inductance: Faraday's and Lenz's Law; Self and Mutual Inductance Generation of High voltages using principles of induction; Energy storage in inductors and B fields; Electric motors and generators; The Lorentz force; Electromagnetic Oscillations and Alternating Currents: L-R, L-C, and L-CR circuits; Basic Alternating current circuits; Phasor notation; Power in AC circuit; A-C network Theorems; AC bridges; Frequency filtering and tuning circuits; Transformers, capacitor and inductor circuits with generator together with Eddy currents.

SPH 1106 Modern Physics For Chemists   **10 Credits**

This module acquaints students with the introductory concepts in Modern Physics, Optics and Sound; In addition, selected topics in Electronics are dealt with as applied to Instrumentation Physics;

SPH 1114 Thermal Physics I   **10 Credits**

The module looks at Thermodynamic system, the working substance, state of a working substance, thermodynamic- co-ordinates, reversibility, thermodynamic equilibrium, and thermodynamic process; Temperature: Zeroth law and the concept of temperature, measuring temperature, temperature scales, Thermal expansion; Thermodynamic System: The concept of thermodynamic equilibrium; Equation of state; PV and Pq diagram for pure substances; PVq surfaces; Differential changes of state; Mathematical theorems; Examples of thermodynamic systems: stretched wire, surface film, reversible cell, dielectric slab, paramagnetic rod and work done in changing these parameters; Heat and the First Law of Thermodynamics: Heat, measuring heat capacities, heats of transformation, heat and work; First Law of Thermodynamics: non-flow energy equation, steady flow energy equation; The Heat Engine Cycle: The Carnot cycle, Carnot cycle for a perfect gas, constant pressure cycle, air standard cycles, steam cycles, gas turbine cycles; Refrigeration and Heat Pumps: Vapour compression cycles, pressure-enthalpy diagram,

vapour-absorption cycles, and liquefaction of gases - isoentropic and isoenthalpic cooling, air and hydrogen liquefiers; Heat transfer: Conduction, convection, radiation, electrical analogy, thermal resistance; Properties of Thermodynamic substances: PV, PT diagrams of pure substances, PVT surfaces, use of vapour tables; The ideal gas: Properties and model of an ideal gas as well as the Equation of state for an ideal gas.

SMA1201 Calculus Of Several Variables   10 Credits
This module explores the Cartesian coordinates in three dimensions; Functions of several variables; Quadric surfaces; Curves; Partial derivatives; Tangent planes; Derivatives and differentials; Directional derivatives; Chain rule; Div, grad and curl; Maxima and minima; Lagrange multipliers; Double and triple integrals; Change of order; Change of variable; Polar and spherical coordinates; Line and surface integrals; Green' theorem in the plane; Divergence theorem; Stokes theorem and Applications.

SPH 1201 Waves And Optics   10 Credits
The module examines coupled Harmonic and anharmonic Oscillations: Normal modes; energy transfer in the coupled system; Coupled oscillations and the wave equation; Anharmonic Oscillations due to a non-linear return forces; The large amplitude pendulum; Thermal expansion of crystals; Wave Phenomena: Longitudinal and transverse progressive waves; Superposition of waves; pulses and wave packets; Fourier analysis of wave motion; Frequency spectrum; The Fourier integral; Waves in 2D and 3D; Resonating cavities and wave guides; Application to fibre optics Sound: Sound wave propagation in gases and solids; Energy distribution; Reflection and transmission of sound at boundaries; Acoustic phenomena -reverberations; music and noise; Infra and Ultrasound; Applications of ultrasound in medicine; material testing etc. it also looks at interference: Young's two slit experiment; Multi-beam interference; Newton's rings; Lloyd's mirror Michelson interferometer; Fabry-Perot interferometer; Applications of interferometry; Diffraction: Fraunhoffer diffraction; Diffraction gratings; Fresnel diffraction Kirchhoff's diffraction theory; Application of diffraction; Polarization: Methods of production of linearly polarised light; Circular and elliptical polarisation and the Polarisation of polychromatic light.

SPH 1202 Analogue Electronics   10 Credits
This module looks at Electronic Devices: Semiconductor diodes, transistors, FET, UJT, SCR, MOSFETS; Rectifier Circuits: Power supplies, half and full wave rectifiers, filter circuits, series and shunt voltage regulators; Amplifiers: Transistor biasing, stability factors, C-E amplifiers, linearity and distortion, h-parameter analysis, frequency response, feedback amplifiers, Operational amplifiers, ideal differential amplifiers, slew rate, frequency response;
Power amplifiers: Amplifier classes and efficiency, push-pull amplifiers, transformerless push-pull amplifiers; Oscillators: Barhausen criteria, phase shift, Wien bridge and Hartley oscillators and Crystal Oscillator for the stability of frequency.

CTL 1101 Conflict Transformation & Leadership   10 Credits
The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and

conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

YEAR II

SPH 2101 Quantum Mechanics   10 Credits
The module is on Schrodinger's theory of Quantum Mechanics: The wave function and its required properties; The probability densities; Solution of the time – independent Schrodinger equation for all known simple potentials including the Harmonic Oscillator - Hermite polynomial; Operator algebra: Hermiticity of Operators: Communicators; The Hamiltonian; The equation of Motion; The eigenvalues and Eigen-functions; Observables and expectation values; The one electron atoms: Spherical Harmonics; Quantum numbers; Selection rules; Angular momentum; The Zeeman Effect; The electron spin the Stern - Gerlach experiment; Addition of angular momentum; The Spin Orbit interaction; Total Angular Momentum; Spin - Orbit Interaction and the Hydrogen Energy levels; Many-electron atoms: Pauli exclusion principle, electronic states, bonding in molecules and solids, the classical free electron model, Fermi energy.

SPH 2102 Thermal Physics II   10 Credits
The module looks at the Second Law: Formulations of Second Law of Thermodynamics, entropy, the T- S diagram, entropy and irreversibility, entropy and disorder; Quasi-static processes; Reversible and irreversible processes; The TdS and Energy equations; The method of Thermodynamic Potentials: U(S,V), F(V,T), H(S,P) and G(P,T); Thermodynamic Functions: Enthalpy Function; Helmholtz Function; Gibbs Function; Maxwell's Relations with thermodynamic variables, TdS equation, energy equations, heat capacity equations, heat capacity at constant pressure/volume, thermal expansivity, compressibility; Applications to various thermodynamic systems: The cooling and liquefaction of gases in a reversible and irreversible adiabatic expansion – the Joule Kelvin Effect; The Thermodynamics of dielectric and magnetic substances: the piezo-electric and piezo-magnetic effects; The Magneto- Caloric Effect; Phase transitions of the first kind: - The Classius-Clapeyron Equation; Nernst Theorem
The Third Law of Thermodynamics: The behaviour of thermal coefficients as the temperature T approaches absolute zero as well as The unattainability statement of absolute Zero.

SPH 2103 Classical Mechanics   10 Credits
The module looks at fundamental forces: Classification and unification; Inertial forces in linearly accelerating frame; Non-inertial systems; Lagrange's and Hamilton's formulation of mechanics; Generalised co-ordinates; Principle of least action; Lagrange's equation of motion and applications; Simple and double pendulum; Inclined plane; Orbital mechanics; Equivalence of Lagrangean and Newtonian mechanics; Lagrange's undetermined multipliers and Hamilton-Jacobi theory and Relativity.

Think in other terms

SPH 2105 Research Methodology   **10 Credits**

The module looks at the importance of Research; Generating and Prioritising Research ideas; Review of Literature; Formulation of hypothesis and objectives; Introduction to study designs; Research proposal writing; Sampling Methods; Data collection; Presentation and analysis; Plagiarism; Referencing and citation as well as Report writing skills.

SPH 2106 Digital Electronics   **10 Credits**

This module looks at Denary, Octal, Hexadecimal, Binary Numbers; Various codes used; Binary addition, subtraction, multiplication, division; Logic Gates, Semiconductor Diodes & Transistor as switching devices NAD, NOT, NOR, OR and Exclusive 'OR* gates Boolean Algebra; Principle of Duality De Morgan's theorem; Half Adder and Full Adder; Karnaugh Map (2, 3, and 4 variables); Mini-terms and Maxi-terms; Use of K-Map using Mini-terms to simplify logic functions; Canonical forms of a function; Symmetric functions; Equivalence and Non-Equivalence Symmetry; Incompletely specified functions; Combinational gates; Logic gate Analysis and Synthesis; Logic Technology: D-T and TTL logic; Fan in, fan out and noise margins; Logic Threshold; Interfacing logic devices; Sequential Logic Systems: Flip-flops, 'SR*, JK, D and T type; Race around condition in clocked flip-flop; Master Slave flip-flop; Shift Registers; SIPO, SISO, PISO, and PIPO; Shift left to right; Schmidt Trigger; Types of memory used in computers; Counters: Synchronous and non-synchronous; Binary & Denary counters; Divide by n or Modulo 'n' counters; Up and down counters, series and parallel carry modes; ADC and DAC: Sample and Hold circuit, Resolution of conversion, Successive Approximation ADC, Counter Ramp ADC; Weighted Resistor ladder DAC and Counter Properties.

SPH 2202 Solid State Physics   **10 Credits**

This module examines crystal Structure and Defects: Unit cell, crystal systems, elements of symmetry, Miller indices, diffraction, imperfections-vacancies, colour centres, dislocations; Burger's vector; Lattice Vibration: Elastic waves; Density of states; Specific heat models of Einstein and Debye; Scattering of X-rays, neutrons and light by phonons; Free-electron Model: Free electron gas; Electrical conductivity; Heat capacity of free electrons; Fermi surface; Thermionic emission; Semi-conductors: Direct and indirect band gap semiconductors, conductivity, mobility and life times in intrinsic semiconductors, extrinsic semiconductors: p-type and n-type semiconductors; Fermi energy level; P-N junctions, light emitting-, Zener -, tunnel diodes; Ohmic and non-Ohmic contacts, Hall effect in semiconductors; Schottly barrier; Oxide and non-oxide semiconductors; Magnetism: Classification as dia-, para-, ferro-, ferri- and antiferro-magnetics; Domains and other macroscopic phenomena; Magnetic measurement techniques; Applications-magnetic bubbles, magnetic phase analysis of alloys, imaging etc;
Dielectrics and Ferro-electrics: Electric polarisation, Mechanisms of polarisation-electronic, ionic orientational and space charge, derivation as a function of temperature and frequency; Claussius-Mossoti equation; Classification of ferro-electrics, ferroelectric domains, pyro-electricity, and piezoelectric materials and applications; Superconductivity: Theory of superconductivity, Meissner effect, flux quantization, type II superconductors heat capacity and applications.

Think in other terms

SPH 2203 Instrumentation Physics   **10 Credits**

This module looks at Measurement Systems: Purpose, structure and elements; Static characteristics of measurement instruments, repeatability, tolerance, calibration, measurement standards, frequency response of measurement elements, error calculations and error compensation; Noise and interference in measurement circuits, random signals, probability density, spectral density and autocorrelation functions, noise reduction methods, economics, reliability and choice of measurement systems; Transducers: Principles and types; Capacitive, resistive, inductive, electromagnetic, thermoelectric, elastic, piezoelectric, piezo-resistive, electrochemical, gas, ion selective electrodes; Signal conditioners and data acquisition: Applications and limitations of op-amps, instrumentation amplifiers, current transmitters, frequency to voltage converters, current to voltage converters, energy to voltage converters, phase locked loops, ADC and DAC application in instrumentation systems, analogue and digital recorders, digital printers; introduction to flow measurement: Velocity, volume flow-rate, mass flow-rate, types of flow meters - ultrasonic, Doppler flow meter, pulse transmission and reflection, medical imaging flow measurement; Radiation Measurements: Photo-multiplier tubes, scintillators, ionisation chambers, infrared detectors, semiconductor detectors, nuclear instrumentation and standards.

SPH 2205 Atomic Physics   **10 Credits**

This module looks at Multi-electron Atoms: Identical particles and Indistinguishability; The Schrödinger Equation and the wave functions of multi-electron atoms: The two and three electron atoms; The exclusion principle: Fermions and Bosons; The Hartree Theory and its applications to multi-electron atoms; Electronic configuration and the ground states of multi-electron atoms; The periodic table; X-ray line spectra; Optical Excitations in Multi-electron atoms: Alkali atoms, Atoms with several Optically Active electrons, LS Coupling; Energy Levels in multi-electron atoms: The Carbon Atom; The Zeeman Effect in multi-electron atoms; Molecules: Bonding in molecules: Ionic and Covalent bonds; Molecular Spectra: Rotational, Vibrational and Electronic Spectra; Molecular energy levels; The Raman effect; Applications of Raman scattering;

YEAR III

SPH 3010 Industrial Attachment   **120 Credits**

A student is attached to the Industry with the assistance of the Department for a period of 28 weeks. The student is assigned an academic supervisor and at the point of his attachment, he/she shall be assigned a supervisor by the Company/Institution where he/she shall be attached. The academic supervisor shall from time to time liaise with the student and visit him/her for purposes of assessment. The Industrial supervisor shall also assess the student separately. The end of the

attachment period, the student shall be jointly assessed by the two supervisors. The student shall write a report of what transpired when on attachment. He/she may be required to give an Oral Presentation before the Departmental Panel of Examiners and submit a written Industrial Attachment Report to the department at least two weeks before the beginning of the Semester Written Examination Schedule.

YEAR IV

SPH 4101 Statistical Mechanics   **10 Credits**
The module looks at Statistical Systems Microcanonical, Canonical and Grand Canonical Ensembles; Phase space; Classical Statistics: Liouville Theorem; Entropy and thermodynamic probability; Entropy of perfect gas using Microcanonical ensemble; Partition function; Evaluation of partition function for monatomic and diatomic gases; Maxwell's velocity distribution function; Equipartition of energy; Quantum Statistics: Inadequacy of classical statistics; Partition function for Bosons; Plank's law Derivation; Systems with variable particle numbers; The Gibbs and B;E distribution functions; Bose-Eistein condensation; Fluctuations in Bose System; Statistics of fermions; Fermi-Dirac energy distribution; Zero point energy; Concept of absolute zero of temperature; Fermi energy level and its physical significance; Electron contribution to specific heat capacity in metals; Fluctuations in fermion systems; Cryogenics: Phase equilibrium; The Clausius-Clapeyron equation; Pressure dependence of melting and boiling points; Critical point; Liquefaction of gases; Cryostat cooling with ^{3}He; Production of milli degree temperatures; Applications of cryogenics in rocket propulsion, electronics, biology and medicine.

SPH 4102 Nuclear Physics   **10 Credits**
The module offers a review of elements and Principles of Quantum Mechanics - 3-dimensional problems, angular momentum, Parity, Transitions between states; The predictions of the shell model; Fermi Gas and Collecture model; Nuclear decay: Alpha decay; Basic Alpha decay processes; Theory of Alpha emission; Angular momentum and parity in α - decay; α - decay spectroscopy; Beta decay; Fermi Theory of β-decay; Energy release in β -decay; Angular Momentum and Parity Selection Rules; Forbidden decays; Double β -decay; β -decay spectroscopy; γ- Decay; Energetics of γ-decay; Angular Momentum and parity selection rules; Internal convection; Lifetimes for γ-emission; γ- ray spectroscopy, Nuclear Resonance, Fluorescence and the Mossbauer Effect; Nuclear Reactions: Energetics of Nuclear Reactions, Reaction cross section; Coulomb scattering; Nuclear scattering; Experimental Techniques; The optical model; Direct, Resonance and Heavy-Ion Reactions; Neutron Physics: Absorption and moderation of Neutrons; Neutron Sources and Neutron Detectors; Neutron Capture; Interference and diffraction with Neutrons; Nuclear fission: Characteristics of Fission, Fission and Nuclear Structure; Controlled Fission Reactions; Fission Reactors and Radiature Fission.

SPH 4103 Electromagnetism   **10 Credits**

The module covers Boundary Value Problems: Poisson's Equations; Solution of Poisson's equation for graded junctions, Child-Langmuir Relation; Laplace's equation; Uniqueness theorem; Solution in one and two variables; 90º Corner, Potential well, Parallel plate capacitor etc; Field and Circuit Theory: Maxwell's Equations for static and harmonically varying Currents; Displacement Current; Applications of circuit Theory and Field Theory; Electromagnetic Waves: Helmholtz Generalized Wave equation; Plane waves in dielectric, lossy dielectric and conducting medium; Phase and group velocities; Impendance of the medium; Poynting's Vector; Reflection, refraction, polarisation and dispersion of waves. It also looks at transmission Lines: Coaxial, Two wire and Infinite plane transmission line; Telegrapher's equation; Impedance at a point on a terminated transmission line; Matched impedance; Impendance matching with a quarter wavelength line; Smith Chart and its applications; Rectangular Waveguides; TE and TM mode of propagation; Cut-off frequency, attenuation in guides, Characteristic properties of Waveguides; Cavity resonators; Antennas and Radiation: Retarded Potentials, Radiation field due to a short dipole; Radiation due to half wave dipole; Radiation patterns due to linear arrays; Various types of antennas; Plasmas and Propagation in Ionised Medium: Definition of plasma in laboratory; Plane waves in ionised medium and Faraday Rotation.

SPH 4010 Research Project   **25 Credits**

Each student shall be required to undertake a research project in their fourth year of study. The project may be of an applied theoretical, experimental or industrial nature. The defining characteristic shall be one of quality and maturity of work expected of a graduating student. Results of the project work carried out during the entire year are to be typewritten, bound and submitted before the beginning of the Year IV second semester examinations. All students shall be required to give a seminar on their project work and the final grade shall be determined on the basis of the written report and the seminar.

SPH 4201 Management Science And Quality Assurance   **10 Credits**

The module looks at general and personnel management; Management control and Marketing Strategies; Business and Finance; Quality control plans for factories with special reference to physics equipment; Cost Effective Product Development; ISO standards; Research and Development Strategies in factories as well as quality and reliability.

SPH 4202 Lasers And Modern Optics   **10 Credits**

The module explore the Introductory concepts: Spontaneous and stimulated emission Rates of absorption and stimulated emission; Line broadening mechanisms; Transition cross-section and Gain co-efficient; Einstein Thermodynamic treatment; Saturation of absorption; Gain saturation; Pumping processes: Optical pumping; Radiative and transfer efficiencies; Quantum efficiencies for absorption and power; Electrical pumping; Electron impact excitation; Ionization balance equation; Pump rate calculation; Optical Systems: matrix formulation of geometrical optics; The Fabry Perot Interferometer; Fox and Li treatment, Confocal resonator; Gaussian beam

propagation and 'ABCD' law; Stability condition; Unstable resonators; Hard-Edge Unstable resonators; Transformation of impedance through multi-layer optional systems; Resonator design; Types of lasers: Structure and operation of gas lasers, solid state laser, semiconductor laser, excimer lasers and dye lasers; Applications: Industrial applications, medical applications, telecommunication applications, environmental applications and military applications.

SPH 4203 Materials Science   **10 Credits**
This module looks at solid Solutions: Substitutional and interstitial solid solutions; Rules for solid solutions - Hume-Rothery; Intermediate Phases - crystal structure and properties; Examples of alloy systems; Constitutional Phase Diagrams: Solidification; Non-ferrous metals and alloys; Cooling curves and construction of phase diagrams; Examples of complete, partial and incomplete phase diagrams; Interpretation of phase diagrams - phases and compounds e;g; Al-Cu, Pb-Sn, Cu-Z and A1-Si systems; Ceramic phase systems; Eutectic, hypereutectic and hypo-eutectic compositions; Aluminium-rich end of A1-Cu and A1-Si systems. It also looks at Diffusional Processes: Mechanisms of diffusion - substitutional and interstitial; Diffusion equations - Fick's 1st and 2nd Laws; Applications of diffusion Laws; Deformation of Metals: Elastic and plastic deformation - introduction; Critical resolved shear stress in single crystals slip systems; Engineering stress-strain curves - modulus of elasticity, tensile strength, yield strength, ductility; Methods of metal deformation - rolling, extrusion, forging, drawing; Hardness measurement - Vickers, Brinell and Rockwell; Engineering application of cold and hot annealing. The module also examines corrosion: Oxidation of metal surfaces; Corrosion in acids and alkalis; Types of corrosion - electrochemical, atmospheric, intergranular; Methods for corrosion prevention - e;g; cathodic protection; Structure and Properties of Ceramic, Polymeric and Composite Materials; Simple Ceramic Materials: Alumina ($A1_2O_3$), Magnesia (MgO), Silicates -asbestos, mica, clay, Mullite, Spinels, Carbides, Glasses - glass formers, modifiers, intermediates; Crystal Structures of Ceramic Materials e;g; NaC1, CsC1, CaF_2, Diamond, corundum, perovskite silica; Some Properties of Ceramics: Porosity and densities, Thermal shock resistance; Thermal coefficient of expansion, Thermal conductivity, Hardness and strength, Rupture strength; Piezo-electricity;Composites: General treatment of composites - concrete, asphalt, wood; Fabrication of composites; Classes of composites - different configurations of matrix and fibres and the Mechanical properties of composites.

SPH 4204 Industrial Instrumentation   **10 Credits**
This module looks at the measurement concepts: Measurement Energetics, Measurement Dynamics; Transducer Design and applications; Electronic and optical instrumentations; Digital and analogue signal processing: Digital and analogue signal processing and digital measurement techniques; Image processing as well as measurement Systems hardware.

ELECTIVE MODULES
The choice of electives shall be offered subject to staff availability.; With the agreement of both Departments, students may also take a maximum of two modules from other Departments.

Think in other terms

SPH 4120 Geophysics I   **15 Credits**

The module highlights the Physics of the earth: Elementary plate tectonics; Geophysical methods and their applicability; Organisation of the geophysical work; Magnetic methods: Magnetic potentials; magnetic properties of rocks; The geomagnetic field -elements; measurements; measuring instruments; Anomalies of simple bodies; Qualitative and quantitative interpretation; Gravity methods: Electrical properties of rocks and minerals; Self-potentials; Resistivity method; Interpretation and the method of curve matching.

SPH4220 Geophysics II   **15 Credits**

This module looks at refraction and reflection seismology: Basic theory on refraction and reflection seismic methods, instruments for seismic data acquisition, interpretation of seismic data and seismic data processing techniques; Seismic reflection methods in engineering and environmental applications.

SPH 4150 Energy Physics I   **15 Credits**

This module is on energy sources: Renewable and non-renewable sources; Solar Energy: Solar energy, solar cells, solar panels, solar-chemical cells; Solar thermal applications; Solar energy storage; Efficiencies and applications.

SPH 4150 Energy Physics II   **15 Credits**

This module is on non-conventional energy sources: Wind, micro-hydro, tide, chemical, geothermal, biomass and biogas; Efficiencies and applications.

SPH 4160 Medical Physics I   **15 Credits**

The medical Physics elective is designed to prepare students to get employment in the health sector, medical equipment companies, equipment sales, pharmaceutical companies, public and private hospitals, etc. Major topics include: Radiotherapy, Nuclear medicine; Diagnostic radiology; MRI and Ultrasound.

SPH 4260 Medical Physics II   **15 Credits**

The module looks at therapeutic applications; Human anatomy and Physiology; Audiological measurements; Detectors, scintillators; PMT, TLD and film; Introduction to neurological measurements and Radiation Protection.

SPH 4170 Applied Optics I   **15 Credits**

The module outlines optical Detectors; Photonic devices for imaging and storage; Basic principles and applications of holography and Fibre optic telecommunication.

SPH 4270 Applied Optics II

The module is on laser Spectroscopy and Non-linear Optics.

Think in other terms

SPH 4180 Plasma Physics I   **15 Credits**

Topics in this module include: Plasmas in nature; Plasma-fluid equations; Wave propagation in plasma Controlled fusion; Magnetic and inertial confinement.

SPH 4280 Plasma Physics II   **15 Credits**

The module explores plasma etching, deposition spraying; Plasma devices; MHD generators; Laser induced plasmas and Plasma diagnostics.

SPH 4190 Astronomy And Astrophysics I   **15 Credits**

This module is an introduction: Scope of astronomy; Size and age of the universe; Objects of the night sky: (Stars, constellations, planets); The Celestial Sphere: Rotation and hourly change of the night sky; Coordinate systems: declination and right ascension; Effect of the movement of the Sun in the sky; The ecliptic and the zodiac; equinoxes and solstices; Sedereal and solar day; Precession of the equinoxes; The Moon: Physical characteristics and orbit; phases and eclipses; sidereal and synodic month; Lunar surface and exploration; Theories of origin; The Solar System: Planetary orbits; Kepler's laws; Retrograde motion; Overview of specific characteristics of each planet and its satellites; Asteroids and comets; Formation of the solar system; The Sun: Characteristics and structure; Spectrum; Sunspots and Energy output.

SPH 4290 Astronomy And Astrophysics II   **15 Credits**

This module looks at stars: Measuring distances – light year and parsec; Stellar motion; Star brightness – apparent and absolute magnitude; Star colours and spectra: spectral classification; Hertzsprung-Russel diagram; Evolution of stars – red giant, white dwarf, stellar collapse; Supernovae, pulsars, quasars; Black holes; Variable stars; Binary stars, open and globular clusters; Galaxies: The Milky Way; Galaxy types, sizes, distances; Recession and Hubble's law; Age of the universe and the Big Bang; Cosmology; Solar System Formation: Collapse of Nebula; Capture theory; Condensation and Accretion theory; Star Formation: Jeans Collapse mechanism, Hydrogen burning, Accretion: free-fall, disk, outflows and Initial Mass Function.

Think in other terms

BACHELOR OF SCIENCE HONOURS IN EARTH SCIENCES

1.0 DEGREE PROFILE: Bachelor of Science Honours in Earth Sciences

Institution:	National University of Science and Technology
Type of Degree:	Honours
Credit Load:	480 credits
Level:	SADC-QF - Level 8
Accreditation Organisation(s):	Zimbabwe Council for Higher Education
Period of reference:	2018

2.0   REGULATIONS
These regulations shall be read in conjunction with the Faculty of Applied Science and University General Academic Regulations.

3.0   DURATION
The Programme shall normally be offered over a four-year period.

4.0   ENTRY REQUIREMENTS
Normal Entry
An applicant must have at least two 'A' Level passes in Physics and Mathematics.

5.0   PROGRAMME STRUCTURE
5.1 The Programme consists of 4 parts. A student shall register for at least six   prescribed and approved modules or their equivalents in each semester. Most of these modules carry practical and fieldwork work where students shall learn and gain an appreciation of the practical and technological applications of Earth science.

5.2 **Fieldwork**
The majority of the modules on the programme have a fieldwork component that is carried out concurrently with the theory part of the modules. Fieldwork comprises the practical component of the degree programme. For a module with a fieldwork component, the fieldwork shall comprise 40% of the overall continuous assessment.

5.3 **Research Project Module**
A student in Part IV is required to undertake a Research Project weighted at two modules.

Think in other terms

5.4 Industrial Attachment

A student on this programme shall be required to complete an industrial attachment component that runs from January to the end of July during Part III of the programme. At the end of the attachment period, the student shall be required to present both a written and an oral report to the Departmental Panel of Examiners.

6.0   ASSESSMENT
6.1   Taught modules shall be assessed through continuous assessment and a three-hour final written examination at the end of each semester. Continuous assessment shall be 25% and the written final examination shall be 75% of the final mark.
6.2   The Industrial Attachment module shall be assessed by a detailed attachment report and continuous assessment from industrial or field supervisors, a prescribed logbook and a viva voce. The continuous assessment mark from industrial or field supervisors shall constitute 20%, and viva voce 30% and the overall report mark shall constitute 50% of the overall assessment.
6.3   The Research Project shall be assessed by means of a written research project report and an oral presentation. The oral presentation mark shall constitute 50% of the overall project mark. The research project report shall constitute the other 50% of the overall research project mark.
6.4   A minimum of 480 credits shall be required for the degree to be awarded.

7.0   WEIGHTING
The Parts of the Degree programme shall be weighted as follows: -

Year I   15%
Year II   20%
Year III   25%
Year IV   40%

PROGRAMME SUMMARY

YEAR I: Semester I

Module Code	Module Description	Credits
SES 1101	Introduction to Earth Systems Science	10
SPH 1101	Mechanics and relativity	10
SPH 1107	Electric Circuits and instruments	10
SMA 1101	Calculus	10
SMA 1102	Linear Algebra	10

SEMESTER II

SMA 1204	Ordinary Differential Equations	10
SES 1202	Physical Geology	10
SPH 1201	Waves and Optics	10
SES 1203	Geo Chemistry	10
SMA 1201	Calculus of Several Variables	10
SCS 1201	Computer applications and Programming	10
CTL1101	Conflict Transformation and Leadership	10

YEAR II: Semester I

SES 2101	Geotectonics and Geohazards	10
SORS 2106	Probability Theory	10
SES 2102	Geomicrobiology	10
SPH 2105	Electromagnetism	10
SES 2103	Elements of Geomorphology	10
SES 2104	Surveying I	10

SEMESTER II

SES 2201	Soil Physics	10
SES 2202	Theory of Seismology	10
SES 2203	Elements of Meteorology	10
SES 2204	Surveying II	10
SMA 2206	Numerical Analysis	10
SMA 2104	Partial Differential Equations	10

YEAR III: Semester 1

SES 3106	Petrology	10
SES 3101	Remote Sensing	10

Think in other terms

SES 3102 Potential Field Exploration Methods	10
SES 3103 Research Methods	10
SES 3105 Electrical and Electromagnetic Exploration Methods	10
SES 3104 Principles of Surface and Groundwater Hydrology	10

Semester II

SES 3200 Industrial Attachment	60

YEAR IV

Semester I

SES 4101 Seismic Exploration Methods	10
SES 4102 Borehole Logging Techniques	10
SES 4103 Groundwater Modelling and Management	10
SES 4104 Geographical Information Systems	10
SES 4105 Structural Geology	10
SES 4010 Research Project	10

Semester II

SES 4201 Climate Dynamics	10
SES 4202 Environmental Geo-science and Impact Assessment	10
SES 4203 Geotechnical Investigations	10
SES 4204 Quality Assurance and Project Management	10
SES 4205 Time Series Analysis and Signal Processing	10
SES 4010 Research Project	10

Think in other terms

MODULE SYNOPSES

YEAR I

SES1101 Introduction to Earth Systems Science   **10 Credits**

The module is an introduction to the processes of and linkages among major components of planet Earth; Geosphere, hydrosphere, atmosphere, biosphere as dynamic and interdependent systems; Influence of human activity on earth systems, structure and dynamics of the Earth; stratigraphy and geological history; climatology; surface processes and evolution of landscapes; biogeography; humans and the environment; Processes operating on and below the earth's surface and the resulting features of landscape, earth structures, and earth materials; Occurrences and utilization of the earth's physical resources.

SPH1101   Mechanics and Relativity   **10 Credits**

The module is on kinematics and Kinetics: Inertial frames of reference; Motion in two and three dimensions; Dynamics of system of particles; Interactions between bodies, relative of motion; Conservation of momentum and energy; Motion of systems of particles with variable mass; Collisions of particles; Rotational Dynamics: Rotation of rigid bodies; Moment of Inertia and its calculations for bodies of various shapes and about different axes; Work and energy in rotational motion; Angular momentum; Principles of conservation of angular momentum; Gravitation: Kepler's laws of planetary motion; Gravitational potential; Gravitation and gravity; Effect of earth's rotation on "g"; Gyroscope; Motion of a satellite; Coriolis force; The fundamental forces and their unification; Inertial forces in linearly accelerating frame; Oscillatory motion: Simple harmonic motion; Mechanical oscillators; Superposition of S;H;M's; Damped and forced S;H;M;, Lissajous, Resonance; Properties of Matter Elasticity: Hooke's law; Moduli of elasticity and their inter-relationship; Applications of elasticity; Fluid mechanics: Fluid at rest; Surface tension and capillarity; The continuity equation; Various types of flows; Boundary layers and turbulence; Steady state flow of fluids; Bernoulli's equation; Viscous flow and Viscosity; Friction: Nature of frictional forces; Motion in frictional medium; Rolling and sliding friction; Relativity: Space-time frames of reference; Galileo's principle of relativity; Simultaneity of events; Einstein's Special theory of relativity; Lorentz transformations; Momentum and energy systems.

SPH1107   Electric Circuits and Instruments   10 Credits.

The module is an introduction to electric field; Motion of point charges in electric fields; Lines of force; Electric dipoles in electric fields; Electric flux; Gauss's Law; Electric Scalar Potential; Capacitors in circuits; D;C and A;C circuit analysis; Thevenin and Norton's Theorems; Power supply, rectifiers and filters; Potential dividers; Introduction to semiconductors, diodes and transistors; Basic Concepts of Electrical Measuring Instruments, Current Measurement and Voltage Measurement, Power Measurement and Energy Measurements, Measurement of other Electrical Quantities, A;C; Bridges, Dielectric Measurement; Frequency Analysis of Circuits: Steady-state sinusoidal analysis and impedance, Magnetic fields: The force between currents; Instrumentation: Measuring System, Transducers/sensors, Signal conditioner, Indicators and Recorders, Measurement of Physical Quantities, Telemetry; Magnetic flux Density; Magnetic intensity, Magnets in magnetic fields; Magnetic dipole moment; Torque on a current loop in a uniform magnetic field; Motion of charges in magnetic fields; Biot-Savart Law; Ampere's Law; Magnetic field of a solenoid and a bar magnet; Induction and Inductance: Faraday's and Lenz's Law; Electric motors and generators.

SMA1101   Calculus   12 Credits

The module examines the limit of functions; One-sided and infinite limits; Continuity; Differentiation; Definition, basic properties; Rolle's Theorem, mean value theorem, Cauchy's mean value theorem; Leibniz' rule; Applications; Taylor series; Integration, Definite integrals; Antiderivatives; Fundamental theorem of calculus; Improper integrals; Gamma and Beta functions; Definition of natural logarithm as integral of $1/x$ and exponential as inverse; Area, volume of revolution, arc length, surface area; Parametric equations; Arc length, surface area; Polar coordinates; Graph sketching; Area in polar coordinates; Complex numbers; Algebra of complex numbers; De Moivre's theorem and exponential form.

SMA1102   Linear Algebra   12 Credits

The module looks at vector Algebra: Scalar and vector product; Collinear, coplanar vectors; Applications; Equations of lines and planes; Matrices; Products, sums, echelon form, rank, inverse; Determinants; Definition, properties, evaluation; Systems of Linear Equations; Consistency, Gauss' method, Cramer's rule; Homogeneous systems; Vector Spaces, linear independence, bases and Subspaces.

SES1202   Physical Geology   10 Credits

This module is about scientific methodology applied to the study of common rock-forming minerals, common rocks, topographic maps, geologic structures and geological maps; Physical processes involved in igneous, metamorphic and sedimentary rock formation, modification and destruction; Physical geology and principles of stratigraphy; Sedimentology: Mechanisms of

Think in other terms

transport and deposition of siliciclastic sediment; Textual analysis of sedimentary rocks; Sedimentary structures, traces fossils and bioturbation; siliciclastic, diagenesis of carbonate rocks, evaporitic and other sedimentary rocks; earthquakes, stress, displacement and strain; brittle and ductile deformation; classification and petrography of igneous rocks; physical processes in magma chambers; the relationship between chemical and mineralogical composition; types of metamorphism, metamorphic textures and mineral assemblages and Field work.

SCS1201　　　**Computer Applications and Programming**　　　**10 Credits**

The module explores data types, basic control structures; Python, Object-oriented programming, classes and data hiding, dynamic object construction and destruction, derived classes and inheritance, virtual functions; file processing; engineering applications; Introduction to C++, basic structure of C++, variables, single & Multidimensional arrays, string, for, while, do-while, conditional statement (if, switch, question mark operator), functions, structures, Application of set theory to program specification, Programme design through pseudocode, JSP, Klarner, O, Diagrams and FORTRAN.

SES1203　　　**Geochemistry**　　　**10 Credits**

The module looks at the earth as a closed geochemical system; Geochronology, Geochemical surveys, orientation soil surveys, Practicalities of a soil survey; Dispersion-primary dispersion, secondary dispersion, primary dispersion patterns, secondary dispersion patterns, displaced anomalies, physical form and classification of secondary dispersion patterns; Geochemical associations; Geochemical data; Analytical terms in geochemistry; Wet analyses; Preparation of samples for analyses, analytical methods in geochemistry, data analysis and data presentation as well as Geochemical techniques for mineral exploration.

SMA1201　　　**Calculus of Several Variables**　　　**10 Credits**

This module explores the Cartesian coordinates in 3 dimensions; Functions of several variables; Quadric surfaces; Curves; Partial derivatives; Tangent planes; Derivatives and differentials; Directional derivatives; Chain rules; Div, grad and curl; Maxima and minima; Lagrange multipliers; Double and triple integrals; Change of order; Change of variable; Polar and spherical co-ordinates; Line and surface integrals; Green's theorem in the plane; Divergence theorem; Stokes theorem and Applications.

SPH1201　　　**Waves and Optics**　　　**10 Credits**

This module looks at Coupled Harmonic Oscillations: Normal modes; energy transfer in the coupled system; Coupled oscillations and the wave equation; Anharmonic Oscillations: due to a non-linear return forces; The large amplitude pendulum; Thermal expansion of crystals; Wave Phenomena: Longitudinal and transverse progressive waves; Superposition of waves; pulses and

wave packets; Fourier analysis of wave motion; Frequency spectrum; The Fourier analysis of wave motion; Frequency spectrum; The Fourier integral; Waves in 2D and 3D; Resonating cavities and wave guides; Application to fibre optics; Sound: Sound wave propagation in gases and solids; Energy distribution; Reflection and transmission of sound at boundaries; Acoustic phenomena - reverberations; music and noise; Infra and Ultrasound; Applications of ultrasound in medicine; material testing, etc; Young's two slit experiment; Multi-beam interference; Interference: Newton's rings; Lloyd's mirror Michelson interferometer; Fabry-Perot interferometer; Applications of interferometry; Diffraction: Fraunhoffer diffraction; Diffraction gratings; Fresnel diffraction; Kirchhoff's diffraction theory; Application of diffraction; Polarization: Methods of production of linearly polarised light; Circular and elliptical polarisation and Polarisation of polychromatic light.

SMA1204   Ordinary Differential Equations   10 Credits

The module looks at first order ordinary differential equations; Separable, Linear, Exact; Integrating factors; Existence; Uniqueness; Applications; Second Order Equations; Linear equations and linear differential operators; Linear independence, Wronskian; Ordinary Linear Differential Equations with constant coefficients; Undetermined coefficients; Variation of parameters; Applications; System of Equations; Phase plane portraits for Linear Systems; Introduction to Nonlinear systems; Predator-prey and Volterra-Lotka equations; Series solution of ordinary differential equations; Method of Frobenius; Legendre polynomials and Bessel functions.

CTL 1101 Conflict Transformation & Leadership   10 Credits

The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

YEAR II

SES2101   Geotectonics and Geo-hazards   10 Credits

This module is an examination of modern tectonic principles and fundamental tectonic elements of the earth's lithosphere; orogenic belts, cratons, island arcs, rift zones, continental margins, etc; The geological record of plate tectonics past and present; Geotectonic models; plate geometries, geodynamical processes, and sedimentary products; Reconstructing of ancient tectonic settings with an emphasis on methodology (paleomagnetism, basin analysis, and provenance) and case; Mechanical aspects of lithospheric deformation and mantle dynamics; The elastic behaviour of the lithosphere, its thermal structure, the forces that drives plate tectonics, and mantle convection; Tectonic processes and types of plate interaction are then analysed in terms of

seismicity, geodetically defined deformation fields, and a range of different approaches to mechanical analysis, includingthin-viscous-sheet theory, block tectonics, critical wedge theory, and fluid mechanics. It also looks at contemporary methods used to identify and assess natural hazards, techniques used for the probabilistic forecasting, spatial representation and communication of hazards; The relationship between hazard information, risk mitigation and emergency management. The module is best offered with a strong focus on the use of case studies.

SES 2102   Geo-Microbiology   10 Credits

The module examines the interactions of microbes with earth materials (soils, rocks, water, etc;); The relationships between the microbial life forms and their environment, from localized niches, that occur on the order of micrometres, to global elemental cycles; Microbial physiology and genetics; geochemical controls on microbial diversity and activity; microbiological controls on geochemical reaction networks; redox and acid-base geochemistry; Biomineralisation, origin and evolution of life, microbial weathering and rock formation, and influences on environmental problems; Bio signatures and life detection and origin and evolution of microbial life.

SES2103   Elements of Geomorphology   10 Credits

The module explores the history and Methodology of Geomorphology: Time scales; Development of scientific methods; Development of major scientific principles pertaining to geomorphology; Reconstructing the past: dating techniques; Structural Geomorphology: - Plate tectonics and global scale landforms, Seismic activity; Development of continents, orogens, continental boundaries, cratons, volcanism; Structural geomorphology of deformed rocks, fractures and faults, mountain building, landforms controlled by faults and folds; Process Geomorphology: - Weathering and Karst landforms; Slope processes / mass movement; Hydrology, flow principles in open channels, scientific means to determine discharge and velocity, rating curves, hydrographs and flood frequencies. It also looks at fluvial processes and landforms; Glacial processes and landforms; Glacial Periods; Periglacial processes and landforms; Coastal and aeolian processes and landforms; Geomorphic change: long-term evolution of landscapes and Field Work.

SPH2105   Electromagnetism   10 Credits

The module looks at boundary Value Problems: Poisson's Equations; Solution of Poisson's equation for graded junctions, Child-Langmuir Relation; Laplace's equation; Uniqueness theorem; Solution in one and two variables; $90\,^O$ Corner, Potential well, parallel plate capacitor etc; Field and Circuit Theory: Maxwell's Equations for static and harmonically varying Currents; Displacement Current; Applications of circuit Theory and Field Theory; Electromagnetic Waves: Helmholtz generalized Wave equation; Plane waves in dielectric, lossy dielectric and conducting medium; Phase and group velocities; Impedance of the medium; Poynting's Vector; Reflection, refraction, polarization and dispersion of waves; Transmission Lines: Coaxial, Two wire and Infinite plane transmission line; Impedance at a point on a terminated transmission line; Matched impedance; Impedance matching with a quarter wavelength line; Smith Chart and its

applications; Rectangular Waveguides; TE and TM mode of propagation; Cut-off frequency, attenuation in guides, Characteristic properties of Waveguides; Cavity resonators; Antennas and Radiation: Retarded Potentials, Radiation field due to a short dipole; Radiation due to half wave dipole; Radiation patterns due to linear arrays; Various types of antennas; Plasmas and Propagation in ionised medium: Definition of plasma in laboratory; Plane waves in ionised medium as well as Faraday rotation.

SES2104   Surviving I   10 Credits

This module is an introduction to surveying; Measurements and SI Units in survey; Errors in measurements: Systematic and Random errors; Methods of eliminating or minimizing these errors; Plane and Geodetic survey; Application of plane and geodetic surveys; Topographical, Cadastral, Hydrographic, Mine, Photo grammetry and Engineering Survey; Chain Surveying; Types of measurements in chain survey; Booking Methods Chain Survey Equipment; Care and maintenance; Methods of setting up; Checks and adjustments to the optical square; Ranging a straight line using a prism square; Taping; Corrections to measured lengths; Temperature, slope, standardization, tension, reduction to mean sea level; Electromagnetic measurements; Microwave, Infrared and Laser Instruments; Compass Surveying; Meridian, magnetic bearing, true north/geographic north, isogons, agonic line and magnetic declination; Factors affecting declination, types of compasses; Bearings; Elimination of local attraction, compass traverses, distance measurement; Adjustment of compass traverses using Bowditch graphical method and reconnaissance work for compass surveys; Areas of regular and irregular figures; Planimetry; Levelling: - dumpy, tilting and automatic levels; Levelling for construction, longitudinal and cross-sections, grading of constructions as well as cut and fill work.

SORS 2106   Probability Theory   10 Credits

The module outlines probability; Random/Statistical Experiments, Sample Spaces, Events, Set Theory; Axioms of probability; Laws of probability; Finite Sample Spaces; Conditional Probability, Independent events; Random Variables and Probability Distributions; Discrete probability distributions; Continuous probability distributions; Discrete bivariate distributions; Continuous bivariate distributions; Marginal probability distributions; Independent random variables; Conditional probability distributions; Distributions of functions of single random variables; Conditional probability distributions of Mathematical Expectation; Expectations of discrete and continuous random variables; Expectation of a function of a single random variable; Expectation of a function of several random variables; Expectation of a function of a single random variable; Expectation of a function of several random variables; Properties of expectations; Variance and Covariance; Markov and Chebyshev inequalities; Moment generation functions; Properties of moment generating functions; Special Distributions; Bernoulli, Binomial, Geometric, Negative Binomial, Hypergeometric, Poisson distributions; Normal, Gamma, Exponential and Beta distributions.

Think in other terms

SES2201   Soil Physics   10 Credits

The module explores basic characteristics of soils, permeability of soils, seepage and site investigation; Basic Characteristics of Soils: Soil-phase diagrams, definitions and calculations of the following soil properties - Bulk density, dry density, void ratio, porosity, water content, degree of saturation, specific gravity of soil particles, bulk unit weight, saturated unit weight, dry unit weight, submerged density, submerged unit weight and water content; Determination of water content of a soil sample and specific gravity of soil grains are to be carried out, including classification of soil by the sieve analysis method and the Cassagrande's apparatus; Permeability of Soils: Darcy's Law, coefficient of permeability and its determination by construct head method –Guelph Permeameter, falling head method and pumping well test analysis; Seepage: Pore water pressure and effective stress in a soil mass, critical hydraulic gradient, quicksand conditions and piping, drawing of flow nets and determination of factor of safety against ping; Site Investigation: methods used to collect soil samples for identification and testing - trial pits, hand auger or post-hole auger, deep boring and drilling methods and some Field work.

SES2202   Theory of Seismology   10 Credits

This module explores the wave Theory: Fundamentals of wave motion; seismic wave types; Stress tensor, strain tensor, stress-strain relations; linearized equations of motion; elastic moduli; The wave equation: dilatational and rotational solutions; separation of variables; plane and spherical waves; Reflection and refraction of plane waves at a plane boundary; independence of SH and P and of SV waves; boundary conditions; P, SV and SH waves incident at the free surface of a homogeneous half-space and at general interfaces; energy conversions; Rayleigh waves for a homogeneous half-space; Love waves for a two-layer half-space; Superposition of plane waves, group velocity, dispersion; Free oscillations, toroidal and spheroidal modes; Earthquake Seismology: The Earthquake Source: Focal mechanisms, moment tensors, source time function; Earthquake Mechanics: Friction and fracture, populations, dynamics, scaling; Seismic Recording: Sensors, recorders, networks and arrays; Seismograms: Natural and synthetic, time and frequency domain, combined influence of source, ray path, recording site and instrument; Earthquake Location: Ray parameters (arrays) and the Geiger method (networks); Global Earth Structure: Layered structure from travel time tables and 3D structure from seismic tomography.

SES2203   Elements of Meteorology   10 Credits

This module outlines Local Area Forecast, Heat transfer, Temperature humidity and pressure in Meteorology; Moisture and Atmospheric Stability, Forms of Condensation and Precipitation; Air Pressure and Winds, Air Masses, Thunderstorms and Tornadoes, Surface and Upper-Air Charts; T-Φ graphs, Converting raw Radiosonde Data into a forecast; Recognizing specific RADAR and

other satellites signatures and forecasting weather; Forecasting Simulations- Forecasting weather for a specific location; Field and laboratory work.

SES2204   Surveying II   10 Credits

The module covers the spatial coordinates system or Gaussian system of coordinates; Traversing, triangulation and resection; Fieldwork/reconnaissance, station marking, angular measurement and centring errors; Sources of errors during angle measurement, distance measurement and the three-tripod system; Determination of angular misclosures in closed polygon and closed route traverses and distribution; Coordinate misclosures during traversing and their distribution by the Bowditch and Transit methods; Types and classification of triangulation fieldwork; Adjustment of angles in braced quadrilaterals and centre point polygons using the method of equal shifts and coordinate calculations; Resection calculations using Collins Auxiliary Point method and Tan K Formula; Theodolites and theodolite work: Temporary and permanent adjustments of theodolite angle measurement using; the repetition, directional and sector methods; Tachometry work; Curves: circular, reverse, compound, transition and vertical curves; Theory and calculations; Setting out methods: Site inspection, error detection, communication on site and stages; Vertical control, temporary bench marks, sight rails, travellers and boring rods; Slope rails or batter boards, profile boards; Positioning techniques; Setting out Civil Engineering structures and Practical work.

SMA2104   Partial Differential Equations   10 Credits

The module is on Fourier Analysis; Fourier series and Fourier transforms; Laplace Transforms: Definition basic results; Heaviside function; Convolution; Applications to the solution of ordinary differential equations; Sturm-Liouville problems; Orthogonality; Partial Differential Equations; Classification of second order partial differential equations; The partial differential equations of mathematical physics; Derivation of the wave equation and heat equation in one dimension; Separation of variables; Fourier sine and cosine transforms and Fourier trans-form methods.

SMA2206   Numerical Analysis   10 Credits

The module looks at errors in numerical analysis; Taylor Series; Solutions of Equations in One Variable: Bisection and Newton-Raphson methods; Fixed point iteration; Order to Convergence; Direct and Iterative Methods of Solving Linear Systems; Gaussian elimination with scaled partial pivoting; Jacobi and Gauss-Seidel iterations; Convergence criteria; Interpolation and Extrapolation; Lagrange interpolating polynomial; Newton interpolating polynomial; Richardson extrapolation; Integration; Trapezoidal rule, Simpson's rule; Gaussian quadrature and Numerical Solutions of Ordinary Differential Equations.

Think in other terms

YEAR III

SES3101   Remote Sensing   10 Credits

The module explores electromagnetic (EM) and remote sensing- Interaction of EM radiation with the Earth's atmosphere; Interaction of EM radiation with the Earth's surface; Sensors- passive sensors and active sensors: RADAR, LIDAR and Platforms of remote sensing: Airborne and Space borne; Image data characteristics; Photographic systems: aerial camera; Multispectral scanners: Whiskbroom, push broom, Earth observation systems; Thermal infrared remote sensing; Digital data processing: Image pre-processing - radiometric correction and geometric correction; Image enhancement and visualisation; Band transformations; Visual image interpretation; Digital image classification; Forest and Agricultural Crop Inventories, wetlands mapping and Productivity Assessment, Land Use Mapping /Land Cover mapping, Environmental Impact Assessment (Coastal Erosion, etc;) Predictive Models for Archaeology and Highway Planning, Urban Applications of Remote Sensing, Delineating subsurface structures and fieldwork.

SES3102   Potential Field Exploration Methods   10 Credits

The module examines the role of gravity and magnetics in exploration; Conservative forces, Central force fields, Value of a scalar potential, Divergence theorem, Poisson's and Laplace's equations, Spherical Harmonic Analysis: general solution, solution for rotating Earth, significance of terms, International Gravity Formula; Absolute and relative gravity measurements, Gravity instruments, Data acquisition, land gravity data, marine gravity data, airborne gravity data, satellite methods, Reduction of gravity data, instrument, tidal and drift corrections, free air correction, Bouguer correction, borehole gravity, isostasy; Anomaly separation and filtering: smoothing, gridding, least squares, Fourier filtering, Interpretation of gravity data, uniqueness problem, direct approach, indirect methods, rock densities, gravity due to simple bodies, solid angle method, line-integral method, chart methods, computer-aided interpretation and field work. It also looks at the earth's magnetic field: the main field, source, distribution, secular variations, external field, International Geomagnetic Reference Field; Rock magnetism, susceptibility, remanent: TRM, CRM, DRM, paleomagnetism and effect on present- day field; Acquisition of magnetic data: measuring susceptibility and magnetism, land magnetic data, marine magnetic data, airborne magnetic data, Reduction of magnetic data: diurnal correction, drift correction, regional correction; Anomaly separation and filtering: filtering, reduction to pole, downward and upward continuation; Interpretation of magnetic anomalies: Poisson's formula, magnetic field due to simple bodies, solid angle method, basement depth determinations, computer-aided interpretation; Applications to environmental and engineering studies: delineating structural trends, mapping structures, detection of archaeological objects and field work.

Think in other terms

SES3103   Research Methods   10 Credits

This module is about research designs, Literature survey, Qualitative and quantitative methodology, Technical Report writing, Ethics and confidentiality in technical reporting, Presentation of Graphs, Tables, Figures, Data collection and analysis; Preparation of abstracts and manuscripts, Referencing and citation of references, Writing business proposal for consultative work and research grants, Research Budgets, Research presentation; Field procedures as well as safety in the field.

SES 3104   Principles of Surface and Groundwater Hydrology   10 Credits

The module highlights the hydrologic Cycle: Basic picture of the hydrologic cycle including storage, fluxes, and residence times; Concepts of discharge, watershed, and drainage or catchment basin introduced; Infiltration: Introduction to soil moisture; Rainfall rates, interception, depression storage, and infiltration; Measuring infiltration; Calculation of saturated and unsaturated hydraulic conductivities from infiltration methods   with numerical solutions; Ground Water: Overview of aquifers, the water table, streams, springs, marshes and wells; Porosity, specific yield, field capacity, and wilting points in soils and rocks; Permeability and Hydraulic Conductivity of rocks and soils; Application of Darcy's law; Well hydraulics, practical interpretation of well pumping tests and log test data, failing head test, Steady and unsteady groundwater flow; Flow to wells; Well function and Theis Method; Various methods for determination of sequence of strata and ground water levels. It also looks at water Quality: elements of groundwater surface water interaction, surface and groundwater contaminant systems, Dissolved materials; Contaminant process; introduction to groundwater contamination, historical incidents, advection, dispersion, diffusion, biodegradation of groundwater contamination; Transport, diffusion, and remediation of pollutants through the soils as well as field work.

SES 3105   Electrical and Electromagnetic Methods   10 Credits

The module explores the Archie's law, Factors affecting current flow - resistivity, permittivity, permeability, isotropic and anisotropic media; Self-potential method; Mechanisms of producing natural ground potentials; Fixed and moving source resistivity methods; Apparent resistivity, field layouts, Data interpretation/curve matching; Electrical tomography; Quantitative solutions for layered media; Induced Polarisation -physical basis of the electro-magnetic (EM) technique, Frequency and time domain induced polarisation; The pseudo-sections; Case studies; Generation of Induced EM fields; Propagation of EM waves in the ground; Time domain and frequency domain techniques; Dip angle measurement, AFMAG/Audio-frequency, HLEM, VLF, Airborne EM systems; Telluric and magnetotelluric methods of surveying; Applications to environmental and engineering studies: Groundwater exploration and quality, characterisation of geothermal, minerals exploration, location archaeological objects and field work.

Think in other terms

SES3106   Petrology   10 Credits

The module has an overview of Fundamental Concepts, Composition and Classification of Magmatic Rocks, Thermodynamics and Kinetics: Silicate Melts and Volatile Fluids in Magma Systems Crystal-Melt Equilibria in Magmatic Systems, Chemical Dynamics of Melts and Crystals, Kinetic Paths and Fabric of Magmatic Rocks, Physical and Thermal Dynamics of Bodies of Magma, Magma Ascent and Emplacement: Field Relations of Intrusions, Magma Extrusion: Field Relations of Volcanic Rock Bodies, Generation of Magma, Differentiation of Magmas, Magmatic Petrotectonic Associations, Metamorphic Rocks and Metamorphism: An Overview, Petrography of Metamorphic Rocks: Fabric, Composition, and Classification, Metamorphic Mineral Reactions and Equilibria, Evolution of Imposed Metamorphic Fabrics: Processes and Kinetics, Metamorphism at Convergent Plate Margins: P–T–t Paths, Facies, and Zones and Precambrian Rock Associations.

SES3200   Industrial Attachment   60 Credits

The student shall normally be attached to an institution/company for a period of six months. He/she shall work under the direction and supervision of a supervisor from the institution/company and an academic supervisor from the university.

YEAR IV

SES 4101   Seismic Exploration Methods   10 Credits

The module explores the head wave, refraction profiles; Use of seismic reflection and refraction methods for petroleum and mineral exploration and environmental monitoring; introduction to seismic imaging, instruments for seismic data acquisition; interpretation of seismic data, Static and dynamic corrections; Velocity analysis and CMP Stacking, Elimination of multiples, Residual static -237 -corrections, Time to depth conversion, Seismic Imaging and Migration; Seismic reflection methods in engineering and environmental applications; Tomography, Inversion of velocity anomalies, Cross-hole tomography, mapping shallow reflectors, Interpretation of seismic data, Attributes, coherence analysis in 3D data sets; Application of seismic methods in mapping, exploration of hydrocarbons, geotechnical, groundwater, hazard analysis; Applications to environmental and engineering studies: Groundwater exploration, mapping fracture zones, delineating bedrock, detection of cavities, exploration of hydrocarbons and Fieldwork.

SES 4102   Borehole Logging   10 Credits

The module looks at description, application, interpretation-Large spacing core logging, electrical and dielectric logs; Induction measurements; description, application, interpretation; Nuclear well logging: Natural gamma; Density and Neutron log and their description, application, and interpretation; Acoustic well-logging, Dipmeter logging, Temperature logging,

Sonic logs Seismic or geophone velocity survey, description, application and interpretation; Borehole gravity meter Measurements of Resistivity, Conventional Resistivity Logs, Dual Induction, Dual Laterolog Micro Spherically Focused Log, Measurements of Porosity, Density Log; Measurements of formation Dips; Log interpretation, correlation, lithology identification, porosity determination, location of permeable beds, identification of hydrocarbon saturation; Geological applications of well logs, stratigraphy and sedimentology from well logs, compaction, volcanic rocks; Fracture detection, fault detection, well logging methods for rock mechanics, Well Logging for Mining and fieldwork.

SES 4103   Groundwater Modelling and Management   10 Credits

This module explores numerical modelling as a tool of managing aquifer systems; General concepts of numerical modelling, Flow nets, Analytical methods, Method of images (Flow near boundaries) in aquifer characterization; Well design, development, and construction, Finite difference, Finite element, Boundary element, Green element methods; Artificial recharge as a management tool: Methods of artificial recharge; Groundwater pollution and control; Introduction to contaminated land, threshold values, source-pathway-target framework, remediation; Protection zoning; Investigation of contaminated land; qualitative risk assessment; Landfills; waste degradation, dilute and disperse, modern landfills, barriers, site selection, monitoring and fieldwork.

SES 4104 Geographical Information Systems (GIS)   10 Credits

The module has an introduction to GIS and spatial data types, Data processing systems, Determining and mapping position – data quality, spatial referencing, measures of location error on maps, satellite based positioning: GPS; Data entry and preparation – spatial data input, data preparation, point data transformation, advanced operations on continuous fields; Spatial data analysis – classification of analytical data capabilities, overlay function, neighbourhood functions, network analysis, error propagation in spatial data processing; Data visualisation – GIS and maps, the visualisation process, the cartographic toolbox, map cosmetic, map dissemination;   Geologic and hydrologic applications: Fault-line Analysis and Patter Recognition, Spectral Discrimination of Rocks and Soils, Geobotany and Mineral/Metal Exploration, Hydrologic Studies of Watersheds as well as laboratory work and fieldwork.

SES 4105   Structural Geology   10 Credits

The module examines the measurement of altitude and location, interpretation and construction of contour maps, geometric methods: Altitude calculations, dimension calculations normal, thrust and strike-slip faults; Introduction to stereographic projections, stereographic poles and rotations, structural analysis; Interpretation of geologic maps, stress; analysis of data from rock-deformations; Techniques and assumption used in the construction of structural cross sections; Analysis and interpretation of natural deformation; The fault, fold and ductile flow systems accompanying deformation of the earth's crust; Description of macroscopic structures, fold mechanisms; Analysis of fracture array geometry, faults, shear zones and unconformities, folds in cross-sections, Primary and Secondary geological structures, rock types - sedimentary,

igneous, metamorphic rocks, rock forming minerals; Introduction to cross-section balancing; Two dimensional finite strain analysis; Scale modelling of structures and fieldwork.

SES 4010　　Research Project　　　　　　　　　　　　　10 Credits

Students undertake a research project on a topic approved and supervised by the department. Industrial supervision may also be acceptable for projects linked to where students were attached during industrial attachment.　The project report shall comprise the honours thesis of the Programme. The research project shall be equivalent to two modules.

SES 4201　　Climate Dynamics　　　　　　　　　　　　10 Credits

The module has an overview of Climate Variability and the Science of Climate Dynamic; Basics of Global Climate; Physical Processes in the Climate System; El Niño and Year-to-Year Climate Prediction; Climate Models: Constructing a Climate Model; Numerical representation of atmospheric and oceanic equations; Parameterization of small scale processes; The hierarchy of climate models; Climate simulations and climate drift; Evaluation of climate model simulations for present day climate; The Greenhouse Effect and Climate Feedbacks; Climate Model Scenarios for Global Warming; Greenhouse gases, aerosols and other climate forcings; Global-average response to greenhouse warming scenarios; Spatial patterns of warming for time-dependent scenarios; Climate response time in transient climate change; extreme events; Climate change observed to date; Emissions paths and their impacts; Downscaling techniques, Palaeoclimates as well as the use of fossils to reconstruct environments and climates.

SES 4202 Environmental Geoscience and Impact Assessment　　　10 Credits
This module highlights the Geo-Environmental applications- Pollution and contamination; leachate, pollution and groundwater, geophysical "detectability" of pollutants, pollution pathways, detection, monitoring and remediation, rising groundwater levels, abandoned mine workings; Landfill sites; surveys of landfills, characterising landfill sites, investigative methods, pollution near landfills, compaction and consolidation of landfill material, anthropogenic gases; Radioactivity and radioactive waste; Geological appraisal for radioactive waste storage and the protection of groundwater quality. It also looks at concepts and issues in environmental planning and ecological conservation; Objectives of and statutory provisions for EIA's in Zimbabwe; EIA techniques and analyses; mitigatory measures; project implementation; The EIA report; draft EIA review (assessing the quality of draft Environmental Impact statement etc;); project implementation; decommissioning; Case Studies such as EIA of water resource, energy development, mining, etc and field work.

SES 4203　　Geotechnical Investigations　　　　　　　　10 Credits
The module outlines delineating geological boundaries; Depth to bedrock, near-horizontal bedrock, varying depth bedrock, weathered bedrock, buried valleys including potentially hazardous fracture zones and faults, cavities and mine shafts; Evaluation of ground conditions;

Think in other terms

soil corrosivity, soil stiffness profile, Rock mass and fracture state, rock mass deformability, rippability, diggability, trenchability and liquefaction potential; Foundations of structures-Strength profile, settlement estimation, response to dynamic loading, subsidence risk; Dams and Reservoirs- Site location and appraisal, investigations of dam foundations, Leakage, Ground treatment; Surface excavations- method, groundwater, slope stability; investigations from within subsurface excavations; Route surveys- route appraisal and fieldwork.

SES 4204 Quality Assurance and Project Management   10 Credits

The module is on general and personnel management; Management control and Marketing Strategies; Business and Finance; Quality control plans for factories with special reference to physics equipment; Cost Effective Product Development; ISO standards; Research and Development Strategies in factories; Quality and reliability; Policies, programmes and projects; Project Management Concepts; Project Planning: Mobilization, project scope, project quality, scheduling, critical path method, staffing, budgeting, risk management; Project directing and leading Project controlling; Project evaluation, Cost Benefit Analysis and activity based costing.

SES 4205   TIME SERIES ANALYSIS AND SIGNAL PROCESSING   10 CREDITS

The module is on the time series, Z-transform, 1D Fourier Transform, Properties, FFT, Design of digital filters, stability and accuracy, Linear systems and convolution, Design of deconvolution operators for 1D time series, Causality and stability, Deconvolution in the time and in the frequency domain, Deconvolution of noisy data, determination of trade-off parameters Predictive de-convolution and FX SNR enhancement filters; Non-Parametric spectral analysis, The autocorrelation function, the periodgram, tapering, variance versus bias, Parametric spectral analysis: MA, AR and ARMA models and their spectral representation, Maximum Entropy Spectral Analysis, Multichannel analysis: para-metric and non-parametric; The 2D discrete Fourier Transform, properties, symmetries, 2D deconvolution and filtering, The Hartley transform, Eigen images, The Radon transform, Eigen-structure based coherence measures, Spectral estimators based on eigen-coherence measures, Wave-number estimation in seismic data as well as time-frequency analysis.

MASTERS DEGREE PROGRAMME SPECIAL REGULATIONS

MASTER OF SCIENCE DEGREE IN GEOPHYSICS

1.0   Degree Profile: Master of Science Degree in Geophysics

Institution:	National University of Science and Technology
Type of Degree:	Masters
Credit Load:	400 credits
Level:	SADC-QF - Level 9
Accreditation Organisation(s)	Zimbabwe Council for Higher Education

PROGRAMME CHARACTERISTICS

Objectives

The programme is designed to provide an overview of both the theoretical background and the applications of geophysical methods to young scientists intending to make geophysics their career in Zimbabwe and within the region. It is designed for students planning for employment in fields of Applied Geophysics such as, earthquake hazard analysis, mineral exploration, oil and gas exploration, environmental geosciences, and geotechnical investigations. It aims at producing theoretically grounded professional expert in Applied Geophysics.

Orientation:

Research, teaching and learning are professionally oriented and focused on real life problems

Employability:

Our graduates can be employed as exploration geophysicists, geotechnical managers, hydro-geophysicists, mineral resource surveyors, meteorologists and climate scientists, research scientists, water resource managers, Seismic analysts and researchers.

Further Studies:

Doctoral studies in Applied Geophysics related disciplines such as Exploration Geophysics, Reservoir Geophysics

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PROGRAMME DELIVERY

Teaching and Learning:	Lectures, tutorials, field work and practicals, seminars, group work, industrial visits, industrial attachment, research project, individual independent study
Assessment Methods:	Written and oral examinations, tests, seminar presentations, industrial attachment report, final year research project report, continuous assessments
Distinctive Features:	Solving problems from many branches of applied Geophysics so as to develop new technologies and scientific based approaches that enable sustainable resource utilisation of natural resource and Application of several methods in geotechnical safety analysis.

Programme Competences

Generic:

Multidisciplinarity: Ability to use Geophysics principles to analyse and solve problems from multiple natural resource exploration disciplines.

Quantitative and innovative reasoning: Capacity to design and carry out fieldwork, experiments and simulations that helps us to solve real life problems.

Communication skills: Ability to communicate effectively and to present information orally and in writing and using available technology to both expert and non-expert audiences.

Analysis and synthesis: Capacity for analysis using simulations and mathematical modelling and ability to synthesise the outcomes using logical arguments and proven facts.

Ethical commitment: Professional integrity and awareness of impact Geophysics on society, economy and the environment.

Entrepreneurial skills: Capability to identify key discoveries and develop them into bankable projects and create new business ventures based on knowledge and new thinking paradigms

Discipline specific:

Deep knowledge: Ability to analyse data in terms of underlying principles and phenomena and use appropriate mathematical and field tools to explain and solve problems.

Production skills: Ability to design and carry out field investigation to better understand the real world for sustainable development.

Technology development skills: Ability to develop new technologies in Geophysics with a view to enhance production efficiencies and outputs in industry.

Problem-solving skills: Ability to solve a wide range of problems in Geophysics by identifying their fundamental aspects and using both theoretical and practical methods

Analytical and computational skills: Ability to use filed based and experimental results to analyse various phenomena and technological issues using appropriate computer packages

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Think in other terms

Intended Learning Outcomes

Ability to approach problems in an analytical and rigorous way, formulating theories and applying them to solve problems in business, engineering, the sciences, and other fields;

Ability to analyse and interpret data, finding patterns and drawing conclusions to support and improve business decisions;

Ability to analyse complex systems into simple and understandable components;

Ability to use mathematical and statistical packages to model and solve problems in Geophysics disciplines.

Ability to deal with abstract concepts and to think logically;

Ability to present mathematical arguments and conclusions with accuracy and clarity;

Ability to identify problems in industry and the community and develop appropriate solutions;

Develop mathematical models to solve current practical problems;

Communicate effectively and present information methodically and accurately using multi-media.

2.0 REGULATIONS

These regulations should be read in conjunction with the University General Academic Regulations for Masters Degrees by module-work (hereinafter referred to as the General Regulations).

2.1 **Entry Requirements**

2.1.2   The normal entry qualification shall be an Honours Degree with at   least a 2.2 classification in Applied Physics, Earth Sciences or Geology.

2.1.2   Applicants with a BSc Degree with a minimum classification of 2.1 in Geology may be considered for admission by the Departmental Board subject to approval by the Senate, if they have a strong mathematical background,

2.1.3   Any other equivalent qualifications obtained from recognised institutions in Zimbabwe or elsewhere may be considered for admission by the Departmental Board subject to approval by the Senate.

3.0 PROGRAMME DURATION

3.1   The programme is offered on full-time and runs over a period of twenty-four (24) months comprising four semesters.

3.2   When the programme is offered on part-time basis, it runs over thirty-six (36) months comprising six semesters.

4.0 PROGRAMME STRUCTURE
4.1 **Full-time Programme:**
    4.1.1   Part I consists of module-work over two semesters.
    4.1.2   Part II consists of elective modules and a research project work
    leading to a dissertation.

Think in other terms

4.1.3   The research project may commence any time after the second semester examinations. It may be undertaken within the Department, at any industry or any other institution approved by the   Departmental Board. The dissertation report shall normally be submitted to the Department at least one month before the end of the fourth semester (Part II) of the Degree programme.

4.2   **Part-time Programme:**
   4.2.1   Students on Part-time shall normally take two modules per semester
   over a period of six semesters (3 years).
4.2.2   The research project may commence at any time after the fourth semester examinations. It may be undertaken either in or at any industry or any other institution approved by the Departmental Board. The dissertation report shall normally be submitted to the Department at least one month before the end of the sixth semester
   4.2.3   Full-time students must complete and pass a minimum of ten (10)
   modules. Students shall be required to choose a minimum of two
   modules from the list of elective modules subject to the availability of expertise and equipment in the Department.
   4.2.4   Part-time students shall propose their project titles at the end of the
   fourth semester and start working on their projects by the beginning of the fifth semester (third year of the programme).
   4.2.5   Projects are compulsory and shall be chosen in the area of geophysics.
   All students shall be required to actively participate in field-trips /
   excursions and camp-outs which shall be organised during the
   module-work duration. Participation in the field-trips (etc.), shall count
   towards the continuous module-work assessment for the students in the
   particular module(s).

5.0   MODULE EVALUATION
5.1A taught module shall be assessed normally by a three-hour examination at the end of the semester. The final grade in the module-work shall normally be based on 25% of continuous assessment and 75% of final examination.
5.2 To pass a module a student must obtain an overall mark of 50% and must obtain at least 45% in the final examination. A student shall be expected to obtain a minimum mark of 50% in the Masters project assessment. The dissertation shall contribute 40% of the mark for the degree classification.

6.0   DETERMINATION OF RESULTS
6.1   **Award of the degree**
6.1.1   The pass mark in each module and in aggregated part or programme marks shall be 50%.
6.1.2   The determination of the overall degree programme aggregate including the   dissertation component shall be:
        Taught modules   60%

Dissertation   40%

6.1.3   In determining the overall degree programme aggregate, the following part weightings shall be used:

Part I   50%   (200 Credits)
Part II   50%   (200 Credits)

6.1.4   A student must earn a minimum of 400 credits to be awarded the Degree and the degree classification shall be in accordance with the General Regulations.

7.0   PROCEED AND DISCONTINUE

7.1   To proceed to Part II, a student must pass all modules.

7.2   A student who fails 50% or less, of the modules in Part I, may be allowed to repeat the failed modules before proceeding to Part II, else, he / she shall discontinue the programme; and a student who fails a part of the programme more than once, shall withdraw from the programme.

7.3   A student who is not allowed to proceed to Part II, but has passed at least six (6) taught modules may request to proceed to carry out a dissertation and opt for the award of a Post-graduate Diploma at the end of his studies.

7.4   For a student to be awarded either a Post-graduate Diploma or a Master of Science Degree in Geophysics, he / she should satisfy the examiners in the Dissertation. The dissertation shall be compulsory for any award on this programme.

PROGRAMME SUMMARY

PART I
SEMESTER I

Module Code	Module Description	Credits
MAPH 5131	Seismic Theory and Fundamentals	25
MAPH 5132	Time Series Analysis and Inverse Theory	25
MAPH 5133	Structural Geology	25
MAPH 5134	Global Tectonics	25

SEMESTER II

MAPH 5236	Geophysical Inverse Theory	25
MAPH 5237	Geoelectric And EM Methods	25
MAPH 5238	Gravity and Magnetic Exploration	25
MAPH 5239	Refraction and Reflection Seismology	25

PART II
SEMESTER I

	Elective	25
	Elective	25
MAPH 6040	Research Project	50

Electives

MAPH 6121	Hydrology and Contaminant Processes	25
MAPH 6140	Seismic Hazard Assessment	25
MAPH 6122	Remote Sensing I	25
MAPH 6141	Remote Sensing II	25
MAPH 6123	Reservoir Geophysics	25
MAPH 6142	Ground Investigation	25

SEMESTER II

MAPH 6040	Research Project	100

Think in other terms

MODULE SYNOPSES

YEAR I

MAPH 5131 Seismic Theory And Fundamentals   25 Credits
The module explores the time series, Z-transform, 1D Fourier Transform, Properties, FFT, Design of digital filters, stability and accuracy, Linear systems and convolution, Design of deconvolution operators for 1D time series, Casuality and stability, Deconvolution in the time and in the frequency domain, Deconvolution of noisy data, determination of trade-off parameters Predictive de- convolution and FX SNR enhancement filters. It also looks at Non-Parametric spectral analysis, The autocorrelation function, the periodogram, tapering, variance versus bias, Parametric spectral analysis: MA, AR and ARMA models and their spectral representation, Maximum Entropy Spectral Analysis, Multichannel analysis: para- metric and non-parametric. The module also covers the 2D discrete Fourier Transform, properties, symmetries, 2D deconvolution and filtering Deconvolution with positivity constraints; Other transformations: The Hartley transform, Eigen images and the KL transform, The Radon transform, Eigen-structure based coherence measures, Spectral estimators based on eigen-coherence measures, The Pisarenko estimator, Wave-number estimation in sonar and seismic data; Time-frequency analysis and the wavelet transform, Continuous and discrete wavelet trans- form, The Gabor transform, Matching pursuit techniques; Introduction to higher order statistics, Third and fourth order cumulants, The bispectrum and trispectrum.

MAPH 5133 Structural Geology   25 Credits
This module examines the measurement of altitude and location, interpretation and construction of contour maps, geometric methods: Altitude calculations, dimension calculations normal, thrust and strike- slip faults; Introduction to stereographic projections, stereographic poles and rotations, structural analysis; Interpretation of geologic maps, stress; analysis of data from rock-deformations; Description of mesoscopic structures and fold mechanisms. This module also has an analysis of fracture array geometry, faults, shear zones and unconformities, folds in cross-sections, Primary and Secondary geological structures, rock types - sedimentary, igneous, metamorphic rocks, rock forming minerals; Introduction to cross-section balancing; Two-dimensional finite strain analysis; Scale modelling of structures; Regional geology and geology of Zimbabwe.

MAPH 5134 Global Tectonics   25 Credits
The module outlines the continental drift theory, continental reconstructions, palaeoclimatology and palaeontological evidence of continental drift; Palaeomagnetism, seafloor spreading, oceans, ridges and continental rifts, the geosynclinal theory and impact of tectonics; Transform and transcurrent faults; Divergent, convergent and transform boundaries; Subduction zones, mountain ranges, mechanism of plate tectonics and implications of plate tectonics; The nature and origin of large sedimentary basins and igneous provinces; Earthquake seismology, seismic

Think in other terms

waves, earthquake location, earthquake mechanisms and sources, seismic tomography, velocity structures and composition of the earth; The crust, ophiolitites, differences between continental and oceanic crusts, the mantle, the core, deformation in the crust and mantle; Isostasy, lithosphere and asthenosphere and terrestrial heat flow.

MAPH 5238 Gravity And Magnetic Exploration   25 Credits
This module highlights the relative costs of geophysical data acquisition, Role of gravity and magnetics in exploration; Conservative forces, Central force fields, Value of a scalar potential, Divergence theorem, Poisson's and Laplace's equations, Spherical Harmonic Analysis: general solution, solution for rotating Earth, significance of terms, International Gravity Formula, History of the gravity method, Absolute and relative gravity measurements, Gravity instruments, Data acquisition, land gravity data, marine gravity data, airborne gravity data, satellite methods, Reduction of gravity data, instrument, tidal and drift corrections, free air correction, Bouguer correction, borehole gravity, isostasy: free air vs; Bouguer anomalies, Eotvos effect, terrain (topographic) correction as well as FAA, BA, CBA and IA. The module also looks at anomaly separation and filtering: smoothing, gridding, least squares, Fourier filtering, Interpretation of gravity data, uniqueness problem, direct approach, indirect methods, rock densities, gravity due to simple bodies, solid angle method, line-integral method, chart methods, computer-aided interpretation; History of magnetism, similarities and differences with gravity, basic definitions, the Earth's magnetic field: the main field, source, distribution, secular variations, external field, Inter- national Geomagnetic Reference Field; Rock magnetism, susceptibility, remanance: TRM, CRM, DRM, paleomagnetism and effect on present-day field. The module also covers acquisition of magnetic data: measuring susceptibility and magnetism, land magnetic data, marine magnetic data, airborne magnetic data, Reduction of magnetic data: diurnal correction, drift correction, regional correction; Anomaly separation and filtering: filtering, reduction to pole, downward and upward continuation;
Interpretation of magnetic anomalies: Poisson's formula, magnetic field due to simple bodies, solid angle method, basement depth determinations and computer-aided interpretation.

MAPH 5236 Geophysical Inverse Theory   25 Credits
This module looks at the Ill-posed and well-posed problems, Dealing with non-uniqueness, Physically feasible and non-feasible solutions, Data space, Model space and observational noise, Review of Linear Algebra: Linear vector spaces, Matrices, Matrix inverses, Eigen-values and Eigen-vectors, Singular value decomposition, Generalized inverse, Null Space, Model and data resolution matrices. It also looks at Linear Inverse Problems with accurate data: Minimum norm construction, Weighting functions in model space, Smoothing with derivatives; Linear Inverse Problems with inaccurate data: Gaussian errors and least-squares methods, Damped least-squares, Trade-off curves, SVD solution, truncation of singular values; Numerical solutions of large linear inverse problems: Iterative and semi-iterative solutions, Conjugate gradients, LSQR, Lanczos bi-diagonalization; Inversion with the Lp norm: Robust inversion, Iterative re-weighting least-squares, L1 solution; Bayesian methods: A priori and A posteriori probabilities, Non-informative priors, Maximum entropy principles, Frequentist vs Bayesian analysis;

Think in other terms

Non-linear inverse problems: Multi-modality, Linearized inversion, Gauss methods, steepest descent and conjugate gradients; Global optimization: Simulated annealing as well as genetic algorithms.

MAPH 5237 Geoelectric And EM Methods   25 Credits

This module looks at the factors affecting current flow - resistivity, permittivity, permeability, isotropic and anisotropic media; Self-potential method; Mechanisms of producing natural ground potentials; Fixed and moving source resistivity methods; Apparent resistivity, field layouts, Data interpretation/curve matching; Electrical tomography; Quantitative solutions for layered media; Induced Polarisation -physical basis of the electro-magnetic (EM) technique, Frequency and time domain induced polarisation; The pseudo-sections; Case studies; Generation of Induced EM fields; Propagation of EM waves in the ground; Time domain and frequency domain techniques; Dip angle measurement, AFMAG/Audio-frequency, HLEM, VLF, Airborne EM systems; Telluric and magnetotelluric methods of surveying and a number of case studies.

MAPH 5239 Refraction And Reflection Seismology   25 Credits

This module explores the head wave, refraction profiles; use of seismic reflection and refraction methods for petroleum and mineral exploration and environmental monitoring; introduction to seismic imaging, instruments for seismic data acquisition; interpretation of seismic data, Static and dynamic corrections; Velocity analysis and CMP Stacking, Elimination of multiples, Residual static corrections, Time to depth conversion, Seismic Imaging and Migration; Seismic reflection methods in engineering and environmental applications; Tomography, Inversion of velocity anomalies, Cross-hole tomography, Mapping shallow reflectors, Interpretation of seismic data, Attributes as well as coherence analysis in 3D data sets.

YEAR II

MAPH 6121 Hydrology And Contaminant Processes   25 Credits

This module deals with basic concepts in soil genesis, land degradation and water contamination; Water cycle, aquifers, Darcy's law, hydraulic conductivity, transmissivity, storativity, methods of permeability, measurement; fluid potential and Bernoulli equation; Flow nets and maps; Deriving transmissivity and storativity from well pumping tests; Aquifer properties, heterogeneous systems and representative volumes, dual porosity systems, groundwater sampling; Well hydraulics, practical interpretation of well pumping tests and log test data, failing head test, packer tests; Groundwater modelling - water balance methods, flow models; Aquifer assessment; uniform and non-uniform flow; radical flow to a well; aquifer pumping test analysis; image well theory, multiple well fields, salt water encroachment; Using Aquifer software package; Groundwater chemistry; inorganic reactions, pH buffers, mineral dissolution, ion exchange; bacterially mediated reactions, electron acceptors; seawater intrusion, Ghyben-Herzberg relation, remediation of marine incursion; Water quality and use, water balance, water resource management, conjuctive use; artificial recharge, case histories; Introduction to

Think in other terms

contaminated land, threshold values, source-pathway-target framework, remediation; Investigation of contaminated land; desk study; sampling design and methods; analytical strategy, qualitative risk assessment; Landfills; waste degradation, dilute and disperse, modern landfills, barriers, site selection, monitoring; Contaminant process; introduction to ground- water contamination, historical incidents, advection, dispersion, diffusion, biodegradation of groundwater contamination; Infiltration, run off as well as evapotranspiration.

MAPH 6140 Seismic Hazard Assessment   25 Credits

This module examines the seismic hazard analysis - hazard versus risk, the law and regulations, instrumental seismicity, importance of historical data, seismotectonic sources, maximum earthquakes, ground motion and site effects; Soil liquefaction and liquefaction potential, reliability of liquefaction analysis potential, reliability of liquefaction analysis potential evaluation, groundwater and its damaging effects, landslides and slope stability under seismic action; Probabilistic seismic hazard analysis, The deterministic approach to hazard analysis; Strong motion measurement and characteristics, measurement of strength of ground motion using peak parameters, spectral methods, response spectra, Fourier spectra, energy methods, statistical models of strong ground motion; Effects of magnitude, distance and local site conditions; The engineering design problem-elements of structural dynamics SDOF systems, materials and elements under seismic loads; Determination of seismic loads together with probability - theory methods in problems of seismic resistance.

MAPH 6122 Remote Sensing I   25 Credits

This module is on definition and Applications of Remote Sensing, Basic Remote Sensing Elements and Systems; Types of sensors: Visible, Near-Infrared, Thermal Infrared, Microwave (Radar), Imagers (Aerial Photo Cameras, Multispectral Scanners), Spectrometers, Radiometers, Profilers, Sensor Calibration, Comparison of Sensor Performance, Aerial Photography: Vertical, Oblique, Stereo Photography, Camera, Lens, Film and Filter Selection, System Trade-Offs: Resolution vs; Coverage, Exposure, Image Motion Compensation, Sun Angle, Scene Contrast, Resolution Limits, etc; Satellites and data sources: Remote Sensing Satellite, Orbits, Sensors, Landsat, SPOT, NOAA/ AVHRR, etc; Hyperspectral, High Resolution Systems, Satellite Data Products and Sources; Image pre-processing and enhancement: Image Statistics and Histograms, Image Rectification and Restoration, Image enhancement (Colour Density Slicing, etc;), Contrast Manipulation (Edge Enhancement etc;), Image Transforms (Principal Component Analysis, etc;) Multispectral analysis and classification: Multi-Image Manipulation (Spectral Pattern Recognition), Image Classification (Maximum Likelihood, etc;) Supervised and Unsupervised Classification (Training) and the Classification Accuracy Assessment (Errors of Omission and Commission).

MAPH 6141 Remote Sensing II   25 Credits

The module covers topics such as remote sensing of vegetation: Spectral Signatures of Plant Species, Plant Reflectance Models, Forest and Agricultural Crop Inventories, wetlands Mapping and Productivity Assessment, Detection of Plant Stress (Insects, Disease, Drought, etc;), Land

Think in other terms

use/Land cover mapping: Land Use Mapping with Landsat TM and SPOT, Land Cover Change in Coastal Watersheds, Environmental Impact Assessment (Coastal Erosion, etc;) Predictive Models for Archaeology and Highway Planning, Urban Applications of Remote Sensing; Geographic information systems (GIS): Introduction to GIS and Georeferenced Data, Data Input (Conversion from other records etc;) Data Output (Formatting, Hardcopy/Softcopy, etc;) Data Management (Data Base, Spatial Data Models, etc;) GIS Analysis Functions (Integrated Analysis of Spatial and Attribute Data); Geologic and hydrologic applications: Fault-line Analysis and Patter Recognition, Spectral Discrimination of Rocks and Soils, Geobotany and Mineral/Metal Exploration, Hydrologic Studies of Watersheds, Riparian Buffers in Coastal Watersheds; Detection of particulate/dissolved substances in water: Optical Properties of Water: Scattering and Absorption, Spectral Discrimination of Particulate and Dissolved Substances, Mapping Suspended Sediment and Chlorophyll Concentrations, Regression and Neural Network Models, Ocean Colour Sensors and Data Products (SeaWiFS). The module also covers water circulation-a pollutant dispersion: Data for Watershed Hydrology and Flood Analysis, Current Measurement with Dyes and Drogues (Langrangian Techniques), Coastal Current Circulation, Fronts and Upwelling, Predicting and Tracking Oil Slick Drift and Dispersion, Modelling and Monitoring Ocean Dumped Waste Dispersion; Thermal infrared techniques: Thermal Infrared Sensing (Theory, Sensors, Techniques, etc;), Mapping Sea Surface Temperature (Currents, Effluents, Fronts, etc;) Polar Meteorological Satellites (NOAA/AVHRR, etc;), Geosynchronous Satellites (GOES, etc;); Laser Applications: Laser Fundamentals, Ocean Depth Profiling (Bathymetry) Ocean Wave Profiling, Oil and Chlorophyll Fluorescence Mapping; Radar applications: Radar Satellites (RADARSAT, ERS-1, et;), Ocean Surface Observation, Spatial Filtering and Pattern Recognition, Analysis of Surface and Internal Wave Spectra.

MAPH 6123 Reservoir Geophysics   25 Credits

This module explores the basic concepts of energy, exploitation of thermal energy, geology of geothermal fields, hydrogeology of geothermal areas; Geochemical and geophysical methods for investigating geothermal reservoirs; Well logging methods; Resistivity; spontaneous potential (SP); porosity logs (sonic, whole-waveform, formation- density, neutron); Natural gamma-ray logs; determination of porosity and lithology; checkshot surveys and vertical seismic profiles (principles, wave types, acquisition, processing, modern developments); attenuation measurement and its uses;

Reservoir engineering; Potential evaluation methods and some case studies.

MAPH 6142 Ground Investigation   25 Credits

This module highlights the classification and properties of soils; effective stress, pore pressure parameters, applications: soil testing: triaxial, shear box, ring shear, strength parameters; Earth pressures, active and passive; Soil stress; seepage and flow; earth dams and embankments; Stability analysis; flow slides, liquefaction; Bearing capacity; types of foundation; settlement of foundations; Earth retaining structures; sheet piling, reinforced earth; The importance of geology in engineering: Engineering properties of geomaterials, stresses and strains, engineering

classification of soils and rocks; engineering classification of weathering, rock weathering time; Understanding the ground: Building a geotechnical model of the ground, desk study; Uncertainty and risk in engineering geology; Terrain analysis: Terrain Investigation, remote sensing and air photography interpretation, multispectral versus visible remote sensing methods, airborne and satellite remote sensing, choosing remote sensing data to suit ground conditions, characterising the ground conditions, geomorphological mapping and walk-over surveys, terrain evaluation and hazard mapping; Site Investigation: Site investigation and BS5930, invasive techniques for boreholes and coring, sampling, laboratory and in situ testing methods before, during and after construction, instrumentation and monitoring.

MAPH 6040 Research Project   **150 Credits**
Students shall be encouraged to come up with research topics of their choice for their research projects. Such projects shall be approved by the Department before they embark on them. Students are encouraged to select projects that can be done in collaboration with the industry and or for the direct benefit of the industry. Field trips, camp - outs and/or excursions that are a requirement of the degree programme are not necessarily a part of the Research project.

MASTER OF SCIENCE DEGREE IN LASERS AND APPLIED OPTICS

1.0 DEGREE PROFILE: Master of Science Degree in Lasers and Applied Optics	
Institution:	National University of Science and Technology
Type of Degree:	Masters
Credit Load:	400 credits
Level:	SADC-QF - Level 9
Accreditation Organisation(s):	Zimbabwe Council for Higher Education
Period of reference:	Accredited by ZIMCHE 2018

PURPOSE OF THE PROGRAMME

The programme is designed to enhance
(a) scientific manpower trained to participate in the technological development of Zimbabwe
(b) creativity and innovation so that students can pursue further research work in appropriate fields of lasers and applied optics.

2.0   PREAMBLE

The Department of Applied Physics offers both Undergraduates and Post-graduate Degrees programmes. The BSC Honours programmes are in two main areas of specialization, namely Applied Physics and Radiography. The undergraduate degrees are categorized as follows, BSc (Hons) in Applied Physics, BSc (Hons) in Radiography, BSc Special (Hons) in Radiography. The Masters programmes are offered either as taught modules (on full time basis or on block release basis) or through research (MPhil). The different areas of specialization include MSc in Lasers and Applied Optics, MSc in Geophysics, MSc in Medical Physics and MSc in Radiography. We are looking for dedicated PhD research candidates. The department has therefore been motivated by the recent technological advances and the need by people to equip themselves with the relevant knowledge, to amend its programmes to address the need. The department has therefore amended some of its programmes to be offered on both full time and block release basis to train the required scientific manpower. The block release programme shall cater for those candidates who may not be able to study on full time basis due to work and other related commitments. The current, MSC in lasers and applied optics programme was designed to embrace candidates with a broader technological understanding of recent advanced industrial

Think in other terms

applications of lasers, with special emphasis on the telecommunication industry (optical communication). The main programme regulations however remained unchanged.

3.0   REGULATIONS
These regulations should be read in conjunction with the University General Academic Regulations and the Faculty of Applied Science regulations for Masters Degrees by module-work.

4.0   ENTRY REQUIREMENTS
4.1   Applicants shall normally hold an Honours Degree in Applied Physics with a 2.2 degree class to be eligible for admission into the programme.
4.2   Any other equivalent qualifications obtained from recognised institutions in Zimbabwe or elsewhere may be considered by the Departmental Board subject   to   the approval by the Senate.
4.3   For an applicant who does not hold an Honours Degree in Physics or Applied Physics and / or does not hold a 2.2 degree class, the Departmental Board shall determine the level of Physics background the applicant holds and decide if it be adequate and may recommend the applicant to the Senate for admission.

5.0   DURATION
The programme shall normally be offered over a period of twenty-four (24) months on full-time study or on block release basis in two Stages over a period of twenty-four (24) months. Each Stage shall consist of two blocks.

6.0   MODE OF STUDY
6.1   **Full-time study**
The programme, when offered on full-time basis, shall comprise four   semesters (i. e.   two years).
6.1.1   Year I shall consist of class and laboratory work for two semesters while Year II shall consist of two taught modules and a research project leading to a dissertation.
6.1.2   The research project may commence at any time after the Second Semester written examinations. It may be undertaken either in the Department, at any Industry or any other Institution approved by the Departmental Board. The Dissertation report shall normally be submitted to the Department at least *one month* before the end of the Second Semester of Part II of the programme.

6.2   **Block release programme**
6.2.1   When the programme is offered on Block Release basis, it shall be in two Stages, with a total of four Blocks over a period of two years. Stage I comprises of Block I and Block II while Stage II comprises of Block III and Block IV.

Think in other terms

6.2.2   Stage I (Block I and Block II), comprise two intensive, three-weeks blocks of class and laboratory work; Stage II shall consist of one, three-weeks block for class-work in Block III and a Research Project, leading to a Dissertation in Block IV. Laboratory work shall proceed between Block I and Block II.

6.2.3   The Research Project may commence at any time after Block II, Stage I examinations. The dissertation report shall normally be submitted to the Department at least one month before the end of Block IV, Stage II.

6.3   A student shall require a minimum of 400 credits to successfully complete the programme.

7.0   ASSESSMENT

7.1   A taught module shall be assessed normally by a four hour examination at the end of each Semester / Block.

7.2   The final grade in a taught module work shall normally be based on Continuous Assessment (25%) and a final written examination (75%). The Seminar and Laboratory work Module shall be assessed wholly (100%) by Continuous Assessment.

7.3   To pass a module, a student must obtain a minimum overall mark of 50% and must have obtained at least 50% in the final written examination

7.4   The overall classification of the degree shall be done in accordance with the General University Regulations.

8.0   PROCEED AND DISCONTINUE

8.1   To proceed from Year I to Year II a student must have earned a minimum of 150 credits with 50 credits having been earned from the Seminar and Laboratory work modules.

8.2   A student who fails four or more of the taught modules shall be required to discontinue.

9.0   AWARD OF DEGREE

To be awarded the Degree, a student must have satisfactorily earned 400 Credits from the programme. The Degree Classification shall be in accordance with the University General Regulations.

10.0   AWARD OF POSTGRADUATE DIPLOMA

10.1   A student who passes all the ten taught modules but fails to complete the project work *may* be awarded a Postgraduate Diploma.

10.2   A student who passes at least six of the taught modules and successfully completes the project work *may* be awarded a Postgraduate Diploma.

10.3   The overall classification of the Postgraduate Diploma shall be done in accordance with the University General Regulations.

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PROGRAMME SUMMARY

Semester and Block	Module Code Module description	Credits
	MAPH 5131 Mathematical Methods	25
Year I **Semester I / Block I**	MAPH 5071 Advanced Quantum Mechanics	25
	MAPH 5031 Physical and Geometrical Optics	25
	MAPH 5112 Seminar and Laboratory Work	25
Semester II /Block II	MAPH 6033 Fibre Optics and Non Linear Optics	25
	MAPH 5032 Physics and Technology of Lasers	25
	MAPH 6036 Optical Communication	25
	MAPH 5112 Seminar and Laboratory Work	25
Year II **Semester I / Block III**	MAPH 6092 Optical Instrumentation and Measurement	25
	Elective module	25
	MAPH 6112 Research Project	50
Semester II/ Block IV	MAPH 6112 Research Project	100
Total credits		**400**

LIST OF ELECTIVES

A student can choose any one elective out of the modules listed below. The electives shall be offered depending on availability of staff, facilities and number of students who opt for it.

Elective	Credits
MAPH 6040 Optical Technology	25
MAPH 6035 Optical Properties of Materials	25
MAPH 6034 Laser Spectroscopy	25
MAPH 6037 Industrial Applications of Optics	25
MAPH 5072 Quantum Electrodynamics	25
MAPH 5113 Computer Applications and Interfacing	25

Think in other terms

MODULE SYNOPSES

YEAR I

MAPH 5131 Mathematical Methods   **25 Credits**
This module looks at   complex Analysis: Multi-valued functions; Branch Points and cuts; Evaluation of Integrals; Singularities of functions; Dispersion relations; Fourier Series and Integral Transforms: Fourier series and Fourier analysis; Orthogonality, random process probability; Time-frequency domain; Signal processing; Fourier and Laplace transforms; Fast Fourier and Z transformation; Convolution and De-convolution; Auto and cross co-relation. It also looks at differential Equations: Higher order differential equations with constant and non-constant coefficients; Partial differential equations; Integral transform and Green function methods; Special Functions: Sturm-Lioville Theory; Legendre, Lagurre; Hermite and Bessel functions; Group Theory: Definition and examples of groups, the action of a group on a set; Theory of finite groups; Small oscillations and group theory; Compact and Lie groups; Applications of groups in quantum mechanics and spectroscopy.

MAPH 5071 Advanced Quantum Mechanics   **25 Credits**
This module explores angular momentum and spin in Schrondiger Equation; Spin-spin, spin-orbit interactions; Thomas-Fermi model; Angular distributions from decay and collisions; Generalised Pauli principle; Properties of symmetry of states, Notion of Parity; Time reversal and charge conjugation.

MAPH 5031 Physical And Geometrical Optics   **25 Credits**
This module highlights gaussian approximation; The matrix formulation of the Guassian optics; Cardinal points; Monochromatic and chromatic aberration; Geometrical image evaluation; Fresnel Diffraction and X-ray microscopy; Fraunhofer diffraction and Fourier transforms; Coherence and interference design; Two beam and multi-beam interferometers and evaluation of interferograms.

MAPH 5113 Computer Applications And Interfacing   **25 Credits**
This module is on Programming C++, scope and principles; Use of wide range of computer packages e ;g; Excel - 3; Auto cad, smart work; Basic simulation and modelling methodology, sampling data collection, analysis and visual output; Interforce applications in control systems and instrumentation.

Think in other terms

MAPH 5032 Physics And Technology Of Lasers   **25 Credits**

This module is on Density Matrix formulation of interaction of radiation with matter; Threshold condition, Lamb dip; Unstable resonators; Active and passive Q switching, mode locking; Cavity dumping; Design of gas lasers, solid state lasers, semiconductor lasers and dye lasers; Techniques for measuring the spectral and temporal properties of laser beams.

MAPH 5072 Quantum Electrodynamics   **25 Credits**

This module explores the quantum electric dipole; Dipole oscillators Electromagnetic fields and their quantization; Quantum Electrodynamics; Recapitulation of elementary quantum mechanics; Virtual oscillators; Dirac's and Jordan's quantization; Jordan's Pau relativistic quantization of charge free electromagnetic fields; Negative energy states; Electromagnetic fields and their quantization; Electromagnetic Waves in Anisotropic crystals; The index ellipsoid; The quantization of radiation field; The lens Waveguides, the wave equation in quadratic index media; Elliptic Gaussian beams; Density Matrix derivation of the Atomic Susceptibility; Quantum well laser and the free electron laser.

MAPH 5092 Optical Instrumentation And Measurement   **25 Credits**

This module has a review of Electronic Instrumentation and measurement; Fibre optic sensors; Measurement of pressure, temperature, magnetic and electric field based on intensity, phase, polarization, frequency and wavelength; Sensor design; Optical time domain refectometer spectral analyser, ellipsometer, beam view analyser and diagnostics; Electro-optic, magneto optic and acoustic devices and their applications.

YEAR II

MAPH 6033 Fibre Optics And Non Linear Optics   **25 Credits**

This module examines materials and fibre preparations; Propagation of 'EMR' in optical fibres; Optical waveguides cable connectors, detectors and measurement techniques; Modal analysis for step index fibres; Pulse dispersion, attenuation and splice loss, grating compression; Raman optical amplifiers; Non-linear optical susceptibility; Phase matching and harmonic generation; Parametric excitation; Photon echo, self-induced transparency, damage effects and optical bistability.

MAPH 6032 Applications Of Lasers   **25 Credits**

This module is on holography; Principles of wave front reconstruction; Types of holograms; Multiplexing, non-destructive material testing, storage and optical processing; Holographic optical elements; Medical diagnostic, surgery, cancer treatment, bloods coagulation molecular biology; Laser remote sensing and environmental pollution measurement and monitoring and Industrial applications of lasers.

Think in other terms

MAPH 6038 Optical Technology   **25 Credits**

The module explores the generating of optically flat, spherical and aspherical surfaces; Various theories of polishing; Surface finish and polishing quality; Holographic testing; Design of optical processing unit; Production of lenses and prisms; Computer simulation of lens design and prisms; Semiconductor and metallic films, design methods of multilayer interference filter coatings; Guided waves in dielectric films and Devices for integrated optics.

MAPH 6035 Optical Properties Of Materials   **25 Credits**

The module outlines optical properties of glasses, plastics, amorphous synthetic quart (Vitreous silica) artificial crystals, metallic materials; Photo refractive crystals; Materials for thin fi lm reflection and Anti-reflection coatings; Materials for optical fibres; Fabrication and statistical tolerances for different components.

MAPH 6034 Laser Spectroscopy   **25 Credits**

This module looks at the tunable coherent light sources; Doppler limited absorption and fluorescence spectroscopy; Laser Raman and Brillouin spectroscopy and time resolved Laser Spectroscopy.

MAPH 6036 Optical Communication   **25 Credits**

This module covers semiconductor injection lasers, Modes, characteristics and efficiency; LED driver circuits; Receiver structure; High performance receivers; Optical receiver circuits multiplexing strategies; Optical amplifiers; Modulation and demodulation formats; Multi-carrier systems and network concepts; Information theory, entropy information rate, coding to increase average information per bit; Shannon's theorem and channel capacity.

MAPH 6037 Industrial Applications Of Optics   **25 Credits**

This module is on surface finish testing; Monitoring on line diameter of threads, wires, etc; Laser alignment techniques; Laser drilling, cutting, welding, heat treatment, glazing, alloying, cladding hardening of surfaces, semi-conductor annealing and trimming; Processing of micro-electronic components; Industrial lasers; Surveillance and range finding; Applications of Fourier optics in character recognition and cross correlation.

MASTER OF SCIENCE DEGREE IN MEDICAL PHYSICS

1.0   Degree Profile: Master of Science Degree in Medical Physics

Institution:	National University of Science and Technology
Type of Degree:	Masters
Credit Load:	340 Credits
Level:	SADC-QF - Level 9
Accreditation Organisation(s):	Zimbabwe Council for Higher Education

Period of reference: Accredited by ZIMCHE 2018

Purpose of the Programme

● Provide an education framework in the university and clinical environments leading to professional competence in medical physics

● Lay appropriate underpinning scientific knowledge leading to high levels of competence and interest in new technology and efficient practice in the highly dynamic environment of radio therapeutic and diagnostic imaging

● Inculcate in students research mindedness and awareness and prepare students to engage in research related to medical physics and the broad environment in which it is practiced

● Ensure students appreciate patients' needs and provide informed, appropriate and compassionate health care

Think in other terms

PROGRAMME CHARACTERISTICS

The programme has two distinct components which are aimed at producing a medical physicists that is educated and clinically orientated and therefore fit to practice on completion of the degree Clinical practice component enables the student to build, reinforce and consolidate on theory and clinical learning. The clinical component shall follow recommendations for Medical Physics Education in AFRA Member States endorsed by the Federation of African Medical Physics Organisations (FAMPO). This is based on three IAEA Medical Physics Clinical Training Series Handbooks namely TCS 37, TCS 47 and TCS 50. Students shall be required to compile a logbook or portfolio which reflects the competencies attained during their clinical training. A detailed outline of the clinical programme is shown in Appendix 1. A formal, independent assessment of the students shall take place at the end of the training programme to confirm successful completion of the clinical training programme.

Specialist Focus: It is designed to provide an overview of both the theoretical background and applications of physics in the medical field. It is the intention of this programme to address some of the pertinent issues in medicine today, the availability of personnel to monitor and maintain quality in the equipment and procedures used in medicine, and also to carry out sustained research.

2.0   REGULATIONS
These regulations should be read in conjunction with the Faculty of Applied Science and the NUST General Academic Regulations**.**

2.1   Entry requirements
A Bachelor's Degree in Physics, Biophysics, Radiography or relevant Engineering with a minimum grade of 2.2 or equivalent. Preference will be given to those who are already working in the Health Delivery Sector.

2.2   Duration
The programme runs on a full-time (or block release) over a period of two (2) years.

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2.3   Structure

2.3.1   PART I consists of module work running for two semesters. Part II shall consist of clinical practice and a research project work leading to a dissertation and a portfolio.

2.3.2   The Research Project may commence at any time after the Part I Second Semester examinations. It may be undertaken in any relevant industry or any institution approved by the Departmental Board. The dissertation report shall normally be submitted at least one month before the end of the fourth semester (Part II).

2.3.3   A student is required to pass a minimum of eight taught modules and shall be   required to choose at least one module from the list of elective modules.

  2.3.4   A minimum of 340 credits shall be required for the Award of the Degree.

3.0   MODULE EVALUATION

3.1   A taught module shall be assessed by a four hour written examination at the end of each semester.

3.2   The final grade in the module work shall be based on 25% from continuous assessment and   75%   from   the   final   written   examination.

3.3   To pass a module a student must obtain an overall mark of 50% from both continuous assessment   and   the   final   written   examination.

3.4   A student shall be expected to obtain a minimum of 50% in the Master's Thesis project work and 50% in the Clinical Placement portfolio. The thesis and clinical placement portfolio shall contribute on equal weighting, 40% of the overall mark of the degree classification.

4.0   PROCEED AND WITHDRAW

4.1   A student who obtains a minimum of 80 Credits in Part I and is not allowed to proceed to Part II may be allowed to repeat the Part provided he / she scored an overall aggregate of 50%. A student who is not allowed to proceed to Part II because he/she could not earn a minimum of up to 80 Credits shall withdraw from the Programme.

4.2   A student may be allowed to proceed to Part II while carrying a Part I module, provided he/she has earned a total of 120 Credits in that Part. Such modules shall normally be examined at the next regularly scheduled examinations. A student may not be allowed to carry-over a Module for more than one year. Such a student shall be required to withdraw from the programme.

5.0   AWARD OF DEGREE

5.1   A student who has satisfied the examiners in the modules studied by earning a minimum of three hundred and forty (340) Credits shall be awarded the Master of Science Degree in Medical Physics.

5.2.1   A student who passes eight (8) of the taught modules, successfully completes the Clinical Practice but fails to complete the Research project work, may be awarded a Post-graduate Diploma.

5.2.2   A student who fails to complete the programme but has passed at least six (6) of the

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taught modules and successfully completed both the Clinical Practice and the Research project, may be awarded a Post-graduate Diploma.

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PROGRAMME SUMMARY

PART ISEMESTER I

Module Code	Module Description	Credits
MAPH 5113	Human Anatomy and Physiology	20
MAPH 5114	Physics and Biology of Ionising Radiations	20
MAPH 5115	Medical Imaging	20
MAPH 5116	Radiotherapy Physics	20
Total		**80**

SEMESTER II

MAPH 5220	Safety and Quality Management	20
MAPH 5221	Physics of Non-ionising Radiation	20
MAPH 5222	Medical Electronics and Instrumentation	20
	Elective*	20
Total		**80**

LIST OF ELECTIVES

MAPH 5223	Magnetic Resonance Imaging	20
MAPH 5224	X-ray Imaging	20
MAPH 5225	Nuclear Medicine	20
MAPH 5226	Medical Ultrasound	20
MAPH 5227	Introduction to Bioengineering	20
MAPH 5228	Bioelectricity	20
MAPH 5229	Audiology and Audiometry	20
MAPH 5230	Mathematical Techniques	20

PART II

SEMESTER I

MAPH 6000	Clinical practice
MAPH 6010	Research Project

SEMESTER II

MAPH 6000	Clinical practice	90

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MAPH 6010   Research Project   90
Total credits for the year   **180**

MODULE SYNOPSES

YEAR I

MAPH 5113 Human Anatomy And Physiology   20   Credits

This module covers the relevant anatomy and physiology of each of the major body systems; Nervous system; Thermoregulation; The skeletomuscular system; Endocrine system; Reproduction; Genetics; Cardiovascular system; Respiratory system; The kidney; Gastrointestinal system; Introduction to disease classification; Principles of diagnosis testing and decision-making in medicine as well as malignant disease.

MAPH 5114 Physics And Biology Of Ionising Radiations   20   Credits

The module looks at the interaction of photons, charged particles and neutrons with matter, essential properties of atomic nuclei, quantities and units according to the International Commission on Radiological Units and Measurements (ICRU), radiation measurement and detection; Physical basis of dosimetry, introduce different theories and describe the principle of operation of the various types of dosimeters; Overview of medical applications of ionising radiation; Radiobiology and laboratory work.

MAPH 5115 Medical Imaging   20   Credits

The module looks at the theory of Image Formation; Image Production; Images and Information; Fourier Transforms, FFT, Tomographic Image Reconstruction/Filtered Back projection, k-space representation; Quality Assurance; ROC Analysis; Image display and Storage; Picture Archiving and Communication Systems and an overview of medical imaging modalities.

MAPH 5116 Radiotherapy Physics   20   Credits

The module explores the basic Concepts; External Beam Therapy - Introduction: radiotherapy versus chemotherapy or surgery; Effects of radiation on cells, cell survival curves; External-beam therapy: linear accelerators, photon and electron beams; Cobalt units: source production, decay schemes; Kilovoltage: circuits, dose distribution, Beam characteristics: percentage depth dose, beam-data measurement; Treatment planning: wedged fields, beam blocks, treatment simulators; Quality control: Radiation dosimetry and detectors; Brachytherapy - Historical development; Types of treatment: Interstitial, intracavitary, intraluminal, moulds; Brachytherapy sources: characteristics, production, specification, apparent activity, AKR; Units: exposure, AKR and dose; Dose calculations: source geometry, self-absorption, capsule attenuation, tissue attenuation and scatter, dosimetry systems (Manchester, Paris); Measurement: activity, dose; Unsealed source therapy: Iodine-131, typical doses, other isotopes (P-32, Y-90, SR-89) and radiation protection in radiotherapy.

MAPH 5220 Radiation Protection, Safety And Quality Management   20   Credits

This module examines ionising radiation safety; Ultrasound safety; Electrical safety; Laser safety; Microwaves, radio-frequency and magnetic fields; Ultraviolet radiation; Chemical safety; Biological hazards; Mechanical workshop safety; Finance and Management of Medical Physics;

Think in other terms

Personnel and Management in a Hospital; Medical Research; Quality Management System and code of ethics.

MAPH 5221 Non-Ionising Radiation   **20 Credits**

The module examines ultrasound; Interaction of ultrasound with tissue; thermal effects; physiotherapy; interaction with red cells; attenuation; absorption; reflection and refraction; velocity; lasers; Interaction of laser light and tissue, coefficient; classification of lasers, safety, therapeutic uses of lasers; surgery; ophthalmic; photodynamic therapy; Microwaves; UV and infrared.

MAPH 5222 Medical Electronic And Instrumentation   **20 Credits**

This module outlines electronic circuits for medical imaging, Nuclear Instrumentation standards, Microprocessor technology in health care delivery, Artificial Intelligence, computer interfacing, Image reconstruction and spectral analysis.

MAPH 5223 Magnetic Reasonance Imaging   **20 Credits**

This module looks at the introduction to Nuclear Magnetic Resonance; Nuclear Magnetism; Nuclear Magnetic Resonance: Properties in Matter; NMR in tissue; Imaging Sequences; - spin echo, multi echo spin echo, fast spin echo; Spatial encoding - k-space and the MR image; Frequency encoding; Phase encoding Half Fourier imaging; STIR; Ultrafast imaging; 3D image acquisition; MRI artefacts and MRI equipment.

MAPH 5224 X-Ray Imaging   **20 Credits**

This module looks at the X-Ray Image Formation: Analogue and Digital Detectors; Conventional X-Ray diagnosis; Image Quality (Noise, Contrast, Spatial Resolution); Noise and Image Perception; Imaging Systems; Mammography; Fluoroscopy; Computed Tomography; Digital Subtraction Radiography and Angiography.

MAPH 5225 Nuclear Medicine   **20 Credits**

The module examines tracer studies, Roentgen, Becquerel, Hevesy; Instrumentation: Thyroid uptake counter, rectilinear scanner (resolution, sensitivity, dose); Gamma camera: Anger camera, technetium, camera uniformity (sensitivity) computers; Gamma camera: Construction, collimator, Anger's equations, dose utilisation, multi-head cameras, pharmaceuticals; Tracer techniques: red-cell volume, compartment models, I-131 uptake test, radiation dose form uptake test, requirements for imaging; Isotope generators: technetium, Krypton, transient/secular equilibrium, isotopes and pharmaceuticals used; Image assessment: aberrations/quality assurance, mechanical and thermal shock, functional studies; Other topics: statistics of counting, well counter, energy discrimination and elementary statistics of photomultiplier tube.

Think in other terms

MAPH 5226 Medical Ultrasound   **20 Credits**

This module looks at physical sound of the Ultrasound Laboratory Room Requirements; Types of Equipment; Image Storage; Image Retrieval; Safety Considerations; Components of Ultrasound Equipment Pulse Echo Systems; Doppler Imaging; Colour Flow Imaging; Continuous Wave Systems; Transducers; Computers; Film Archiving Performance and Safety Standards; Uses of Ultrasound in the Body; Correlative Imaging Angiography; Digital Radiography; Computerized Tomography; Magnetic Resonance Imaging Future Trends in Medical Imaging; Instrumentation A-Mode; Static B-mode; Bi-stable; Grayscale; Real-time; Mechanical sector; Linear array; Phased array; Annular array; Duplex (Doppler); M-mode; Scan converters; Test Objects; Test and Calibration Procedures Output Measurements and Biological Effects; Acoustic output measurements; Biological effects; Doppler Ultrasound: Doppler flowmeters; Doppler shift signals and Colour Doppler Imaging.

MAPH 5227 Introduction To Bioengineering   **20 Credits**

This module has an overview of structure and function of biological materials, implant materials and biocompatibility, materials for medical prosthetics, radiation effects on biomaterials; Mechanical stresses on limbs and joints; Augmenting and replacing body functions: corporeal devices, mechanical, fluid and electrical systems; power sources- drug delivery; safety-critical systems; examples (pacemakers, implanted defibrillatory heart-lung machine dialysis, joints); Functional evaluation and properties of materials.

MAPH 5228 Bioelectricity   **20 Credits**

This module explores the sources of physiological signals: electrical signals (generation of nerve action potential, propagation, velocity, circulating currents, muscles, smooth and striated, oscillators, trans-membrane potentials) - pressure (perfusion, hydrostatic dynamic); flow (blood, gas, food, urine); biochemistry (gas tension, pH, glucose concentration); Accessing physiological signals: (blood flow as a case study to illustrate different methods); images; electrodes (micro, needle, surface, calomel, ion-selective, chemfet); biomagmetism (SQUID); transducers (pressure, flow, ultrasound, temperature, force, displacement); invasive and non-invasive methods.

MAPH 5229 Audiology And Audiometry   **20 Credits**

The module examines basic anatomy and physiology; mechanisms of hearing- effects of excessive sound levels; pathology of hearing; genetic and age effects; basic psychoacoustic properties; Philosophy of audiometric testing; Role and types of audiometry; Pure tone, air and bone conduction audiometry; Physical basis of objective tests of middle ear function; Electrophysiological tests of hearing and optoacoustic emissions and speech audiometry.

MAPH 5230 Mathematical Techniques   **20 Credits**

This module is on mathematical techniques for system modelling, data analysis and data classification: similarities and difference between modelling classification and analytical techniques; Data - signals against time, 'XY' data and images; analogue and digital data,

equivalence of representations, sampling theorem; Time and frequency domain analysis - duality of domains; Statistical properties of signals in relation to analysis; stationarity, ergodic hypothesis; Convolution, correlation and frequency transformation, methods of calculation, relationship between, applications of filtering; windowing and estimation techniques; Pattern recognition and data classification; similarities and differences; Pattern recognition - classical, syntactic, neural nets: applications of, problems with; classification techniques - cluster analysis, principal components, neural nets; Applications of techniques - problem identification, data validation, result validation; common pitfalls and errors.

YEAR II

MAPH 6000 Clinical Practice   **90 Credits**

This module looks at supervised clinical training in the physics aspects in radiation oncology, nuclear medicine, diagnostic radiology and radiation protection; Factors affecting patient care, personnel monitoring, regulatory controls, research and development, teaching, acceptance testing and commissioning of equipment; Monitoring equipment performance and calibration, quality control and professional awareness. Clinical practice shall be assessed by presentations, practical assignments, portfolio and oral assessments.

MAPH 6010 Research Project   **90 Credits**

This module provides the research component of the MSc programme. The research shall be carried out over a period of six months. Such projects shall be approved by the department before they embark on them. This shall be done in an industrial/clinical setting. The dissertation shall be assessed in part by an oral examination.

Think in other terms

MASTER OF SCIENCE DEGREE IN MEDICAL ULTRASOUND

1.0 Degree Profile : Master of Science Degree in Medical Ultrasound	
Institution:	National University of Science and Technology
Type of Degree:	Masters
Credit Load:	300 credits
Level:	SADC-QF - Level 9
Accreditation Organisation(s):	Zimbabwe Council for Higher Education
Period of reference:	Accredited by ZIMCHE 2018

2.0   REGULATIONS
These Regulations should be read in conjunction with the   Faculty   of   Applied   Science Regulations and the General Academic Regulations.

3.0   ENTRY REQUIREMENTS
3.1   Candidates with a BSc Honours degree, minimum classification 2.2 in Radiography (Diagnostic or Therapeutic) who are registered with or are eligible for registration with the Allied Health Practitioner's Council of Zimbabwe will normally be eligible for admission into the programme.
3.2   Any other relevant qualification obtained from a recognised institution in Zimbabwe or elsewhere may be considered for admission by the departmental board subject to approval by the Senate.
3.3   Candidates should provide satisfactory evidence of having secured a clinical placement area.

4.0   DURATION OF THE DEGREE PROGRAMME
The minimum duration of the programme shall be eighteen months. It will be offered on a block release basis over three semesters.

5.0   MODE OF STUDY
The Programme will be by class contact on a block release basis (two blocks of three weeks in the first year and self-directed work-based study in between the blocks). The third semester is dedicated to the final Clinical Practice and Research.
The Research Project could commence during the second semester and may be undertaken in the department, industry or any other institution approved by the departmental board.

Think in other terms

6.0   ASSESSMENT

6.1   The taught modules shall be assessed through continuous assessment and a four-hour final written examination at the end of each block. Continuous assessment shall comprise 25% and the written final examination shall comprise 75% for a taught module, and this shall aggregate to the final mark for the module.

6.2   To pass a module the student must have obtained an overall mark of at least 50% and at least attained a mark of 45% in the examination.

6.3   The clinical practice component shall be assessed by a continuous assessment from clinical supervisors, a prescribed logbook, case studies and a viva voce. To pass the clinical assessment the student shall present a prescribed logbook with the minimum number of examinations, prescribed case studies and a viva voce examination.

6.4   To pass this module, a student must obtain a minimum aggregated mark of 70% which is equivalent to 50%.

6.5   To pass the research project module a student must obtain a minimum mark of 50% in the project report and pass continuous assessment with a similar mark. Oral presentation shall constitute part of the continuous assessment. The research project shall constitute 25% of the overall mark for the degree classification.

7.0   DETERMINATION OF RESULTS

7.1   **Award of a degree**

A student who passes all six taught modules, the clinical practice component and the research project shall be awarded a Master of Science Degree in Medical Ultrasound.

7.2   **Award of a post graduate diploma**

7.2.1   A student who passes all six taught modules and the clinical practice component but fails to complete the research project module may be awarded a Post Graduate Diploma in Medical Ultrasound.

7.2.2   A student who successfully completes three taught modules, that is:

SMU 5103 Pelvic and Obstetrics Ultrasound I;

SMU 5201 Upper abdomen, Vascular and Small Parts Ultrasound;

SMU 5203 Pelvic and Obstetrics Ultrasound II;

SMU 6100 Medical Ultrasound Clinical practice module and the

SMU 6110 Research project

may be awarded a Post Graduate Diploma in Medical Ultrasound.

8.0   DEGREE CLASSIFICATION

8.1   The weighting of the components of the degree shall be;

Average of all taught modules	50%
Clinical practice component	30%
Research Project	20%

8.2   The overall classification of the degree shall be in accordance with university regulations.

Think in other terms

9.0 PROCEED AND WITHDRAWAL

9.1 A student may proceed to do the research project module if he/she has completed at least three taught modules.

9.2 A student who fails more than three of the taught modules at the end of Part 1 shall be required to withdraw from the programme.

PROGRAMME SUMMARY

Part 1 – Semester I

Module Code	Module Description	Credits
SMU 5101	Ultrasound Physics and Instrumentation	25
SMU 5102	Ethics and Professional Practice in Ultrasound	25
SMU 5103	*Pelvic and Obstetrics Ultrasound I	25

Semester II

SRA 5102	Research in Healthcare	25
SMU 5201	*Upper Abdomen, Vascular and Small Parts Ultrasound	25
SMU 5203	*Pelvic and Obstetrics Ultrasound II	25

Part 2 – Last Semester

SMU 6100	Medical Ultrasound Clinical Practice	90
SMU 6110	Research Project	60

Modules required for the post- graduate diploma with a research pathway.

MODULE SYNOPSES

YEAR I

SMU 5101   Ultrasound Physics And Instrumentation   25 Credits
The module looks at waves, Electromagnetic waves and Sound waves. Properties of waves, Power and intensity, Interaction of ultrasound with matter, Ultrasound transducers, Beam characteristics, and current developments in ultrasound transducer designs. Principles of Ultrasound, Image display modes in ultrasound, Doppler principles and instrumentation, Doppler applications in medical imaging, Pulse echo instruments, Image manipulation in ultrasound; Principles of pulse echo imaging; Image quality in Ultrasound imaging; Artefacts; Image storage, display and transmission; Recent advances in image display; Recent advances in ultrasound imaging, Quality assurance in ultrasound imaging.

SMU 5102   Ethics And Professional Practice In Ultrasound   25 Credits
This module analyses ethics and accountability in ultrasound; Experimental biological effects studies, Guidelines and regulations; Litigation; Evidence based practice in ultrasound; Patient care; Communication; Psycho-social issues; Cultural issues; Intracavital techniques and ethics; Counselling, Professional practice in: Interventional Techniques, Emergency situations e.g. postural hypotension, medical emergency response, respiration and chemical spill as well as Bio-effects and safety.

SMU 5103   Pelvic And Obstetrics Ultrasound 1   25 Credits
This module is on anatomy, physiology, and pathology of the male pelvis and non-pregnant female pelvis; Sonographic appearances of normal and abnormal anatomical variants; Patient preparation and ultrasound scanning techniques of the pelvis; Pathology of the female and male pelvis and their sonographic appearances e;g; Fibroids, pelvic inflammatory disease, testicular torsion, prostate cancer and epididymo-orchitis; Spermatogenesis, spermiogenesis, hormonal interactions and the male puberty; The female reproductive cycle, ovulation, conception, implantation and female puberty; First trimester embryonic anatomy, physiology and pathology, normal appearances of a gestational sac, blighted ovum and common congenital abnormalities during the first trimester; Gestational age estimation parameters during first trimester; Complications during first trimester pregnancy and their ultrasonic appearances e;g; threatening miscarriage, Hydatid mole, ectopic pregnancy, retained products of conception; Role of other imaging modalities and clinical findings in complementing ultrasound imaging of the female and male pelvis.

SRA 5102   Research In Healthcare   25 Credits
This module is on evidence based practice, research methodology, research designs, data gathering techniques, validity and reliability, sampling techniques, statistics in research, data processing and scientific reporting, medical ethics and clinical trials.

SMU 5201 Upper Abdomen, Vascular And Small Parts Ultrasound   25 Credits
The module explores anatomy, physiology and pathology of the liver, gallbladder, kidneys, adrenals, spleen and pancreas; The retroperitoneum, lymphatic system, gastro-intestinal, diaphragm and lungs; Liver function tests and biopsies; Patient preparation and Scanning protocols and techniques for the abdominal organs; Sonographic appearances of pathological conditions of abdominal organs e.g.; splenomegaly, hydronephrosis, cholelithiasis, cirrhotic liver disease and pancreatitis; Abdominal scanning in different user groups (Accident and emergency patients, obese patients, paediatric patients, etc); Role of other imaging modalities in complementing abdominal ultrasound findings; Cardiovascular general survey scanning, deep and superficial blood vessels and scanning techniques; Doppler scanning techniques; Musculo-skeletal system and scanning techniques e.g.; tendons, trans-cranial neonatal scanning; Small parts ultrasound scanning techniques, e.g.; neck, breasts, scrotum, penis, eyes and parotids.

SMU 5203   Pelvic And Obstetrics Ultrasound 11   25 Credits
The module explores scanning during second trimester and third trimester pregnancy stages and foetal development; Parturition and labour; Maternal and foetal vascular circulations and placenta scanning; Normal Congenital anomalies e.g.; acrania, duodenal atresia, polyhydramnios, etc; Amniotic fluid volume and index and accompanying pathological conditions; Second and third trimester pregnancy complications e.g.; intrauterine foetal demise, threatening miscarriage, complete and incomplete abortion; Doppler scanning in pregnancy; Complications in male pelvic pathology and sonographic appearances.

YEAR II

SMU 6100   Medical Ultrasound Clinical Practice   90 Credits
In addition to the between blocks clinical learning and practice, this is the clinical practice component where students will be attached to approved supervisors and will carry out a prescribed number of examinations and participate in quality management under supervision. Students will maintain a logbook of practice and attendance and a portfolio of achievement. Assessment shall be through Clinical attachment reports from supervisors, logbooks, prescribed case studies and finally a viva voce examination. Students will be required to present case studies. Students may be required to rotate in a number of clinical departments to fulfil their logbook requirements.

Think in other terms

SMU 6110   Research Project   60 Credits

This module provides the research component of the MSc programme. Hence it is the component that establishes the programme at Masters level. The research will be carried out over a period of six months. Normally this will be done in a healthcare setting. The dissertation from the research will be assessed in part by an oral presentation and a full written report.

MASTER OF SCIENCE IN RADIOGRAPHY

1.0	Degree Profile: Master of Science in Radiography
Institution:	National University of Science and Technology
Type of Degree:	Honours
Credit Load:	300 credits
Level:	SADC-QF - Level 9
Accreditation Organisation(s):	Zimbabwe Council for Higher Education
Period of reference:	Accredited by ZIMCHE 2018

2.0 Preamble

The Bachelor of Science Honours Degree in Radiography has been offered by NUST and UZ since 2002. Graduates from these programmes have found employment within Zimbabwe and abroad. However, any graduates that had wished to pursue further studies had to go abroad for such studies as there were no Masters Degree programme in both Universities. The Radiography programme also needed to develop staff to continue to service its programmes. Setting up an MSc programme within the university enabled staff development as well as provided the much needed professional development within Zimbabwe and nationwide. The target group for this programme are practising Radiographers and as such, it is provided on a Block Release schedule. The programme takes cognisance of the fact that prospective students have clinical experience and they are also within the clinical area where the other part of the learning takes place. Students after completing the core modules may opt for modules with an emphasis in either diagnostic, therapeutic, or any area of speciality in the clinical area.

The programme is designed to meet the development needs of radiographers currently working in diagnostic and therapeutic practice. The aim of the programme is to encourage continued research in the field of radiography and to enhance students' skills in both inquiry and practice. The programme shall enable students to critically evaluate a range of issues within the field as changes in technology and Health Care practice drive radiography forward at a considerable pace. This shall allow evidence based and reflective practice. The programme aims to promote continued professional development by giving radiographers the opportunity to expand their expertise in radiography. It provides a flexible approach, which permits radiographers to react to the diverse range of issues relating to modern practice. It is designed to integrate theory with practice.

It is the intention of this Master of Science degree programme to address some of the pertinent issues in radiography today: quality in patient care to meet the ever changing demands of the patient, radiation protection and technological changes, issues of quality control and quality assurance in radiation sciences and cultivate evidence based practice through research.

Think in other terms

3.0 ENTRY REQUIREMENTS

Candidates with a BSc Honours degree in Radiography, with at least a lower second class or equivalent shall normally be eligible for admission into the programme. In addition, candidates must be registered or be eligible for registration with the Allied Health Practitioners Council.

4.0 DURATION OF THE DEGREE PROGRAMME AND MODE OF STUDY

The programme is run in synchronisation with other Block Release Programmes at NUST. The minimum duration of the programme is 18 months. It is offered as a Block Release Programme over three semesters. The Programme is by class contact on a Block Release basis (two blocks of three weeks in the first twelve months, work based study in between the blocks and a project over the last six months).

5.0 MODULE STRUCTURE

5.1   The program consists of eight modules that are offered in two blocks. A student shall be expected to register for four modules per block. Students are required to undertake all the core modules and then select from the given range of available modules in various fields to achieve the total required number. A specified minimum number of students shall be required for a particular module to be offered. Students however, have the option to take a negotiated module as an independent study.

5.2   Students shall be required to satisfy the examiners in a project dissertation. The research project may commence at any time after the second semester examinations. It may be undertaken either in the Department, Industry or any other institution approved by the Departmental Board. The dissertation report shall   normally be submitted to the Department at least a month before the end of the third semester.

5.3   The programme comprises of two blocks of three weeks each spread over twelve months. On successful completion of Year I, students shall proceed to carry out their research project.

5.4   Students are required to pass all the eight modules and the dissertation. The dissertation shall be equivalent to three modules.

5.5   A minimum of 300 credits shall be required for the degree to be awarded.

6. 0   MODULE EVALUATION

6.1   Various parts of a module may be examined independently during the module of the studies. Both the continuous assessment which shall comprise 40% of the overall mark for that part, and the written examination (comprising 60%), for such a module shall aggregate to the final mark for the whole module. The module shall be assessed by a four hour written examination at the end of the semester.

6.2   To pass a module, a student must have obtained an overall mark of 50% and at least 45% in the final written examination.

Think in other terms

6.3   To pass the Research Project Module, a student must obtain a minimum mark of 50% in the project report and must pass continuous assessment with at least 50%. Oral presentation marks shall constitute part of the Continuous Assessment. The Research Project Module shall contribute 30% of the overall mark for the degree classification.

7.0   SUPPLEMENTARY EXAMINATIONS

7.1   A student shall be allowed to supplement no more than three modules. To be eligible for a Supplementary Examination, a student must have failed with at least 45 % overall mark in that module and should have passed at least 50% of the modules he/she had registered for. A student who fails to attain 45% in a module may apply to repeat the module.

7.2   A candidate who attains less than 40% in the final examination of a module shall not be granted a supplementary examination.

7.3   The maximum mark for a supplemented module shall be 50 %.

8.0   DETERMINATION OF RESULTS

8.1   To be eligible for the award of the MSc Degree in Radiography, a student shall be required to pass all the modules registered for and must have successfully completed all relevant practical work and the Research Project Module.

9.0   DEGREE CLASSIFICATION

9.1   The weighting of the components of the degree shall be:

Average of all taught modules   70 %
Research Project Module   30 %

NB; The overall classification of the degree shall follow university and faculty regulations.

10.0   PROCEED AND DISCONTINUE

10.1   A student may proceed to do the research project module if he/she has completed at least three modules.

10.2   A student who fails more than three of the taught modules at the end of the second semester shall be required to discontinue the programme.

10.3   A student who passes all taught modules but fails to complete the project work may be awarded a Post-Graduate Diploma.

10.4   A student who fails to complete the program, but has passed at least four of the taught modules and successfully completed the project, may be awarded a Post-Graduate Diploma.

PROGRAMME SUMMARY

Year I - BLOCK I

Module Code	Module Description	Credits
SRA 5101	Radiobiology and Radiation Protection	25
SRA 5102	Research in Health Care	25
SRA 5103	Applied Psychology and Sociology	25
SRA 5104	Clinical Practice I	25
Total		**100**

Year I – BLOCK II

SRA 5205	Management in Health Care	25
SRA 5210	Clinical Practice II	25
	Elective I	25
	Elective II	25
Total		**100**

Electives

SRA 5206	Diagnostic Radiography I*	25
SRA 5207	Radiotherapy and Oncology I*	25
SRA 5208	Diagnostic Radiography II*	25
SRA 5209	Radiotherapy and Oncology II*	25

* Elective Modules

Students may only select electives from the same discipline.

Year II

SRA 6110	Research Project Module	100
Total		**100**

MODULE SYNOPYSES

YEAR I

SRA 5101   Radiobiology And Radiation Protection   25 Credits
The module explores the nature and magnitude of hazards to patients in various health-care settings, techniques used to analyse the risks and to address the problems in order to reduce errors and create a safe patient-care environment, probabilistic risk assessment methods, failure mode and effects analysis, human factors analysis and error classification systems, and quality management, radiobiology, human anatomy, physiology and pathology and the biological effects of radiation, radiation protection; Safety standards: recommendations from agencies and continual quality improvement.

SRA 5102   Research In Health Care   25 Credits
The module has evidence based practice; Research methodology: research designs, data gathering techniques, validity and reliability, sampling techniques, statistics in research, data processing and scientific reporting; Medical ethics and clinical trials.

SRA 5103   Applied Psychology And Sociology   25 Credits
This module examines communication skills, Professional judgement and Decision making, Stress and burnout, interpersonal skills, Sociology of illness, psychology of illness, Personality and patient management; Gender and health, Abnormal psychology, Social Psychology-Interpersonal Attraction as a social behaviour Attitude and attitude formation; The influence of others on our behaviour, Decision making, personality theories, person perception and stereotypes, Sociology of the family, Culture and tradition, Stress, emotion and illness, Negotiation and bargaining.

SRA 5104   Clinical Practice I   25 Credits
This is an independent Study Module I- For this module students shall explore an area of their interest in the field of Diagnostic or Radiotherapeutic radiography, i;e; (in any of the following areas; Ultrasound, Radiotherapy Applications, Diagnostic and Computerised Tomography). The aim of the module is to enhance the student's clinical practice in either diagnostic or radiotherapy radiography. The student is expected to critically analyse the principles of operations to include the equipment, merits, demerits and alternative therapy making

recommendations to improve service provision and customer satisfaction. The module shall be assessed through case study presentation, portfolio of achievement and reports.

SRA5205   Management In Health Care   25 Credits

The module looks at organisational behaviour and theory; Operations management, human resources management; Inter group conflict and conflict resolution, Professionalism and inter professionalism in the imaging and radiotherapy department, Managing risk,Design considerations in departments, Equipment selection and procurement, Equipment maintenance, Inventory control, Human resources in imaging departments, Organisational structure, Inter-departmental and Inter-professional collaboration; Principles of quality, quality assurance tests on equipment, organisational quality, Evaluating quality, Quality and the Imaging /Radiotherapy department; Quality and the customer; Total Quality Management; Accidents and accident prevention; Theories of accidents; Leadership and power, Conformity and compliance as well as theories of motivation.

SRA 5206   Diagnostic Radiography I   25 Credits

The module highlights the recent Advances in imaging techniques, Interventional Techniques; Role Development in radiography, Shifts in patient health worker perspectives; Aids and health, Role of support organisations in health care; Health Education; Health sector reforms and the role of Radiography in patient management.

SRA 5207   Radiotherapy And Oncology I   25 Credits

The module explores the alternative Medicine in cancer management, Recent Advances in Radiotherapy treatments; Hyper fractionated treatment; Advances in stereotactic techniques; Role Development in radiography, Shifts in patient health worker perspectives; Aids and health, Role of support organisations in health care; Health Education; Health sector reforms and the role of Radiography in patient management.

SRA 5208   Diagnostic Radiography II   25 Credits

The module looks at image Analysis, Processing and Quality Assessment, Digital Imaging;
Magnetic Resonance Imaging; principles, equipments, clinical applications, functional magnetic resonance imaging and clinical applications. It also looks at computerized Tomography: CT principles, gantry designs, clinical applications in diagnosis and radiotherapy; Nuclear Medicine: instrumentation and clinical applications, SPECT and PET; Medical Ultrasound: Ultrasound Radiation, interaction of ultrasound with tissue; Principles: A-Mode, Static B-mode, Doppler, M mode; Image display, equipment, transducers, image storage and retrieval, safety considerations; Basic Imaging: time gain compensation (TGC), Doppler Ultrasound, reflection and transmission at interfaces, acoustical properties of biological media, transducer operation and beam patterns, Techniques and clinical applications;

SRA 5209   Radiotherapy And Oncology II   25 Credits

This module looks at radiobiology, effect of radiation on cells, cell survival; Radiotherapy versus chemotherapy/surgery; Dosimetry: dose distribution, isodose curves and percentage depth dose

Think in other terms

(PDD); Beam modification Device: oblique incidence and body inhomogeneities; Brachytherapy and Unsealed Source Therapy: interstitial, intracavital, intraluminal; Nucletron Microselectron LDR, IDR, HDR sources, optimisation, clinical applications External-Beam Therapy: principles of acceleration, particle accelerators, linear accelerators, Linacs and Betatrons cyclotrons, synchrotrons, synchrocyclotron, linac, powering systems, clinical applications and patient care; Megavoltage Electron Beams: equipment and clinical applications, Neutron beam characteristics equipment and clinical applications; Stereotactic radiotherapy: equipment, clinical applications, recent advances in stereotactic techniques; Cobalt units: equipment and clinical applications; Treatment planning: equipment and simulation, Virtual and CT simulation, treatment planning, plan documentation; Conformal radiotherapy, Treatment using complex radiation fields, Portal Imaging and Quality Assurance (QA) in Radiotherapy

SRA 5210   Clinical Practice II   25 Credits
This is an independent Study Module II - For this module students shall explore an area of their interest in the field of radiography in any of the following areas; Magnetic Resonance Imaging, Radionuclide Imaging, Interventional Radiology, Radiotherapy Planning and Mould Room Techniques, Alternative medicine in cancer management, Chemotherapy in cancer management and interstitial techniques; i.e. other than those areas explode in clinical practice I. The aim of this module is to enhance the student's clinical practice in a wide range of sub areas in either diagnostic or radio therapeutic radiography. The student is expected to critically analyse the principles of operations to include the equipment, merits, demerits and alternative therapy making recommendations to improve service provision and customer satisfaction. The module shall be assessed through case study presentation, portfolio of achievement and reports.

YEAR II

SRA 6110   Research Project Module   100 Credits
This module provides the research component of the MSc programme. Hence it is the component that establishes the programme at Masters Level. The research shall be carried out over a period of six months. Normally this shall be done in a Health Care setting. The dissertation from the research shall be assessed in part by an oral presentation and a final written report.

Think in other terms

DEPARTMENT OF COMPUTER SCIENCE

Lecturer and Chairperson

Dr Thambo Nyathi, Ph.D. Computer Science, UKZN, SA, 2018, Post Graduate Diploma in Higher Education, NUST, Z'bwe, 2012, MSc Computer Science, NUST, Z'bwe, 2005, Beng Electronic & Information Eng, Aberdeen, UK, 1996

Lecturers

Dr Sindiso Mpenyu Nleya, Post Graduate Diploma in Higher Education (PGDHE) 2010, BSc (Hons) App. Physics 2003, MSc (Computer Science 2007 , NUST,Z'bwe), PhD (UCT) 2016

Mrs Sibonile Moyo, MSc. Computer Science NUST (2005); BSc. (Gen.), UZ (1991), Further Education Teacher's Certificate (Byo Poly) (2000)

Mrs Sibusisiwe Dube, Post Graduate Diploma in Higher Education (PGDHE) 2012, MSc. Computer Science, 2007 NUST 2007; BSc. (Hons.), MSU 2003

Mrs Samkeliso Suku Dube, Post Graduate Diploma in Higher Education (PGDHE) NUST 2011; MSc. Computer Science NUST 2009; BSc (Hons)Computer Science,NUST 2007

Mr Sibangiso Ngwenya, Post Graduate Diploma in Higher Education (PGDHE) 2010, MSc. Computer Science, NUST, Z'bwe, 2008, Bsc (Hons) Mathematics and Computer Science, Jose Varona University, Cuba (1996); Post Graduate Diploma in Higher Education, NUST, Z'bwe, 2010; Certificate in Research Methods, UB, 2012

Mr Khesani Richard Chilumani, Post Graduate Diploma in Higher Education (PGDHE), NUST 2010; MSc. Computer Science, NUST 2008; BSc. (Hons.) Computer Science, NUST 2005

Mr Kernan Mzelikahle, MSc. Computer Science, NUST 2011; BSc. (Hons.) Computer Science, NUST 2007

Mr Daniel Musundire, Post Graduate Diploma in Higher Education(PDGHE)2012 MSc(2011); BSc. (Hons.), Computer Science NUST' (2008)

Mr Khulekani Sibanda, Post Graduate Diploma in Higher Education(PDGHE)2012 MSc(2011); BSc. (Hons.), Computer Science NUST' (2008)

Think in other terms

Mrs Siqabukile Sihwa, Post Graduate Diploma in Higher Education(PDGHE)2014, MSc(2013); BSc. (Hons.), Computer Science NUST' (2008), HND, Computer Studies (HEXCO)

BACHELOR OF SCIENCE HONOURS IN COMPUTER SCIENCE

1.0 DEGREE PROFILE: BACHELOR OF SCIENCE HONOURS IN COMPUTER SCIENCE

Institution:	National University of Science and Technology
Type Of Degree:	Honours
Credit Load:	480 Credits
Level:	SADC-QF - Level 8
Accreditation Organisation(S):	Zimbabwe Council for Higher Education
Period Of Reference:	Accredited by ZIMCHE

PURPOSE OF THE PROGRAMME
To produce graduates capable of providing computing solutions to solve problems.

PROGRAMME CHARACTERISTICS

Areas of Study:	Software Engineering, Network Administration, Cyber Security, Digital Forensics,
Specialist Focus:	Information Communication Technology
Orientation:	Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects
Distinctive Features:	

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability:	Programmer, Network Engineer, Security Expert, Software Developer, Database Administrator, Computer Hardware Engineer, Computer Systems

	Analyst, Computer Network Architect, Web Developer, Information Security Analysts, Computer Programmer.
Further Studies:	Masters in Computer Science, Masters in Information Systems

TEACHING AND LEARNING

Teaching and Learning:	Lectures, tutorials, laboratory classes, seminars, group work, farm-based activities, industrial visits, industrial attachment, research project, individual independent study
Assessment Methods:	Written and oral examinations, tests, laboratory reports, seminar presentations, industrial attachment report, mini-research project report, final year research project report, continuous assessments

2. 0   REGULATIONS
These Regulations should be read in conjunction with the Faculty of Applied Science and the University General Academic Regulations.

3.0   ENTRY REQUIREMENTS

3.1   Normal Entry
An applicant must have passed at least Mathematics and either Physics or Computing at "A" level.

3.2   Special Entry
An applicant who has successfully completed a National Diploma in Information Technology or its recognized equivalent may apply   for entry into Part I.

4.0   DURATION
The Programme runs over a period of four years.

Think in other terms

5.0   PROGRAMME STRUCTURE

5.1   The Programme consists of thirty-six taught modules, an Industrial Attachment module in the third   year that runs for 28 weeks. At the end of the Industrial Attachment period, a student is expected to present an oral examination on the work that he/she did as well as submit a written report. In Year IV, a student shall undertake a Research Project.

5.2   A student is expected to obtain a minimum total of 480 credits to be awarded the Degree.

6.0 ASSESSMENT

6.1   Continuous assessment shall constitute 25% and written final examination, 75% of the overall mark. The pass mark is 50% and above.

6.2   A student who has failed to satisfactorily complete a part of his/her programme may be allowed to proceed to the next part carrying the failed modules provided they are no more than 25% of the number of normally scheduled modules in a particular year.

PROGRAMMME SUMMARY

		Modules	Credits
Part I	Semester I	SCS1101 Introduction to Computer Science & Programming	10
		SCS1102 Mathematical Foundations for Computer Science	10
		SCS1103 Operating Systems Concepts	10
		SCS1105 Computational Research Methods	10
		SMA1101 Calculus I	10
		SMA1102 Linear Algebra	10
	Semester II	SCS1207 Structured Program Design	10
		SCS1202 Database Concepts	10
		SCS1204 Logic Design & Switching Circuits	10
		SCS1205 Software Engineering Concepts	10
		SCS1206 Visual Programming Concepts & Development	10
		CTL1101 Conflict Transformation & Leadership	10
Part II	Semester I	SCS2101 Computer Data Communications	10
		SCS2102 Computer Architecture	10
		SCS2103 Data Structures & Algorithms	10
		SCS2104 Systems Analysis & Design	10
		SCS2108 Object Oriented Software Concepts & Development	10
		SORS2107 Operations Research	10
	Semester II	SCS2201 Software Design Methodologies	10
		SCS2203 Advanced Mathematical Structures for Computing	10
		SCS2204 Internet & Web Design	10
		SCS2206 Societal Computing	10
		SCS2207 Computer Networks & Applications	10
		SCS2209 Computational Modelling	10
Part III		SCS3000 Industrial Attachment	120
Part IV	Semester I	SCS4000 Final Year Project	
		SCS4101 Artificial Intelligence	10
		SCS4103 Software Project Management	10
		SCS4108 Simulation & Modelling	10
		SCS4110 Information Systems Security & Auditing	10

Think in other terms

	SCS4111 Enterprise Architecture Programming	10
	SCS4000 Research Project	20
	SCS4203 Computer Graphics	10
Semester II	SCS4207 Expert Systems and Decision Support Systems	10
	SCI 4201 Digital Forensics	10
	SCS4201 Database Design & Management	10
	SCS4208 Distributed Computing	10
TOTAL		**480**

MODULE SYNOPSES

YEAR I

SCS 1101 Introduction To Computer Science And Programming   10 Credits
The module explores information and Knowledge Societies, Evolution of Computers, Computer Organisation and Architecture: CPU; Memory; I/O, Number Systems and Conversions (Bin; Dec; Hex; Oct), Concepts of Computer Languages: high\low level languages; compiler; interpreter, Programming Techniques: grammar; recursion; Variables; Data types; Initialization; Comments; Keywords; Constants; Assignment, Programming constructs: branching; looping; recursion; Programming using data structures: arrays; lists; trees; hash tables; queues; stacks; files, Programming Algorithms for Problem Solving: Sorting; compression; numerical and encryption, Fundamentals of Operating System, Fundamentals of Databases and fundamentals of networks.

SMA1102 Linear Algebra   10 Credits
This module is on Vector Algebra: scalar and vector product. Collinear, coplanar vectors. Applications. Equations of lines and planes. Matrices: products, sums, echelon form, rank, inverse. Determinants: definition, properties, evaluation. Systems of Linear equations, Gauss's method, Cramer's rule, homogeneous systems. Vector Spaces: definition, linear independence, bases, subspaces.

SMA1101 Calculus   10 Credits
The module looks at Limits of functions; One-sided and infinite limits; Continuity; Differentiation: definition, basic properties, Rolle's theorem, mean value theorem, Cauchy's mean value theorem, Leibniz's rule, applications, Taylor series; Integration: definite integrals, antiderivatives, fundamental theorem of calculus, improper integrals, Gamma and Beta functions, definition of natural logarithm as integral of $1/x$ and exponential as inverse; Area, volume of revolution, arc length, surface area; Parametric equations: arc length, surface area; Polar coordinates; Graph sketching; Area in polar coordinates; Complex numbers; Algebra of complex numbers; DeMoivre's theorem and the exponential form.

SCS 1102 Mathematical Foundation For Computer Science   10 Credits
This module explores sets, relations, functions; Discrete probability; Combinatorics: Permutations and Combinations; Propositional logic; Logical Connectives; Truth tables; Normal forms; First order predicate logic; Reasoning about programs: axiomatic semantics, pre/post-conditions, loop invariants; Recurrence relations, Application to searching and sorting.

SCS 1103 Operating Systems Concepts 										**10 Credits**

The module is an overview of operating systems structures, Operating system organisation and Services, Computer design, the hardware and its interfaces, Device management; I/O management; Creating virtual device abstractions; Support for processes and threads; Job Scheduling, Disk scheduling, file systems; Process management, synchronisation and communication; Memory management: deadlock, virtual memory management and processing Synchronisation; File management; Filing systems, interface and implementation; Case studies drawn from Linux and mobile operating systems, android.

SCS1105 Computational Research Methods 								**10 Credits**

The module explores empirically-based design research, Typical approaches to empirically-based design research are: direct observation of the results of designing; surveys of designers' perceptions; and protocol studies of individual and collaborating designers designing; Axiom-based design research axiom-based research produces models of design through the identification of a set of axioms and the logical consequences of the axioms; this approach to design science research involves: (i) specifying relevant axioms (ii) deriving logical consequences of the axioms mapping the axioms and their consequences onto a particular domain to derive new results; Critical thinking and analysis; critical reasoning; scientific writing for computer science and the tools for presentation of research in computer science.

SCS 1201 Programming And Program Design 								**10 Credits**

The module looks at the concept and properties of algorithms, Programming process, Fundamental design concepts and principles: Divide-and-conquer strategies; Abstraction; Program decomposition; Encapsulation and information hiding, Separation of behaviour and implementation, Basic syntax and semantics of a higher-level language, relevant program representations: basic blocks; control-flow graphs; defuse chains; static single assignment and Jackson Structured programming.

SCS 1202 Database Concepts 										**10 Credits**

The module examines the database management systems (DBMS), Database Models: Entity-relationship Model; The relational model; The SQL language; Database design: ER to Relational mapping, the systems development lifecycle, the database lifecycle, Conceptual design, logical, physical design; Normalisation; Aspects of physical database access: Database Transactions: Distributed Databases: Client-server database systems; Higher-level and extended data Models: Object-oriented data models are introduced; SQL3 and the requirements of Multimedia database

Think in other terms

SCS1203 Business Information Systems   **10 Credits**

The module explores the Business Environments; Changing lives and businesses in the Information Era, Redesigning the organization with information systems Types of Information system: TPS; MIS; DSS; and Expert Systems; The Systems life cycle, the phases within it and the activities and documentation appropriate to each phase; Other development strategies, including 4GLs, Prototyping, and Evolutionary development; Building and managing information systems; IS project organisation and management Information System Security and Control the Internet and electronic business.

SCS1204 Logic Design And Switching Circuits   **10 Credits**

The module outlines the Binary logic functions, Set Theory and Venn Diagrams, Logic Gates, Karnaugh Maps, Combinatorial Circuits: - design procedure, adders, Subtractors, Integrated circuits; Sequential Circuits: - flip-flops, Equivalent Gates, Counters and Registers and Computer Aided Circuit Design Practical.

SCS 1205 Software Engineering Concepts   **10 Credits**

The module looks at the software development process, agile software development, requirements engineering, analysis and design, documentation, implementation strategies, system testing, validation and verification, software evolution, project management and software development life cycle.

SCS1206 Visual Programming Concepts And Development   **10 Credits**

The module looks at the structure and Nature Of Visual Applications, user interface Contexts (webpage; business applications; mobile applications; games), Canonical uses (GUIs; mobile devices; robots; servers) , Events and event handlers, Separation of model, view, and controller, Visual Design Elements :Object; Controls; Windows; Forms; Dialogues; Templates; Panels; Panes; etc;, user-centred development, interaction design: Physical capabilities; Cognitive models, Social models, Principles of good design and good designers, Accessibility, Principles of graphical user interfaces (GUIs), Elements of visual design, User interface standards, Functionality and usability requirements, Techniques for gathering requirements, Internationalisation, interaction styles and techniques, Representing information to users, Design, implementation and evaluation of non-mouse interaction.

SCS 1207 Structured Program Design   **10 Credits**

The module looks at basic syntax and semantics of a higher-level language variables and primitive data types (e;g; numbers, characters, Booleans), types, expressions and assignments, simple I/O including file I/O; structured decomposition; program decomposition techniques, top-down functional decomposition; Conditional and iterative control structures: sequence, selection, iteration; Functions and parameter declaration, returning values, pass by value and pass by reference, inline functions; Program design methodology: structured methodology, object-oriented methodology and design notation.

Think in other terms

CTL 1101 Conflict Transformation & Leadership   **10 Credits**

The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

YEAR II

SCS 2101 Computer Data Communications   **10 Credits**

The module explores the type of media, transmission, modulation, network topologies, synchronous and asynchronous transmission data link protocol, network topologies, OSI model, TCP/IP suite, Transport layer, Addressing Network layer, Data link layer; Planning and cabling networks.

SCS 2102 Computer Architecture   **10 Credits**

The module covers the fundamentals and performance Technology trends, measuring CPU performance, Amdahl's Law and averaging performance metrics; Assembly level machine organisation Basic organisation of the von Neumann machine, control unit: fetch, decode and execution, components of instruction sets, RISC and CISC and example instruction sets, addressing modes; Interfacing and communication, I/O fundamental: handshaking, buffering, programmed I/O, interrupt –driven, Interrupt structures: vectored and prioritised, interrupt acknowledgement; External storage, physical organisation and drives; Buses: bus protocols, arbitration, direct memory access (DMA); Multimedia support; Analogue and digital devices; Memory system organisation and architecture Storage systems and their technology; Memory hierarchy: importance of temporal and spacial locality; Main memory organisation operations; Latency, cycle time, bandwidth, interleaving; Cache memories (address mapping, block size, replacement and store policy) embedded systems Microcontrollers, The C programming language, device drivers, and the device driver software environment.

SCS 2103 Data Structures And Algorithms   **10 Credits**

The module highlights problem solving, algorithms, Data structures - pointers, linked lists, queues, stacks, trees, priority queues, sets, maps, graphs and operations on them; Applications of data structures and algorithms. It also covers algorithms- Mathematical Principles of algorithm analysis to evaluate algorithm space/time trade-offs; Algorithm Design -divide and conquer (recursion), backtracking, dynamic programming, randomized algorithms sorting, searching, hashing and shortest path algorithm.

SCS 2104 Systems Analysis And Design   **10 Credits**

The module has an overview of systems development lifecycle, structured analysis and design, business systems and computer resources; Analysis phase and techniques used, SSADM, Outline of Version IV, DFDs, data dictionaries, DFDs; Database definitions; Object Oriented analysis

and design Project planning and control, communication; Documentation and document standards; Prototyping and a Case study of practical systems project using structured approach to systems development.

SCS 2108 Object Oriented Software Concepts And Development   10 Credits
The module examines Object Oriented programming model: Software reusability concepts; Abstraction, Polymorphism; Objects, messages, encapsulation; Classes, inheritance, and class categories; Foundation and Collection Classes; Design and Implementation techniques; Object Oriented Programming and Databases; Java Basics: History, Design Goals, the Web, Java Programming; Java Virtual Machine: Java Compiler, Byte-codes, Interpreter, JIT Compilation, Software Portability, Garbage Collection, Security; Java APIs: Abstract Window Toolkit, Java Foundation Classes, Commerce, JDBC; Java and the Internet: Applets, Communication, RMI, Client & Servers, Data Access and Network Computers.

SCS 2201 Software Design Methodologies   10 Credits
The module looks at Reliable System/Software Design Concepts and Development Methods: design management and development lifecycle phases; Object Oriented method: Object Oriented analysis and design; Prototyping, System maintenance, System dependability and security, Case Study/Project: design of a database retrieval system with OOD front –end and functional data-base design.

SCS 2203 Advanced Mathematical Structures For Computing   10 Credits
The module explores sample spaces and events; axioms and definitions; total and conditional probability; Bayes rule; Independence; Random Variables: - continuous and discrete; distribution and density functions; mean, variance and covariance definitions and properties; Special Distributions: - uniform, Poison, Normal – definitions and properties and examples; Mathematical logic, linear algebra and graph theory; Computer Aided Implementation using Mathematical tools like MATLAB or OCTAVE.

SCS 2204 Internet And Web Design   10 Credits
This module examines the fundamentals of networks and TCP/IP-Internet services Internet legal and privacy issues Internet commercialisation Internet societal impact, Home page programming using latest versions of tools such as HTML, CSS, javascript, and PHP Web Content Management using software systems such as Wordpress, Joomla and Drupal, Java Web services, XML and AJAX.

SCS 2206 Societal Computing   10 Credits
The module looks at ethics and ICT, computing applications that address social needs such as basic health, rural health issues, rural education needs, water and shelter needs; E-governance and e-government that improves democracy; Computer applications that address environmental

concerns such as climate change as well as Policies and applications that can reduce the digital divide.

SCS 2207 Computer Networks And Applications **10 Credits**

The module is a networking technology overview, Overview of the network data link protocol and networking layers; Introduction to routing and packet forwarding, Static and Dynamic Routing, Distance Vector Routing and Link State Routing; Router configuration including Wireless Router configuration, LAN design and switch configuration; VTP, STP and Inter VLan Routing Frame relay and Access control Lists.

SCS 2209 Computational Modelling **10 Credits**

This is an introduction to computational modelling; Modelling methodologies; Modelling software tools; Data modelling, fitting curves and distribution to data; Pseudo code extraction; Stochastic and deterministic simulation; Algebraic application in modelling software tools; Data modelling, fitting curves and distribution to data; Pseudo code extraction; Stochastic and deterministic simulation as well as Algebraic application in modelling.

YEAR III

YEAR IV

SCS 4000 Research Project **20 Credits**

The project consists of implementing a major piece of software and involves report writing and verbal presentation; The specification and design of the software; The project may involve a large suite of software consisting of a mixture of rapidly prototyped software and 'near-market' quality software. The project may or may not involve traditional academic research and the re-use of existing software and algorithms is encouraged. The software (combined with the business plan) should convince potential investors that the project is worth further funding.

SCS 4101 Artificial Intelligence **10 Credits**

This is an overview of AI problems: Intelligent behaviour; The Turing test; Rational versus non-rational reasoning, Nature of agents, Agent architectures: Reactive; Layered; cognitive, Nature of environments, Uninformed search: breadth-first; depth-first; depth-first with iterative deepening, Heuristics and informed search: hill-climbing; generic best-first; A*, Problem spaces, Logic: Proposition and Predicate, Forward chaining, backward chaining, probabilistic reasoning, Bayes theorem, Machine learning: statistical-based learning; parameter estimation; ILP, State-of-the-art robot systems: sensors and sensor processing.

SCS4103 Software Project Management **10 Credits**

The module examines software project life cycle Team participation, Roles and responsibilities in a software team Role identification and assignment Individual and team performances

Think in other terms

assessment Team processes including responsibilities for tasks, meeting structure, and work schedule Team conflict resolution; Team organization and decision-making Risk - The role of risk in the life cycle; Risk categories including security, safety, market, financial, technology, people, quality, structure and process; Risk identification Risk tolerance (e;g;, risk-averse, risk-neutral, risk-seeking) Risk planning, removal, reduction and control principles of risk management Risk analysis and evaluation Project Scheduling and tracking project management tools Cost/benefit analysis, Software measurement and estimation techniques, Software quality assurance and the role of measurements.

SCS 4108 Simulation And Modelling   10 Credits
This module is an introduction to Simulation and Modelling; Basic simulation and modelling methodology: sampling, data collection analysis and visual output; Modelling complexities and decision-making simulation; Basic simulation topics: random numbers, statistical functions, and experimentation; Applied statistical methods for analysis and modelling; Approaches to structuring simulations; Introduction to variance reduction; Focus on discrete simulation, but overview on Monte Carlo, continuous, and agent-based simulation.

SCS 4110 Information System Security And Auditing   10 Credits
This module has the foundational Concepts in Security: CIA, ethics, terminology; Security Policy and Governance; Principles of Secure Design: least privilege and isolation, fail safe defaults, open design, end-to-end security, security by design, security composability; Defensive Programming: input validation and data sanitization, race conditions, security updates; Threats and Attacks: attacker types, malware, side and covert channels; Cryptography: terminology, cipher types, mathematical preliminaries, symmetric and public key cryptography, authenticated key exchange protocols; Network Security: security protocols (wired and wireless), secure architectures; Web Security and e-commerce: web security model, session management, client-server security, application vulnerabilities and defences; Platform security: code integrity and code signing, secure boot, peripheral threats, OS and embedded devices.

SCS 4111 Enterprise Architecture Programming   10 Credits
The module looks at the Java Platform, Enterprise Edition (Java EE), Design Evaluation, Programming Paradigms, Cache Coherence, Memory Consistency, Threads and Synchronization, Java Mobility Technology, Interconnection Networks, Scaling Trends, GPUs (Graphics Processing Units), Smart Phones/Tablets Programming (e;g; Android), Programming for Data Centres/Supercomputers and JAVA Native Interfaces (JNI).

SCS 4201 Database Design And Management   10 Credits
This module explores detailed examination of techniques used in the implementation of relational, Object-oriented and distributed database systems; Topics are drawn from: Query optimisation, transaction management and concurrency control, database performance tuning and query optimisation, business intelligence and data warehousing, database connectivity and web technologies.

Think in other terms

SCS 4203 Computer Graphics   **10 Credits**

The module explores the fundamentals of Computer Graphics: Applications of Computer Graphics, Digitization of analogue data, Human perception, Images formats, Colour models, Graphics display systems: raster and vector graphics systems, developing of graphical systems; GUI construction using a standard API: double buffering, vector and raster rendering; Basic Rendering (using API): rendering in nature, ray-casting and rasterization, basic radiometry, ray tracing, affine transformations, line generation algorithms, rendering of a polygonal surface (shading), graphics pipeline, visibility and occlusion, texture mapping, Phong reflection model, anti-aliasing; Computer Animation: forward and inverse kinematics, collisions, procedural animation, key-frame animations, camera animation; Visualisation: colour mapping, iso surfaces, and applications of visualization and principles of Computer vision.

SCS 4207 Expert Systems And Decision Support Systems   10 Credits

The module covers the organization of expert systems; Knowledge acquisition; Knowledge representation in Expert Systems; Issues in knowledge representation, and languages; Representation schemes: logical procedural, network, structured; Objects, messages, and hybrid expert system design; A survey and application of expert system development tools; and limitations of expert systems

SCI 4201 Digital Forensics   **10 Credits**

The module explores computer devices, Data collection, Evidence Collection, Extraction and preservation of evidence, Data Recovery, Evidence preservation, verification & authentication, Data Discovery & Identification, Data Analysis, Computer Forensics Tools, Data Hiding Techniques, Computer forensics and mobile forensics.

SCS 4208 Distributed Systems   **10 Credits**

The module offers a detailed coverage of distributed systems, with a particular focus on concurrency programming using distributed computing architectures; Use of distributed architectures for big data processing and parallel computing; Distributed memory coherence; distributed file systems; distributed process management, including load sharing and process migration; concurrency control; fault tolerance, recoverability and distributed transactions; naming; industry standards and some case studies.

SCS 4109 Formal Languages And Automata   **10 Credits**

This module is an introduction to the theory of formal languages; The Chomsky hierarchy of formal grammars and the corresponding automata; Finite state automata and regular expressions; Deterministic and nondeterministic finite state automata (FSA); Context-free grammars as a formal description device for programming language syntax; Context-free grammars and pushdown automata in parsing programming languages; Language translation systems and semantics.

SCS 4105 Comparative Programming Languages   10 Credits
This module gives a brief history of programming languages; Comparing languages: programming paradigms, language features executive styles; (e;g; C, C++, Java and Perl); Language design issues, pointers and arrays, functions and procedures, memory allocation; Miscellaneous topics: machine dependencies, separate compilations and data hiding; Operator overloading; Single multiple inheritance and exceptions.

SCS 4205 Human Computer Interaction   10 Credits
The module examines the definition of HCI, HCI principle and theories, the evolution of HCI, its challenges and goals; Components of HCI, conceptual model of HCI and its design, cognitive frameworks for HCI; Introduction to Cognitive psychology: memory, knowledge, learning, inference, skill acquisition, and procedural vs; declarative knowledge; Cognitive models of HCI: interface metaphors, I/O interactive styles; Information search and information visualization techniques Interactive design methods and techniques, HCI evaluation; and contract management; Project planning and management; Management of expectations, change, system evaluation and selection, vendors and consultants.

Think in other terms

MASTERS DEGREE PROGRAMME

SPECIAL REGULATIONS

1.0 Master of Science in Information Systems

DEGREE PROFILE:	Master Of Science In Information Systems
Institution:	National University of Science and Technology
Type Of Degree:	Masters
Credit Load:	302 Credits
Level:	SADC-QF - Level 9
Accreditation Organisation(S):	Zimbabwe Council for Higher Education
Period Of Reference:	Accredited by ZIMCHE in 2012

PURPOSE OF THE PROGRAMME

The programme is aimed at equipping the graduates with the appropriate knowledge, skills and values to be effective in modern information technology-based business environments. Graduates should be able to recommend the use and uptake of modern information technologies in business organizations to solve identified information systems business needs, analyse the threats and opportunities of the use of technology in businesses to bring about a competitive advantage for those businesses utilizing information systems, as well as debate on the issues of ethics and social implications of the use of computing technology in the business environments.

PROGRAMME CHARACTERISTICS

Entry Requirements ● An Honors degree with a degree class of at least 2.2 in Computing (Computer Engineering, Information Technology, Information Systems, Computer Science, Software Engineering) or its recognized equivalent in Electronic Engineering.

● Relevant work experience (at least two (2) years) in an Information and Communications Technology related field will be an added advantage.

● Students that do not have any qualification in object-oriented programming will be required to take an Object-Oriented Programming module as an option during the First Block.

Think in other terms

Duration of Study:	● The minimum duration of the programme will be 18 months, and it will be offered on a Block Release mode over three semesters. The first two semesters will be by lecture mode, and the last semester will be dedicated to a dissertation. ● Four (4) modules shall be taught per semester and elective modules will depend on the availability of expertise. Each semester shall comprise of one block which is one (1) month (four (4) weeks which may be split into two comprising 2 weeks each). ● Each module shall be 56 hrs.
Areas of Study:	Information Communication Technology
Specialist Focus:	Information Systems
Target:	Graduates that need to learn more about the utilization of information technology in business environments
Orientation:	Management of Information Systems
Distinctive Features:	Business integration with information systems

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability:	Information Systems administrators, Business Analysts, Information Security Officers, Application analyst, Data analyst, Data scientist, Database administrator, Information systems manager, IT consultant, IT technical support officer, Systems analyst, Systems developer
Further Studies:	PhD in Information Systems
Teaching and Learning Methods:	Lectures, tutorials, laboratory classes, seminars, group work, industrial visits, research, dissertation, individual independent study
Assessment Methods:	Written and oral examinations, tests, laboratory reports, seminar presentations, industrial attachment report, mini-research project report, final year research project report, continuous assessments

2.0 REGULATION

These regulations should be read in conjunction with the Faculty of Applied Science Regulations and the General Academic Regulations for Undergraduate Degrees hereinafter referred to as General Regulations.

3.0   ASSESSMENT OF CANDIDATES

3.1   A candidate who fails a module may be allowed to proceed to the next part of the Degree programme whilst carrying the failed module. However, a student may be allowed to proceed carrying not more than 25% of the number of normally scheduled modules in a particular year of a programme.

3.2   A candidate on attachment shall be assessed through their project and attachment report. The report shall contain the attachment activities and details of the project. The continuous

assessment, report and viva presentation shall be 50%, 40% and 10% of the overall mark respectively. The report is expected to contain a proposed final year project identifying a problem from industry and including the proposed solution.

3.3   Candidates shall be required to submit a project, which has a weighing of two modules during the final academic year for which they are registered. On submission of a satisfactory project the student will be required to defend his/her work before a panel of Departmental Examiners.

Think in other terms

PROGRAMME SUMMARY

PART I

SEMESTER I

Module Code	Module Description	Credits
SCIS5102	Enterprise Database Systems	24
SCIS5103	e-Commerce	24
SCIS5104	Information System Strategy	24

(*Elective I refer to list below for list of electives*)

SEMESTER II

SCIS5203	Business Intelligence Systems	24
SCIS5204	Information System Security & Auditing	24
SCIS5205	Research Methods	24

Elective II refer to list below for list of electives)

PART II

SEMESTER I

SCIS 6101	Dissertation	110
TOTAL		**302**

*LIST OF ELECTIVES
Elective I
SCIS 5101	Object Oriented Programming
SCIS 5105	Financial and Management Accounting

Elective II
SCIS5201	Computer Network Management
SCIS 5202	ICT Project Management

Think in other terms

MODULE SYNOPSES

PART I
BLOCK I

SCIS 5101 Object Oriented Programming   24 Credits
The module explores principles of OOP vis-à-vis Structured Programming Principles, Object Orientation, Declarations and Access Control, Flow Control Exceptions and Assertions, Strings, I/O, Formatting, and Parsing, Coding Standards, Clarity and Maintainability.

SCIS 5102 Enterprise Database Systems   24 Credits
The module examines the ER model, Motivation for Complex data types, User defined abstract data types and structured types, Subclasses, Super classes, Inheritance, Specialization and Generalization, Constraints and characteristics of specialization and Generalization, Relationship types of degree higher than two; Concurrency control and recovery management; Database security management; Distributed database functions and client-server architecture; Object-oriented concepts and OODDBMS architecture Web interfaces to the Web; Overview of XML; Structure of XML data, Document schema, Querying XML data and Storage of XML data.

SCIS 5103 E- Commerce   24 Credits
The module covers (IS) management in E-Commerce, IS planning for enterprise-wide e-Commerce, Competitive IS strategies for e-Commerce, Marketing and economic issues in Electronic Commerce for IS managers, Security Issues in e-Commerce, Organizational web sites and Intranets; Web Application options in Electronic Commerce, Business Process Integration for the IS professional, Content Management issues for e-Commerce sites, Organizational Control Strategies, Risk Management, Best Practice in Internal Control, Co-operate Fraud and Crisis Management.

SCIS 5104 Information Systems Strategy   24 Credits
The module outlines the information & techniques for providing information, Networks & Electronic Data interchange, Types of Information Systems, IT security requirements, Organizational Policy, IS and general audit responsibilities and Internal Controls.

SCIS 5105 Financial And Management Accounting   24 Credits
The module highlights the preparation of Financial Statements of Companies, Statements of Company Income, Statements of Changes in Equity, Statements of Financial Position Statements of Cash Flows, Notes to the Financial Statements, Use of Accounting Packages, Interpretation of Financial Statements, Legal and Regulatory Framework, Introduction to Management Accounts,

Think in other terms

Analysis and classification of costs, Absorption and Activity Based Costing, Cost volume profit analysis, Budgeting and Variance Analysis, Budgetary Control and Investment Appraisal.

BLOCK II
SCIS 5201 Computer Network Management   24 Credits
The module covers network-Centric World Digital Transmission and Networking Fundamentals, Elements of Communication Networks and Services, Local Area Networks and Medium Access Control, Applications and Layered Architectures, Advanced Network Architectures, Network Security Protocols, Network Management Protocols and Next Generation Networks.

SCIS 5202 ICT Project Management   24 Credits
The module explores Project rationale, Project scope, Budgeting and scheduling issues, managing project risk, Project quality management, Managing organizational change, Leadership & Conflict management and Leadership theories.

SCIS 5203 Business Intelligence Systems   24 Credits
The module is an introduction to DSS, Modeling, Application Development, Data analysis and display, DSS development, Decision Analysis, Optimization, Queuing and Inventory Modeling, Advanced DSS development topics and Simulation.

SCIS5204 Information Systems Security And Auditing   24 Credits
The module is about developing an Information Security Policy, Physical Computer Security, Biometrics and Digital Signatures, Network Intrusion Detection and Prevention System, Wireless and Mobile Network Security, E-commerce Security, Risk Management & Analysis, Biba Integrity Model, Nature of IS Audit, Audit responsibilities against fraud, IS audit guidelines and standards.

SCIS 5205 Research Methods   24 Credits
The module covers Research Planning and Design, Proposal writing, Data Collection, Literature Review, Research Techniques, Sampling and Sampling Techniques, Validity and Reliability, Research Report Writing, Ethical Issues in Information Systems Research, Measures of Central Tendency, Measures of Variability, Plotting and Displaying Data.

PART II

BLOCK I
SCIS 6101 Dissertation   110 Credits
Candidates will be allowed to submit a dissertation only after successfully completing their taught modules.

Think in other terms

MASTER OF SCIENCE IN COMPUTER SCIENCE

1.0   DEGREE PROFILE: MASTER OF SCIENCE IN COMPUTER SCIENCE

INSTITUTION:	National University of Science and Technology
TYPE OF DEGREE:	Masters
CREDIT LOAD:	302 Credits
LEVEL:	SADC-QF - Level 9
ACCREDITATION ORGANISATION(S):	Zimbabwe Council for Higher Education
PERIOD OF REFERENCE:	Accredited by ZIMCHE in 2014

PURPOSE OF THE PROGRAMME

To develop knowledge, skills and competences in the field of Computing Technology. To provide a foundation for advanced research in Computer Science.

PROGRAMME CHARACTERISTICS

Entry Requirements:	An honours degree (2.2 or better) in Computer Science
Areas of Study:	Software Engineering, Network Management, Data Science, Computer Security, Database Management, Artificial Intelligence, Image Processing.
Specialist Focus:	Programming, Application Development, System Design and Implementation, Network Administration, Artificial Intelligence
Orientation:	Research and innovation oriented
Distinctive Features:	Network administration, ICT management

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability:	Network Administrator, Academic, Software Engineering, Systems Administration, Network

Think in other terms

	Engineer, Games Developer, Information Systems Manager, IT Consultant, Multimedia Programmer, Network Engineer, Systems Developer
Further Studies:	PhD in Computer Science, PhD in Information Systems
TEACHING AND LEARNING:	
Teaching and Learning:	Lectures, tutorials, laboratory classes, seminars, group work, farm, research project, individual independent study
Assessment Methods:	Written and oral examinations, tests, seminar, Presentations, mini-research projects, final year research project report, continuous assessments

2.0   REGULATIONS

These regulations should be read in conjunction with the Faculty of Applied Science and the General Academic Regulations.

3.0   ENTRY QUALIFICATION

A student must have passed an (Hons) Degree (2.2 or better) in Computer Science.

4.0   DURATION

4.1   The Programme shall normally run over a period of eighteen (18) months for full-time study.

4.2   When running on Block Release, the Programme shall be offered over a period of twenty-four (24) months.

5.0   MODE OF STUDY

5.1   Block Release

A student on Block Release shall normally be required to register for three (3) modules per Block. Stage I and Stage II shall each consist   of two Blocks. Block II of Stage I and   Block I of Stage II shall   consist of two (2) modules and one (1) elective module each.   Block II of Stage II shall consist of the Dissertation.

5.2   Full-time

A student on full-time is normally required to register for three (3) modules plus 1 elective per semester in Part I. Part II shall consist of the Dissertation. In order to proceed from Part I to Part II a student must pass all modules he/she would   have registered for.

Think in other terms

6.0   ASSESSMENT

6.1   A taught module shall be assessed by a three hour written examination at the end of each   semester.

6.2   The final grade in the module work shall be based on 25% from continuous assessment   and   75%   from   the   final   written   examination.

6.3   To pass a module a student must obtain an overall mark of 50% from both continuous   assessment   and   the   final   written   examination.

6.4   A student shall be expected to obtain a minimum of 50% in the Master's Thesis project work and 50% from Part I.

7.0   PROCEEDING TO THE NEXT PART

A student is expected to pass all his/her registered modules before proceeding to Part II.

Think in other terms

PROGRAMME SUMMARY

PART I

SEMESTER I

Module Code Module Description		Credits
SCS5107	Advanced Enterprise Architecture Programming	24
SCS5110	Computational Discrete Mathematics	24
SCS5109	Advanced Database and Data Mining	24

(*Elective I refer below for list of electives)

SCS5205	Research Methods	24
SCS5208	Evolutionary Computing & Parallel Distributed Processing	24

SEMESTER II

SCS5210	Simulation & Modelling	24

(*Elective I refer below for list of electives)

PART II
SEMESTER I

SCS 6200	Dissertation	110
TOTAL		**302**

List of electives

The student is expected to choose one module per semester

Electives I
SCS 5103	Pattern Recognition & Image Processing
SCS 5111	Interactive Computer Graphics
SCS 5112	Ontology Engineering

Electives II
SCS 5205	Software Methodology
SCS 5211	Digital Signals Processing

Think in other terms

MODULE SYNOPSES

PART I

SCS 5107 Enterprise Architecture Programming   **24 Credits**
The module has an introduction to application server programming and business logic programming; Transaction processing, concurrency control, Event-driven programming, asynchronous method invocation, job scheduling, Inter process communication; Deployment of software components in an application server; Business Interface development and deployment.

SCS 5109 Advanced Database And Data Mining   **24 Credits**
The module looks at Data Models; The Enhanced Entity Relationship (EER) Model, EER Models to Relational Databases, Database Design and Implementation; design methodologies, implementation methodologies, Physical Database design and Tuning, Query processing and Optimization; Algorithms for Query Processing and Optimization, Transaction Processing, Concurrency Control Techniques; Database Security and Distribution, Distributed Databases, Mobile Databases Machine Learning and Pattern Recognition and Data Mining.

SCS 5110 Computational Discrete Mathematics   **24 Credits**
The module explores Discrete models; Foundations; Basic concepts of sets and functions; Finite series; Logic; Propositional logic; Predicate logic; Combinational circuits; Induction; Finite probability space, events; Conditional probability, Bayes' theorem; Integer random variables; Expectations; Variance Analysis and verification; Searching algorithms; Recursive algorithms; Relations; Basic concepts; Properties of relations; Operations on relations; Undirected graph, Directed graph, weighted graph, Euler circuits and Hamiltonian cycles; Graph isomorphism and representations; Planar graphs; Trees; Different state machines; Input, Output, Initial state and Transition table.

SCIS 5205 Research Methods   **24 Credits**
The module looks at Research, research types, Research planning and design, Project Proposal, Data collection techniques, Literature review, Research techniques, Methodology and Methods, Sampling techniques, Validity and reliability, Research report writing and Ethical issues in Information Systems Research.

SCS 5208 Evolutionary Computing And Parallel Distributed Processing 24 Credits
The module examines fundamentals of genetic algorithms, genetic programming; Conceptual simplicity and broad applicability of genetic algorithms; Features of evolutionary computation, evolutionary strategies, evolutionary programming; Hybridization and Optimization techniques; Heuristic level: knowledge representation, inference strategies; Man-machine interfaces; Fuzzy set theory; Decision: Classical, nonstandard and fuzzy logic; Data representation; Network configurations: single layer non-recurrent networks; Multilayer non-recurrent networks;

Think in other terms

Recurrent networks; Application for artificial neural networks: character and speech recognition, image analysis Parallel distributed processing; General framework; Distributed representation; Basic mechanisms and formal analysis.

SCS 5210 Simulation And Modelling   **24 Credits**
The module looks at advances in simulation and modelling methodology; All students are expected to have completed an introductory module in simulation; Modelling complexities and decision-making simulation using system dynamics; Applied statistical functions, Experimentation, Applied statistical methods for analysis and modelling; Approaches to structuring simulations; Contrasting discrete, continuous and agent-based simulation.

PART II

SCS 6201 Dissertation   **110 Credits**

ELECTIVES
SCS5103 Pattern Recognition And Image Processing   **24 Credits**
The module is an introduction to pattern recognition; Fundamental problems in pattern recognition; Foundations of pattern recognition algorithms and machines, including statistical and structural methods; Data structures for pattern representation, feature discovery and selection, classification vs; description, parametric and non-parametric classification, supervised and unsupervised learning, use of contextual evidence, clustering, recognition with strings, and small sample-size problems biological object recognition and the Bayesian decision theory;

SCS 5205 Software Methodology   **24 Credits**
The module is an overview of Software Engineering, the Software Development Process; requirements analysis and specification phase Design phase; implementation phase, maintenance; Engineering with a Programming Language; Software Engineering Paradigms; Engineering with existing software and Software Engineering Project;

SCS 5111 Interactive Computer Graphics   **24 Credits**
The module explores the fundamentals of Computer Graphics: Structure of Images; Image formats, compression and dithering; Mesh Data Structures; shapes as vertices, edges and faces, using the indexed face set and the half-edge data structures; Transformational Geometry: Scale, rotation, translation, stretch and shear of a shape; Viewing; Perspective, the illusion of depth; Lighting; Rasterisation, convert mesh triangles to screen pixels; Texture Mapping; Visibility; GPU Programming; Colour Theory; Physical Simulation Animation; Parametric Surfaces; Implicit Surfaces; Quaternion Rotations; Skinning and shadowing.

Think in other terms

SCS 5112 Ontology Engineering   **24 Credits**

The module looks at ontology, Types of ontologies; An ontology engineering for the Semantic Web; Notion of ontology technology, Ontology Web Language to represent ontologies and basic aspects to develop ontologies; Top-down Ontology design and foundational ontologies and bottom-up design using non-ontological resources such as relational databases, natural language or thesauri and fundamental aspects of methods and methodologies and Application of ontology technologies.

SCS 5211 Digital Signals Processing   **24 Credits**

This module explores signals and their functional representations; Basics of Counting: Counting arguments (Set cardinality and counting; Sum and product rule); cross-reference AR/Digital logic and digital systems, Computer representation of data (Bits; bytes and words), Numeric data representation and number bases; Fixed- and floating-point systems; Signed and twos-complement representations; Representation of non-numeric data (character codes, graphical data); Representation of records and arrays, digital systems (Combinational vs; sequential logic), State Machines (Digital vs; Analogue and Discrete vs; Continuous Systems), Simple logic gates, Parallelism, synchronization, Multimedia Systems, Principles of digital forensics: Digitization (storage, interchange, digital objects, composites, and packages). The module has been aligned to the ACM/IEE curriculum. The topics that dealt with theoretical aspects of digital computer signal processing have been reviewed to reflect a solid approach rather than an abstract approach.

Think in other terms

DEPARTMENT OF STATISTICS AND OPERATIONS RESEARCH

Lecturer and Chairperson
Dr P. Nyamugure PhD. Statistics & Operations Research (University of Limpopo SA, 2017), MSc. in Operations Research (2000-2002), BSc. Hons. Applied Mathematics (1994-1998), PGDHE (2012-2013)(NUST)

Senior Secretary
S. Thenga, BComm. Human Resources Management (Lupane, 2017)

Senior Technician
T. Silongwe, BSc. Hons. Computer Science (MSU), MSc. Computer Science (NUST)

Professor
Professor B.C. Jones, PhD. Astrophysics (Sussex University 1979), BA Honours (First Class) in Natural Sciences - Theoretical Physics (Fitzwilliam College, Cambridge University, 1972), Certificate in Teaching in Higher Education (The Hatfield Polytechnic 1980)

Senior lecturers
A. Masache. MSc. Operations Research (NUST), BSc. Hons., Applied Mathematics(NUST)

Lecturers
P. Mdlongwa, MSc. Operations Research (NUST 2009), BSc. Hons. Mathematics (Midlands State University 2005), Post Graduate Diploma in Education (NUST 2011)

C.N. Mupondo, Msc. Operations Research (NUST), Bsc. Hons. Mathematics (MSU), Diploma in Education(UZ)

D. Mwembe, MSc. Operations Research (NUST), BSc. Special Hons., Operations Research and Statistics (NUST), BSc.(Gen) in Statistics and Mathematics

F. Ndlovu, MSc. Operations Research (NUST 2010), BSc. Hons. Mathematics (MSU 2004), Post Graduate Diploma in Education (NUST 2011)

P. Mlilo, MSc. In Biometry University Reading (U.K), BSc Hons (UZ), BSc Hons in Agric(West Indies St Augustine, Trinidad and Tobago).

Think in other terms

H. Nare, BSc. Hons., Applied Mathematics(NUST), Msc. Operations Research(NUST), Post Graduate Diploma in Higher Education(NUST)

I. L Zulu, MSc. Operations Research (NUST), BSc Hons. Mathematics (MSU)

BACHELOR OF SCIENCE HONOURS IN OPERATIONS RESEARCH AND STATISTICS

1.0 Degree Profile: Bachelor of Science Honours in Operations Research and Statistics

Institution:	National University Of Science And Technology
Type Of Degree:	Honours
Credit Load:	486 Credits
Level:	SADC- of - Level 8
Accreditation Organisation(S):	Zimbabwe Council For Higher Education
Period Of Reference:	From 2018

PURPOSE OF THE PROGRAMME

To develop knowledge skills and competences in the field of Operations Research and Statistics which are relevant to various career paths. To provide a foundation for further studies and research in Operations Research and Statistics.

PROGRAMME CHARACTERISTICS

Areas of Study:	Probability, Statistics, Optimisation, Statistical Modeling, Statistical Research Techniques and analysis, Survey and data analysis techniques, computational modeling, Statistical inference, Applied Statistics, Linear programming, Time series, Queuing Models, Case studies in Operations Research, Simulation and Modeling, Multivariate Statistics
Specialist Focus:	Application of necessary tools and conceptual foundations in quantitative reasoning to extract information intelligently from a large pool of data (data mining) and the use robust statistical analysis and mathematical modeling to solve an array of business and organizational problems, as well as improve decision-making.
Orientation:	Real problems solving, research and survey activities, teaching and learning oriented programme.
Distinctive Features:	Provide basic techniques in theory of Operations Research and Statistics and their applications to real-world problems by enhancing analytical skills to attack complex, large-scale optimization problems of both a deterministic and stochastic nature to make better decisions that impact society and the world positively.

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CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability: Academia, Transport and logistics, Financial services, Biometricians, Data, Mining, research and Development, Treasury, Monitoring and evaluation, Mining and manufacturing, Health Information management, Bio-informatics, hydrology and Climatology

Further Studies: Masters in Operations Research and Statistics, PhD

TEACHING AND LEARNING

Teaching and Learning Methods: Lectures, tutorials and seminars, computer practical classes, group enquiry and/or problem based study, individual learning, research and research projects, field trips, orals tests

Assessment Methods: Written and oral examinations, tests, seminar presentations, industrial attachment report, mini-research project report, final year research project report, continuous assessments

AIMS OF THE PROGRAMME

To enable students to:

- Develop the analytical skills required for formulating and solving problems encountered in industry, commerce and society at large,
- Learn to conduct research,
- Do further research in an industrial or scientific or commercial setting that may enable them to study for further qualifications (MSc, MPhil or PhD).

2.0   REGULATIONS

The these regulations shall be read in conjunction with the NUST General Academic Regulations.

3.0   ENTRY REQUIREMENTS

3.1 Normal entry

The minimum entry requirement is at least a pass in 'A' level Mathematics and a pass in any other science subject or any commercial subject.

4.0   DURATION OF THE PROGRAMME

This programme shall run for four years.

Think in other terms

5.0 STRUCTURE OF THE PROGRAMME

5.1 The programme shall consist of thirty-three taught modules, including three   electives, plus industrial attachment and a research project. A minimum of six modules shall be done per semester. Students shall do a research project in Part IV. The overall assessment shall be based on all modules. In the case that a student does more than thirty three taught modules, his/her overall assessment shall be calculated from his/her best thirty three taught modules, the project and the industrial attachment.

5.2   In determining the overall degree programme aggregate, the following part weightings shall be used:

Part I   10%   minimum 120 credits
Part II 30%   minimum 120 credits
Part III 20%   minimum 120 credits
Part IV 40%   minimum 120 credits

6.0 INDUSTRIAL ATTACHMENT

Students shall do their Industrial Attachment in their third year and submit the industrial attachment report at the end of academic year. The Department of Statistics and Operations Research shall be responsible for the co-ordination, supervision and evaluation of the Industrial Attachment programme as detailed in the University Regulations.

7.0 RESEARCH PROJECT

Students shall be required to submit a project, which is equivalent to three modules, during the last academic year for which they are registered. On submission of a satisfactory project a student shall also be required to defend his/her work before a Departmental panel of Examiners.

8.0 DETERMINATION OF RESULTS

One three-hour paper written at the end of the semester accounts for 75% and the continuous assessment counts for 25% towards the final mark. The continuous assessment is generally a result of assignments and at least two tests.

Think in other terms

PROGRAMME SUMMARY

YEAR I

SEMESTER I

Module Code	Module Description	Credits
SMA1101	Calculus	10
SMA1102	Linear Algebra	10
SCS 1101	Introduction to Computer Science	12
SORS 1101	Introduction to Operations Research	10
SORS 1102	Operations Management	10
SORS1103	Introduction to Statistics	10

SEMESTER II

SMA 1201	Calculus of Several Variables	10
SMA 1204	Ordinary Differential Equations	10
SCS 1201	Programming and Program Design	12
SORS 1201	Applied Statistics	10
SCS 1203	Business Information Systems	12
CTL1101	Conflict Transformation and Leadership	10

YEAR II

SEMESTER I

SORS 2106	Monitoring and Evaluation	10
SORS 2101	Time Series Analysis	10
SORS 2102	Computer Packages	10
SORS 2103	Probability Theory	10
SORS 2104	Operations Research Techniques	10
SORS 2105	Linear Programming	10

SEMESTER II

SMA 2206	Numerical Analysis	10
SORS 2202	Design and Analysis of Experiments	10
SORS 2203	Optimisation	10
SORS 2204	Queuing Models	10
SORS 2205	Simulation	10
SORS 2206	Survey Methods	10

Think in other terms

YEAR III   **(120 CREDITS)**

SORS	3010	Industrial Attachment	120

YEAR IV

SEMESTER I

SORS 4101	Decision Analysis	10
SORS 4102	Statistical Inference	10
SORS 4103	Stochastic Processes	10
SORS 4104	Econometrics	10
SORS 4105	Case Studies In Operations Research	10
SORS 4010	Project	10

SEMESTER II

SORS 4207	Multivariate Analysis	10
SORS4010	Project	20

ELECTIVES(*choose any four***)**

SMA4241	Financial Mathematics	10
SMA4213	Graph Theory	10
SORS 4201	Dynamic Programming and Stochastic Control	10
SORS 4202	Global Optimisation	10
SORS 4204	Advanced Probability Theory	10
SORS 4205	Non-linear Programming	10
SORS 4206	Nonparametric Statistics	10
SORS 4208	Statistical Quality control	10
SORS 4209	Risk Theory	10
SORS 4205	Non-linear Programming	10
SORS 4210	Official Statistics	10

SERVICES MODULES

SORS 2110	Introduction to Applied Statistics	10
SORS 2210	Applied Statistics for Biological Sciences	10
SORS 4106	Experimental Design and Multiple Regression	10

Think in other terms

SORS 4108	Time Series Analysis and Simulation	10
SORS 4106	Experimental Design and Multiple Regression	10
SORS 4107	Queuing Theory and Stochastic process	10
SORS 4108	Time Series Analysis and Simulation	10

Think in other terms

MODULE SYNOPSES

YEAR I

SMA1101 Calculus   10 Credits
The module looks at limits of functions; One-sided and infinite limits; Continuity; Differentiation: definition, basic properties, Rolle's theorem, mean value theorem, Cauchy's mean value theorem, Leibniz's rule, applications, Taylor series; Integration: definite integrals, antiderivatives, fundamental theorem of calculus, improper integrals, Gamma and Beta functions, definition of natural logarithm as integral of $1/x$ and exponential as inverse; Area, volume of revolution, arc length, surface area; Parametric equations: arc length, surface area; Polar coordinates; Graph sketching; Area in polar coordinates; Complex numbers; Algebra of complex numbers; DeMoivre's theorem and Exponential form.

SMA 1102 Linear Algebra   10 Credits
The module looks at Vector Algebra: scalar and vector product; Collinear, coplanar vectors; Applications; Equations of lines and planes; Matrices: products, sums, echelon form, rank, inverse; Determinants: definition, properties, evaluation; Systems of Linear equations, Gauss's method, Cramer's rule, homogeneous systems; Vector Spaces: definition, linear independence, bases and subspaces.

SCS 1101 Introduction To Computer Science   12 Credits
The module explores information and Knowledge Societies, Evolution of Computers, Computer Organisation and Architecture: CPU; Memory; I/O, Number Systems and Conversions (Bin; Dec; Hex; Oct), Concepts of Computer Languages: high\low level languages; compiler; interpreter, Programming Techniques: grammar; recursion; Variables; Data types; Initialization; Comments; Keywords; Constants; Assignment, Programming constructs: branching; looping; recursion; Programming using data structures: arrays; lists; trees; hash tables; queues; stacks; files, Programming Algorithms for Problem Solving: Sorting; compression; numerical and encryption, Fundamentals Operating System, Fundamentals Data Bases and Fundamentals of Networks.

SORS 1101 Introduction To Operations Research   10 Credits
The module gives a historical overview; Definition of Operations Research; Operations Research to problem solving; The process of quantitative modelling; Some quantitative techniques used in Operations Research; Methodology of Operations Research: The phases of an Operations research project, formulation of the problem, the components of a decision problem, state of nature or environment, the systems orientation of Operations Research, the team concept; An abbreviated Case study: Construction of a mathematical model, models as approximations, deriving a solution to the problem, sensitivity analysis, testing the solution for performance,

problems of implementation, planning for implementation, controlling and maintaining the solution.

SORS 1102 Operations Management   10 Credits

The module is an introduction to Operations Management; Operations Strategy; Design; Facility locations and capacity planning; Production planning, types of production processes and criteria for measuring performance; Materials management, scheduling and control.

SORS 1103 Introduction To Statistics   10 Credits

The module looks at the basic Concepts of Statistics: Definition and scope of Statistics, Variables, Types of data, Measurement scales, Use of calculators and statistical computer softwares; Data Collection Methods: Data sources, Population and sample, Probability and non-probability sampling, Survey data collection; Data Presentations: Contigency and frequency tables, Pie charts, Bar charts and Histograms, Line graphs, Cumulative frequency curves, Stem and leaf plots, Box and whisker plot Index Numbers: Types of indices, Simple indices, Un-weighted aggregate index, Weighted Introduction to Probability Theory: Counting rules in probability, Sets and events, Outcome sets for random experiments, Experimental probability, Classical Probability, Theoretical Probability, General laws of probability; Introduction to Hypothesis Testing: Definition of a hypothesis, Procedure for testing a hypothesis, Z-test, t-test; Introduction to Nonparametric Statistics: Order Statistics, Tests concerning a single sample and the Chi-square test.

CTL1103 Conflict Transformation And Leadership   10 Credits

The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

SMA 1204 Ordinary Differential Equations   10 Credits

The module explores first order differential equations; Separable, linear, exact; Integrating factors; Existence, uniqueness and applications; Second Order Equations; Linear equations and linear differential operators; Linear equations and linear differential operators; Linear independence, Wronskian; Ordinary Linear Differential Equation with constant coefficients; Undetermined coefficients; Variation of parameters; Applications; Systems of equations; Phase plane portraits for Linear systems; Introduction to Non-linear systems; Predator-prey and Lotka - Volterra equations; Series solution of ordinary differential equations; Method of Frobenius; Legendre polynomials and Bessel functions.

SCS 1203 Business Information Systems   12 Credits

The module examines Business Environments; Changing lives and businesses in the Information Era, Redesigning the organization with information systems Types of Information system: TPS; MIS; DSS; and Expert Systems; The Systems life cycle, the phases within it and the activities and documentation appropriate to each phase; Other development strategies, including 4GLs,

Prototyping, and Evolutionary development; Building and managing information systems; IS project organisation and management Information System Security and Control the Internet and electronic business.

SMA 1201 Calculus Of Several Variables   **10 Credits**

The module explores the cartesian coordinates in three dimensions; Functions of several variables; Quadric surfaces; Curves; Partial derivatives; Tangent planes; Derivatives and differentials; Directional derivatives; Chain rule; Div, grad and curl; Maxima and minima; Lagrange multipliers; Double and triple integrals; Change of order; Change of variable; Polar and spherical coordinates; Line and surface integrals; Green' theorem in the plane; Divergence theorem; Stokes theorem and Applications.

SCS 1201 Programming And Program Design   **12 Credits**

The module covers the concept and properties of algorithms, Programming process, Fundamental design concepts and principles: Divide-and-conquer strategies; Abstraction; Program decomposition; Encapsulation and information hiding, Separation of behaviour and implementation, Basic syntax and semantics of a higher-level language, relevant program representations: basic blocks; control-flow graphs; defuse chains; static single assignment and Jackson Structured programming.

SORS 1201 Applied Statistics   **10 Credits**

The module is an introduction to Applied Statistics; Statistics: its definition and scope; Descriptive Statistics/Initial Data Exploration: summary statistics, measures of central tendency, mean, mode, median, measures of dispersion, range, variance, standard deviation, Graphical presentation of data, stem and leaf plots, histograms, box plots; Point Estimation/Tests of Hypothesis, interval estimation, $z-test$, $t-test$; Design and Analysis of Experiments, completely randomised designs, randomised complete block designs, Latin squares, factorial designs; Simple linear regression; Statistical computing.

YEAR II

SORS 2101 Time Series Analysis   **10 Credits**

The module looks at smoothing techniques; Moving averages, Simple exponential smoothing, decomposition, identification of trend, seasonal, cyclic and irregular components; Additive and multiplicative models; ARIMA and ARMA models: Model building strategy, models for stationary time series, models for non-stationary time series, parameter estimation, model diagnostics, model specification and forecasting.

SORS 2106 Monitoring And Evaluation   **10 Credits**

The module is an introduction to monitoring and evaluation: Terms and concepts applied in M & E Processes, difference between M & E, M & E in projects implementation, types of for your

Think in other terms

project, M & E in the Project Cycle Management, M & E plan, M & E framework Introduction to Monitoring and Evaluation Plan: functions of an M&E plan, elements of an M&E Plan, standards for an M&E plan, complexities of M &E Plan, overview of M&E plan implementation modalities, data Collection/Capture/Data Quality Checks, types of data collection tools, type of tools at each M &E level; Gathering Performance Data: Data collection methods, choosing the data collection method, preliminary decisions in questionnaire design, deciding the question content, develop the question wording, ordering questions, checking the length of the questionnaire, pre-testing the questionnaire, good questionnaire 'dos' and 'donts', coding data and creating templates in Epi-Info, SPSS, CSPro and SAS, Non-parametric Statistical methods of Analysis i;e Kruskal Wallis, Wilkoxon-Rank-sum Test, Spearman Correlation, Mann-Whitney-U test, Cross-tabulations and odds ratios; Triangulation: Data triangulation, methodological triangulation, investigator triangulation, environmental triangulation, variants of the triangulation design; Data envelopment analysis: Productivity analysis using ratios, Estimation and interpretation of basic DEA model, Estimation of cost-efficiency estimation, Some application of SFA and regression analysis.

SORS2102 Computer Packages   10 Credits
This module shall be a practical module, dealing with the use of computers in a variety of fields through the use of software tools. It is designed to complement the understanding of some of the Operations Research, Statistics and Mathematical concepts through practical use; Statistical packages, including data handling, descriptive statistics, distribution fitting, graphs; Operations Research packages, including linear programming, goal programming, integer programming, waiting line models, network analysis, etc; Mathematical packages, including solution of equations, limits, differentiation and integration, solution of systems of linear equations.

SORS 2103 Probability Theory   10 Credits
The module explores probability: random/statistical experiments, sample spaces, events, set theory; Axioms of probability; Laws of probability; Finite sample spaces; Conditional probability, independent events; Random variables and probability distributions; Discrete probability distributions; Continuous probability distributions; Discrete bivariate distributions; Continuous bivariate distributions; Marginal probability distributions; Independent random variables; Conditional probability distributions; Distributions of functions of a single random variable; Conditional probability distributions of mathematical expectations; Expectations of discrete and continuous random variables; Expectation of a function of a single random variable; Expectation of a function of several random variables; Properties of expectations; Variance and covariance; Markov and Chebyshev inequalities; Moment generating functions; Properties of moment generating functions; Special Distributions: Bernoulli, Binomial, Geometric, Negative Binomial, Hypergeometric, Poisson, Normal, Gamma, Weibull, Exponential, and Beta.

SORS 2104 Operations Research Techniques   10 Credits
The module examines project management: Critical path analysis; Deterministic activity times; Probabilistic activity times; Gantt charts; Resource scheduling; Cost crashing; Inventory Models:

Deterministic demand models: Economic order quantity, Economic production lot size, Economic order quantity with backorders, Quantity discounts; Probabilistic demand models: Single period models, safety stock, Multiple period models; Inventory control: Material requirements planning, materials resource planning, product structure, gross requirements, net requirements; Network Analysis: Terms and definitions; Minimum Spanning Tree problem (Kruskal's Algorithm); Shortest Route problem (Dijkstra's Algorithm); Network Flow problems: Maximum network flow problem (Ford-Fulkerson Labelling Algorithm), Max-flow Min-cut Theorem, Integral flows; Heuristic Problem Solving: Ill structured problems, Heuristics- the human approach to problem solving, Satisfying, heuristic procedures and programs and a case study (e;g; solving a facility location problem).

SORS 2105 Linear Programming   10 Credits
The module looks at model formulation; Solution methods: graphical, simplex, two phase, computer solutions; Duality and sensitivity analysis; Transportation: initial feasible solution methods—north-west corner, least cost, Vogel's methods; Balanced and unbalanced problems, unacceptable routes, degeneracy, Transhipment problems, Assignment problems; Integer Programming: model formulation; Solution methods: graphical, branch and bound method, cutting plane algorithm, implicit enumeration method; Goal programming: model formulation; Goal programming algorithms—the weighting and pre-emptive methods.

SORS 2202 Design And Analysis Of Experiments   10 Credits
This module explores theory and applications of statistics, which include: Experimental design and analysis: 2^k factorial experiments; Confounding, complete and partial confounding; Orthogonal contrasts; Fractional factorial experiments, aliasing; Multiple linear Regression: Variable selection and model building; Multiple coefficient of determination, r^2; Mullow's, C_p and S_p statistics; Covariance analysis; Stepwise regression methods; Forward selection, backward elimination and stepwise regression.

SORS 2203 Optimisation   10 Credits
The module explores deterministic and stochastic dynamic programming; Markov programming: value and policy iteration procedure; Advanced Linear Programming: The revised simplex algorithm, validity proofs of the simplex method, use of column generation to solve large-scale linear programming problems, bounded variables algorithm, parametric linear programming, Dantzig-Wolfe decomposition algorithm and Karmarkar interior point algorithm.

SORS 2204 Queuing Models   10 Credits
The module examines single Server Models: Queuing processes, Kendall-Lee notation, definitions and notation, the role of the exponential distribution, pure birth processes, pure death processes, birth and death processes, parameters of a queuing model; Multiple Server Models: Queuing models with m parallel servers, models with non-Markovian input and output, the Pollaczek-Khintchine formulae and a case study of an $M/M/S$ queuing model.

Think in other terms

SORS 2205 Simulation   **10 Credits**

The module examines simulation by hand, pseudo random numbers, data collection, distribution fitting, activity cycle diagrams, model development, verification, validation, experimentation, analysis of results, method of common random numbers, use of a simulation package; Discrete simulation; Systems dynamics; Simulation software sampling methods; Model testing and validation.

SORS 2206 Survey Methods   **10 Credits**

The module explores simple random sampling, sample size estimation; Systematic sampling; Sample survey and questionnaire design, postal and telephone questionnaires, interviewer-administered questionnaires; Errors in sample surveys; Ratio and regression estimators, separate and combined ratio estimators; Stratified populations and stratified simple random sampling, optimum allocation and Neyman allocation; Cluster multi-stage sampling and Survey method project.

SMA2206 Numerical Analysis   **10 Credits**

The module looks at errors in numerical analysis; Taylor Series; Solutions of equations in one variable: Bisection and Newton-Raphson methods; Fixed point iteration; Order to convergence; Direct and iterative methods of solving linear systems; Gaussian elimination with scaled partial pivoting; Jacobi and Gauss-Seidel iterations; Convergence criteria; Interpolation and extrapolation; Lagrange interpolating polynomial; Newton interpolating polynomial; Richardson extrapolation; Integration; Trapezoidal rule, Simpson's rule; Gaussian quadrature and numerical Solutions of Ordinary Differential Equations.

YEAR III

YEAR IV

SORS 4101 Decision Analysis   **10 Credits**

The module looks at decision environments; Decision making under certainty: Analytical Hierarchy Approach; Decision making under uncertainty: optimistic, conservative and minimax regret approaches; Decision making under conflict: game theory; Decision making under risk; expected value criterion, value of perfect information, value of survey information, variants of the expected value criterion, Bayes posterior probabilities, decision trees, loss and risk functions, admissible estimator, minimax estimator, Bayes risk, Bayes estimator; Hypothesis testing in decision analysis: loss function, risk function, minimax test, Bayes test; Utility Functions: Expected utilities, attitudes of risk and procedures for obtaining utility function from a decision.

SORS4102 Statistical Inference   **10 Credits**

 The module looks at indicator function, exponential family of densities; Parametric Point Estimation: parameter space and point estimators; Methods of finding estimators, method of moments, maximum likelihood method, least squares method; Properties of point estimators;

unbiased estimators, minimum variance unbiased estimators (most efficient estimators), consistent estimators, sufficient estimators, asymptotic normality of estimators; Confidence Intervals: One-sided confidence intervals; Methods for finding confidence intervals, pivotal quantity, statistical and Bayesian; Hypothesis Testing: definitions; Simple and composite hypotheses, test statistic, critical regions, type I and II errors, level of significance, power of a test; Neyman-Pearson lemma; Uniformly most powerful tests and likelihood-ratio tests.

SORS 4103 Stochastic Processes   10 Credits
The module is a review of probability, conditional expectation; Theory and applications of random processes; Poisson process, Brownian motion process, stationary processes and Gaussian processes; Markov chains; Gambler's ruin, Birth and death processes Branching processes and random walks.

SORS 4104 Econometrics   10 Credits
The module is an introduction to econometrics; General linear model; Autocorrelation; Heteroscedasticity; Multicollinearity; Testing linear restrictions; Stochastic regressors; Lagged variables and distributed-lag models; Dummy variables and tests for structural change and simultaneous system of equations in econometrics.

SORS 4105 Case Studies In Operations Research   10 Credits
The module covers consulting Skills: Skills required in practical consulting, covering elements such as: What is Operations Research from the point of view of the clients? Problem structuring-immediate feedback to client-importance of eliciting values; who is the client? The consultant's role in context-sponsor, client, partner, significant actors, politics of OR; Interviewing skills; Proposal preparation, covering costing   and making proposals; Case Studies: Introduction to quantitative modelling in Operations Research, case studies, presentation skills and report writing skills.

SORS 4207 Multivariate Analysis   10 Credits
The module examines the methodology and applications of multivariate analysis; Hotelling's T2, multivariate regression and analysis of variance; Classification and discrimination; Principal components, clustering, multidimensional scaling; use of computer packages, MANOVA.

SORS 4010 Project   30 Credits
Projects may be carried out on an individual basis. Where possible the project shall be done in an industrial setting. The projects test students' ability to organise, complete and report on a significant piece of either Operations Research or Statistics or Applied Mathematics.

Think in other terms

ELECTIVE MODULES

SMA 4213 Graph Theory   10 Credits
The module is an introduction to the abstract known as a graph; Definitions and characterisation of classes of special graphs; Distance and connectedness measures; Various algorithms applied to graphs and some of their proofs, classical and contemporary.

SMA 4241 Financial Mathematics   10 Credits
The module is an introduction to financial derivatives, the Cox-Ross-Rubinstein model, finite security markets, the Black-Scholes model, foreign market derivatives, American options and exotic options.

SORS 4201 Dynamic Programming And Stochastic Control   10 Credits
The module is an introduction to Dynamic Programming, examples and formulation; The Dynamic Programming Algorithm; Deterministic systems and the shortest path problem; Shortest path algorithms; Linear quadratic problems; Inventory control; Shopping and scheduling problems; Deterministic continuous time optimal control; The Pontryagin Maximum Principle; Imperfect state information problems; Linear quadratic problems with imperfect state information; Imperfect state information problems for finite-state systems; Sub optimal control; Rollout Algorithms; Infinite Horizon problems; Stochastic shortest path and discounted problems; Average cost problems; Markov processes value and policy iteration procedure and some case studies in stochastic control.

SORS 4202 Global Optimisation   10 Credits
The module explores local search methods: descent and ascent methods; Neighbourhood search techniques; Metaheuristics. Students shall be introduced to simulated annealing and the metaheuristic simulated annealing shall then be used to solve at least one practical problem in Operations Research;

SORS 4204 Advanced Probability Theory   10 Credits
This module is a review of Univariate Probability Distributions: random variables, univariate probability distributions, functions of a random variable, expectations; Bivariate Probability Distributions: bivariate probability distributions, functions of two random variables, expectations; Multivariate Probability Distributions: multivariate probability distributions, marginal probability distributions, independent random variables, conditional probability distributions, functions of random variables and expectations.

SORS 4205 Non-Linear Programming   10 Credits
The module explores classical Optimization Theory: unconstrained and constrained problems, necessary and sufficient conditions, equality and inequality constraints; Karush-Kuhn-Tucker

Think in other terms

conditions; Nonsimplex Based Nonlinear Programming: gradient search methods for unconstrained and constrained problems; Introduction to penalty and barrier methods; Simplex Based Nonlinear Programming Techniques: separable programming, quadratic programming, convex simplex method criteria and geometric programming.

SORS 4206 Nonparametric Statistics   **10 Credits**
The module is an introduction to nonparametric statistics; Order statistics and their applications; Nonparametric tests concerning a single sample; Nonparametric tests that utilise data from two independent samples; Variable location tests that utilise data from two related samples; Tests involving variable location for three or more independent samples; Tests involving variable location for three or more related samples; Goodness of fit tests; Tests of association and an introduction to robust techniques.

SORS 4208 Statistical Quality Control   **10 Credits**
The module examines statistical process control, Statistical control charts ($\bar{\bar{x}}$ chart, R chart, S chart, C chart, Cp chart); Control chart patterns; Action on control charts; Process capability; Reliability of systems; Reliability function, Failure rate function and expected life.

SORS 4209 Risk Theory   **10 Credits**
The module explores the utility theory: Jensen's inequality, utility and insurance; Optimal insurance; Individual risk models: individual claim random variables, sum of independent random variables, approximation of distribution of the sum; Application to insurance; Collective risk models for a single period: Distribution of aggregate claims; Compound Poisson and Negative Binomial distributions; Properties of the compound Poisson distribution; Convolutions, recursive method; Collective risk models over an extended period: Surplus processes, claim processes, Poisson processes, Compound Poisson processes; Adjustment coefficient; Ruin function; Discrete time model, continuous time model; Maximal aggregate loss and application of risk theory

SORS 4210 Official Statistics   **10 Credits**
The module looks at the functions of statistical services; National and International statistical agencies; Methods of data collection; The module shall put more emphases on; Environmental statistics, Health statistics, Agricultural statistics, Industrial statistics, Economic statistics, Postal censuses and fieldworker surveys.

SERVICE MODULES

SORS 2110 Introduction To Applied Statistics   **10 Credits**
The module covers the definition of statistics: Scope, sampling, questionnaire, measurement scales, types of data; Data descriptions: Graphical Methods: Bar graphs, Pie Charts, Histograms,

Think in other terms

Stem and Leaf Plots, Scatter Plots; Numerical Methods: Measures of Central Tendency and Dispersion; Quartiles and the Interquartile Range; Estimating the Mean and the Variance from Grouped Data; Probabilities: Definitions of Probability; Calculation of Probabilities of Events; Random Sampling; Conditional Probability and Independence; Random Variables: The Binomial and Poisson Distributions; The Normal Distribution; Point Interval Estimation: Estimation of the Population Mean, Proportion, Difference Between Populations, Difference Between Proportions; Hypotheses Testing: Tests about the Population Mean, Proportion, Difference Between Population Means, Difference between Population Proportions; Regression Analysis: Simple Linear Regression and One way Analysis of Variance (ANOVA).

SORS 2210 Applied Statistics For Biological Sciences   10 Credits
The module is an introduction to statistics, descriptive statistics, measures of central tendency, measures of dispersion; Presentation of data; Probability distributions, discrete probability distributions, Binomial, Poisson and Hyper-geometric distribution; Continuous probability distributions, Uniform, Normal and Exponential distributions; Hypothesis testing; Tests concerning means and difference between means; z and t distributions; One sided z and t tests, two sample z and t tests, paired comparisons; Confidence intervals based on z and t statistics for a single mean and the difference between means; Chi-Square test; Chi distribution, contingency tables, observed and expected frequencies; Chi-Square goodness of fit test, Chi-Square test of independence; Simple linear Regression and One way Analysis of Variance (ANOVA). All these should be done with applications in the biological sciences;

SORS 4106 Experimental Design And Multiple Regression   10 Credits
The module looks at the theory and applications of Statistics which include: Experimental Design and Analysis, 2^k Factorial Experiments; Confounding, complete and partial confounding; Orthogonal contrasts; Fractional Factorial Experiments, Aliasing; Multiple Linear Regression: Variable selection and model building; Multiple coefficient of determination, r^2; Mullow's C_p and S_p statistics; Covariance analysis; Stepwise regression methods; Forward selection, backward elimination and stepwise regression;

SORS 4107 Queuing Theory And Stochastic Process   10 Credits
The module looks at the queuing Theory; Elements of queuing models, Queues as birth and death process, Poisson queuing models, non-Poisson queues, P;K; formula, Some simple generalizations such as series queues and applications of queuing theory; Stochastic processes; Theory and applications of random processes, including Markov chains, Poisson processes as well as Birth-and-death processes.

SORS4108 Time Series Analysis And Simulation   10 Credits
The module explores the time series: Smoothing techniques; Moving averages, simple exponential smoothing, decomposition, identification of trend, seasonal, cyclic and irregular components; Additive and multiplicative models, autocorrelation functions; Autoregressive moving average models; Statistical Process Control: x charts, range charts, statistical control,

capable processes; Simulation: Simulation by hand, pseudo random numbers, data collection, distribution fitting, activity cycle diagrams, model development; Verification, validation, experimentation; Analysis of results; Method of common random numbers and the use of simulation package.

Think in other terms

BACHELOR OF SCIENCE HONOURS DEGREE IN BUSINESS ANALYTICS

PROGRAMME SUMMARY

YEAR I

SEMESTER I

Module Code	Module Description	Credits
SORS1101	Introduction to Operations Research	10
SORS1102	Operations Management	10
SMA1101	Calculus	10
SMA1102	Linear Algebra	10
SCS1101	Introduction to Computer Science and programming	12
SORS1103	Introduction to Applied Statistic	10

SEMESTER II

SBA1201	Introduction to Linear Programming	10
SBA1202	Network Models	10
SMA1204	Ordinary Differential Equations	10
SBA1203	Introduction to Business Management	12
SCS1203	Business Information Systems	10
CTL1101	Conflict Transformation and Leadership	10

YEAR II

SEMESTER I

SBA2101	Integer Linear Programming	10
SBA2102	Inventory Control and Management	10
SBA2103	Transportation and Logistics	10
SBA2104	Financial Analytics	10
SORS2106	Monitoring and Evaluation	10
SORS2103	Probability Theory	10

SEMESTER II

SBAS2203	Simulation and Queuing Models	10
SBA2204	Decision and Risk Analysis	10
SBA2205	Scheduling	10
SBA2202	Stochastic Optimization	10

Think in other terms

| SBA2201 | Advanced Linear Programming | 10 |
| SORS2202 | Design and Analysis of Experiments | 10 |

YEAR III

| SBA3010 | Industrial Attachment | 10 |

YEAR IV
SEMESTER I

SBA4101	Non Linear Optimisation and Dynamic Programming	10
SBA4102	Supply Chain Management	10
SBA4103	Algorithms and Heuristics	10
SBA4104	Case Studies in Business Analytics	10

ELECTIVE

| SBA4010 | Research Project | 10 |

SEMESTER II

SMA4241	Financial Mathematics	10
SBA4202	Big Data and Data Mining	10
SBA4203	Business Intelligence	10

ELECTIVE

| SBA4010 | Research Project | 10 |

ELECTIVE I

| SORS4103 | Stochastic Processes | 10 |
| SORS4102 | Statistical Inference | 10 |

ELECTIVE II

SBA4201	Location Modelling	10
SORS4208	Statistical Quality Control	10
SBA4204	Time Series and Forecasting	10
SBA4205	Advanced Optimisation	10
SBA4206	Advanced Dynamic Programming	10
SBA4207	Global Combinatorial Optimisation	10
SMA4213	Graph Theory	10

Think in other terms

MODULE SYNOPSES

YEAR I

SMA1101 Calculus   **10 Credits**
The module explores the limits of functions; One-sided and infinite limits; Continuity; Differentiation: definition, basic properties, Rolle's theorem, mean value theorem, Cauchy's mean value theorem, Leibniz's rule, applications, Taylor series; Integration: definite integrals, antiderivatives, fundamental theorem of calculus, improper integrals, Gamma and Beta functions, definition of natural logarithm as integral of $1/x$ and exponential as inverse; Area, volume of revolution, arc length, surface area; Parametric equations: arc length, surface area; Polar coordinates; Graph sketching; Area in polar coordinates; Complex numbers; Algebra of complex numbers; DeMoivre's theorem and exponential form.

SMA1102 Linear Algebra   **10 Credits**
The module looks at vector Algebra: scalar and vector product; Collinear, coplanar vectors; Applications; Equations of lines and planes; Matrices: products, sums, echelon form, rank, inverse; Determinants: definition, properties, evaluation; Systems of Linear equations, Gauss's method, Cramer's rule, homogeneous systems; Vector Spaces: definition, linear independence, bases and subspaces.

SCS1101 Introduction To Computer Science And Programming   12 Credits
The module explores information and Knowledge Societies, Evolution of Computers, Computer Organisation and Architecture: CPU; Memory; I/O, Number Systems and Conversions (Bin; Dec; Hex; Oct), Concepts of Computer Languages: high\low level languages; compiler; interpreter, Programming Techniques: grammar; recursion; Variables; Data types; Initialization; Comments; Keywords; Constants; Assignment, Programming constructs: branching; looping; recursion; Programming using data structures: arrays; lists; trees; hash tables; queues; stacks; files, Programming Algorithms for Problem Solving: Sorting; compression; numerical and encryption, Fundamentals Operating System, Fundamentals Data Bases and fundamentals of Networks.

SORS1101   Introduction To Operations Research   10 Credits
The module gives a historical overview; Definition of Operations Research; Operations Research to problem solving; The process of quantitative modelling; Some quantitative techniques used in Operations Research; Methodology of Operations Research: The phases of an Operations research project, formulation of the problem, the components of a decision problem, state of nature or environment, the systems orientation of Operations Research, the team concept; An abbreviated Case study: Construction of a mathematical model, models as approximations, deriving a solution to the problem, sensitivity analysis, testing the solution for performance,

problems of implementation, planning for implementation, controlling and maintaining the solution.

SORS1102 Operations Management   **10 Credits**
This is an introduction to Operations Management; Operations Strategy; Design; Facility locations and capacity planning; Production planning, types of production processes and criteria for measuring performance; Materials management, scheduling and control.

SORS1103 Introduction To Statistics   **10 Credits**
The module looks at basic Concepts of Statistics: Definition and scope of Statistics, Variables, Types of data, Measurement scales, Use of calculators and statistical computer software; Data Collection Methods: Data sources, Population and sample, Probability and non-probability sampling, Survey data collection; Data Presentations: Contingency and frequency tables, Pie charts, Bar charts and Histograms, Line graphs, Cumulative frequency curves, Stem and leaf plots, Box and whisker plot; Index Numbers: Types of indices, Simple indices, Un-weighted aggregate index; Introduction to Probability Theory: Counting rules in probability, Sets and events, Outcome sets for random experiments, Experimental probability, Classical Probability, Theoretical Probability, General laws of probability; Introduction to Hypothesis Testing: Definition of a hypothesis, Procedure for testing a hypothesis, Z-test, t-test; Introduction to Nonparametric Statistics: Order Statistics, Tests concerning a single sample, Chi-square test; One way Analysis of Variance (ANOVA) and Simple Linear Regression.

CTL1101 Conflict Transformation And Leadership   **10 Credits**
The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

SCS1203 Business Information Systems   **12 Credits**
The module examines Business Environments; Changing lives and businesses in the Information Era, Redesigning the organization with information systems Types of Information system: TPS; MIS; DSS; and Expert Systems; The Systems life cycle, the phases within it and the activities and documentation appropriate to each phase; Other development strategies, including 4GLs, Prototyping, and Evolutionary development; Building and managing information systems; IS project organization and management Information System Security and Control the Internet and electronic business.

SMA1204 Ordinary Differential Equations   **10 Credits**
The module explores first order differential equations; Separable, linear, exact; Integrating factors; Existence, uniqueness and applications; Second Order Equations; Linear equations and

Think in other terms

linear differential operators; Linear equations and linear differential operators; Linear independence, 103 ; Ordinary Linear Differential Equation with constant coefficients; Undetermined coefficients; Variation of parameters; Applications; Systems of equations; Phase plane portraits for Linear systems; Introduction to Non-linear systems; Predator-prey and Lotka - Volterra equations; Series solution of ordinary differential equations; Method of Frobenius; Legendre polynomials and Bessel functions.

SBA1201 Introduction To Linear Programming 10 Credits

The module gives a definition of Linear programming; Linear programming notation and formulation; Graphical solution, special cases, extreme points and optimal solution; Computer solution; Simplex algorithm; Algebra and the simplex tableau; Two phase method; The big M method; Degeneracy, cycling and stalling; Duality and the dual simplex method; Primal-dual method; Economic interpretation of the dual problem; Computer solution and sensitivity analysis; Applications of Linear Programming in manufacturing, marketing, agriculture, dietary problems, product mix, finance and other; Linear Programming software and sensitivity analysis.

SBA1202 Network Models 10Credits

The module explores basic definitions; Shortest route algorithms (Dijkstra's Algorithm and others); Minimum spanning tree algorithms (Kruskal's Algorithm and others); Network Flow problems: Maximum network flow problem (Ford-Fulkerson Labelling Algorithm), Max-flow Min-cut Theorem, Integral flows; Minimum cost network flow; Chinese postman problem/ Route inspection problem; Travelling salesman problem; Network simplex method; Max-flow Min-cut Theorem, Integral flows Project scheduling using networks; Critical path analysis; Deterministic activity times; Probabilistic activity times; Gantt charts; Resource scheduling; Cost crashing analysis and use of Network software.

SBA1203 Introduction To Business Management 10 Credits

The module has an understanding the Business World: forms of businesses and establishment of a business organisation; Introduction to management: levels of management, managerial roles and management skills; Environmental scanning, social responsibility and ethics; Planning and organising in management; Leadership and control in management and a brief overview of the functional management of the organisation.

YEAR II

SBA2101 Integer Linear Programming 10 Credits

The module highlights the basic definitions and formulations; LP relaxation; Graphical and computer solutions for an all integer linear program; Using the LP relaxation to create bounds; Branch and bound for solving a pure integer programming problem; Branch and bound for solving a mixed integer programming problem; Gomory's cutting plane algorithm; Solving 0-1 integer linear programming problems; Inequalities for 0-1 Knapsack constraints, k out of n alternatives constraints; Sensitivity analysis; Branch and Cut algorithm.

Think in other terms

SBA2102 Inventory Control And Management   **10 Credits**

The module covers inventory Models: Deterministic demand models: Economic order quantity, Economic production lot size, Economic order quantity with backorders, Quantity discounts; Probabilistic demand models: Single period models, safety stock, Multiple period models; Inventory models with planned shortages; Periodic review with Probabilistic demand; Inventory control: Material requirements planning, materials resource planning, product structure, gross requirements, net requirements; Inventory management systems; Warehouse management and the use of Inventory management software.

SBA2103 Transportation And Logistics   **10 Credits**

The module gives a definition, representation and formulation of the transportation problem; Transportation Simplex method; Finding the basic feasible solution (Phase I) using north-west corner, least cost, Vogel's methods; Iterating to the optimal solution (Phase II); Balanced and unbalanced problems, unacceptable routes; Degeneracy; Transshipment problems; Computer solution and sensitivity analysis; Assignment Problem; Representation and formulation of the assignment problem; Hungarian method; Alternating basis algorithm for assignment problem; Transportation and Logistics management; Logistics including Packaging, Containerization, Documentation, Insurance, Storage, Importing and Exporting Regulations, Freight Damage Claims, Working & collaborating with other executives within the supply chain, Managing vendors and partners, Responsible for mitigating risk and mitigation expenditures; Reverse logistics, Maritime Logistics, Air Freight Logistics, Land Logistics, Express Delivery, City logistics and the use of Transportation and logistics software.

SORS 2106 Monitoring And Evaluation   **10 Credits**

The module offers an introduction to monitoring and evaluation (M&E): Terms and concepts applied in M&E processes, difference between M & E, M & E in projects implementation; Introduction to Monitoring and Evaluation Plan; Gathering Performance Data; Coding data and creating templates in Epi-Info, SPSS, CSPro and SAS, Non-parametric Statistical methods of analysis i;e Kruskal Wallis, Wilkoxon-Rank-sum Test, Spearman Correlation, Mann-Whitney-U test, Cross-tabulations and odds ratios; Data envelopment analysis (DEA): Productivity analysis using ratios, Estimation and interpretation of basic DEA model, Estimation of cost-efficiency estimation, Some application of SFA and regression analysis.

SORS2103 Probability Theory   **10 Credits**

The module explores probability: random/statistical experiments, sample spaces, events, set theory; Axioms of probability; Laws of probability; Finite sample spaces; Conditional probability, independent events; Random variables and probability distributions; Discrete probability distributions; Continuous probability distributions; Discrete bivariate distributions; Continuous bivariate distributions; Marginal probability distributions; Independent random variables; Conditional probability distributions; Distributions of functions of a single random variable; Conditional probability distributions of mathematical expectations; Expectations of

discrete and continuous random variables; Expectation of a function of a single random variable; Expectation of a function of several random variables; Properties of expectations; Variance and covariance; Markov and Chebyshev inequalities; Moment generating functions; Properties of moment generating functions; Special Distributions: Bernoulli, Binomial, Geometric, Negative Binomial, Hypergeometric, Poisson, Normal, Gamma, Weibull, Exponential, and Beta.

SBA2104 Financial Analytics   10 Credits

The module examines cash flow streams, present value and fixed income instruments; Linear programming models in finance:- cash flow matching, dedication and immunization; Fandumental theorem of asset pricing; Risk- neutral probabilities and arbitrage detection; Mean variance Markowitz portfolio model using quadratic programming; Constructing an index fund using Integer programming; Structuring CMO's using Dynamic programming; Dynamic portfolio optimization; Stochastic programming and optimal control models in Finance.

SBA2201 Advanced Linear Programming   10 Credits

The module covers a revised Simplex method; Complexity of the simplex algorithm;; Convergence, complexity and basic optimal solutions; Using column generation to solve large scale LP problems; Bounded variables algorithm, parametric linear programming; Karmarkar's interior point algorithm; Dantzig-Wolfe Decomposition algorithm; LP and Zero-Sum Game theory; Lagrangian duality; Multicriterial programming; Goal programming model formulation; Goal programming algorithms—the weighting and pre-emptive methods; Complex problems in goal programming; Analytic Hierarchy Process (AHP), Establishing Priorities using AHP; Using AHP to develop an overall priority ranking; Use of Linear Programming software and sensitivity analysis.

SBA2202 Stochastic Optimisation   10 Credits

The module gives definitions and notations; Contrast of Stochastic and Deterministic Optimization; Some principles of Stochastic Optimization; Properties of Convex sets; Continuity and differentiability of convex functions; Sub-gradients and optimality conditions; Properties of sub-gradients; General properties of direct random search; Stochastic approximation; Stochastic optimization algorithms; Pure random search; Accelerated random search; Simulated Annealing; Evaluating stochastic algorithms and Stochastic Algorithm in R.

SORS2202 Design And Analysis Of Experiments   10 Credits

The module gives a definition of basic terms; Completely randomized design (CRD); Randomized Block Design (RBD); Latin Square Design (LSD); Factorial Designs; factorial experiments; Confounding, complete and partial confounding; Orthogonal contrasts; Fractional factorial experiments, aliasing; Multiple linear Regression: Variable selection and model building; Multiple coefficient of determination, ; Mullow's, and statistics; Covariance analysis; Stepwise regression methods; Forward selection, backward elimination, stepwise regression and the use of Statistical packages in solving problems.

Think in other terms

SBA2203 Simulation And Queuing Models   **10 Credits**

The module look at simulation by hand, pseudo random numbers, data collection, distribution fitting, activity cycle diagrams, model development, verification, validation, experimentation, analysis of results, method of common random numbers, use of a simulation package; Discrete simulation; Systems dynamics; Simulation software sampling methods; Model testing and validation; Use of Simulation package; Single Server Models: Queuing processes, Kendall-Lee notation, definitions and notation, the role of the exponential distribution, pure birth processes, pure death processes, birth and death processes, parameters of a queuing model; Multiple Server Models: Queuing models with parallel servers, models with non-Markovian input and output, the Pollaczek-Khintchine formulae and a case study of anqueuing model.

SBA2204 Decision And Risk Analysis   **10 Credits**

The module outlines problem formulation, payoff tables, decision trees; Decision making without probabilities: Optimistic Approach, Pessimistic approach, Minimax Regret Approach; Decision making with probabilities: The expected value approach; Decision making with perfect information; Computation of branch probabilities using Bayes theorem; Bayes posterior probabilities, decision trees; Value of Sample information; Efficiency of sample information; Utility Theory: Utility and Decision Analysis, Utility functions, Exponential utility function; Risk profile; Loss and risk functions, admissible estimator, minimax estimator, Bayes risk, Bayes estimator; The Difference between Risk Analysis and Risk Assessment; Performing a Risk Analysis; Risk Assessment and Risk Analysis Elements.

SBA2205 Scheduling   **10 Credits**

The module is an introduction to scheduling in manufacturing and other environments; Optimisation overview as needed for scheduling; Single machine project, parallel machines projects, flow shops, job shops; Advanced issues such as uncertainty as it applies to service industries; Machine scheduling to other areas like sports, transportation and military operations.

YEAR III

YEAR IV

SBA4101 Non Linear Optimisation And Dynamic Programming   **10 Credits**

The module gives introductory concepts in Non-Linear Programming (NLP); Graphical illustration of non-linear programming; Convex and Concave functions; Solving NLP with one variable; Unconstrained optimization with several variables; Steepest Ascent Method; Lagrange Multipliers; The Karush-Kuhn-Tucker (KKT) conditions; Quadratic programming; Separable programming; Convex and Non-Convex programming; Pareto Optimality and trade off analysis; Dynamic Programming notation; Shortest route problem; The Knapsack Problem; Dynamic

Programming examples: A network problem, Production and Inventory control, Resource allocation problems, Equipment replacement problems; Formulating Dynamic Programming Problems; and using EXCEL to Solve Dynamic Programming Problems.

SBA4102 Supply Chain Management   10 Credits

The module gives supply chain operations, Supply Chain Planning; Procurement, Purchasing, Supply; Make versus Buy Decisions; Management and Strategic Sourcing; Strategic process improvement; Planning and Control; Management Strategy; Supply Chain Optimization; Logistic and the external environment; Technology Applications and a supply Chain Optimization Case Study

SBA4103 Algorithms And Heuristics   10 Credits

The module gives definitions of algorithm and heuristics; Graph Algorithms and Problems; Algorithmic Techniques; Types of Algorithms; Classification of problems: P, NP, NP-Complete, NP-Hard; Randomized Algorithms, Greedy Algorithms, Graph Algorithms, String Algorithms; Introduction to Heuristic procedures; Heuristic Problem Solving: Ill structured problems, Heuristics- the human approach to problem solving, Satisfying, heuristic procedures and programs; Simulated Annealing; Genetic Search; Tabu Search and Comparison of Heuristics.

SBA4104 CASE STUDIES IN BUSINESS ANALYTICS   10 CREDITS

The module explores consulting Skills: Skills required in practical consulting, covering elements such as: What is Business Analytics from the point of view of the clients? Problem structuring-immediate feedback to client-importance of eliciting values; who is the client? The consultant's role in context-sponsor, client, partner, significant actors, politics of OR; Interviewing skills; Proposal preparation, covering costing and making proposals; Case Studies: Introduction to quantitative modelling in Business Analytics, case studies, presentation skills and report writing skills.

ELECTIVE 1

SORS4103 STOCHASTIC PROCESSES   10 CREDITS

The module is a review of probability, conditional expectation; Theory and applications of random processes; Poisson process, Brownian motion process, stationary processes and Gaussian processes; Markov chains; Gambler's ruin, Birth and death processes Branching processes and random walks.

SORS4102 Statistical Inference   10 Credits

The module examines the indicator function, exponential family of densities;Parametric Point Estimation: parameter space and point estimators; Methods of finding estimators, method of moments, maximum likelihood method, least squares method; Properties of point estimators;

unbiased estimators, minimum variance unbiased estimators (most efficient estimators), consistent estimators, sufficient estimators, asymptotic normality of estimators; Confidence Intervals: One-sided confidence intervals; Methods for finding confidence intervals, pivotal quantity, statistical and Bayesian; Hypothesis Testing: definitions; Simple and composite hypotheses, test statistic, critical regions, type I and II errors, level of significance, power of a test; Neyman-Pearson lemma; Uniformly most powerful tests and Likelihood-ratio tests.

SMA4241 Financial Mathematics   10 Credits
This is an introduction to financial derivatives, the Cox-Ross-Rubinstein model, finite security markets, the Black-Scholes model, foreign market derivatives, American options, and exotic options.

SBA4202 Big Data And Data Mining   10 Credits
 The module looks at fundamental concepts of Decision Making, Big Data and Data Mining; Data Mining processes, Passive Data mining and Active Data Mining; Big Data and Data Mining Computing Environment-hardware, distributed systems and analytical tools; Turning data into insights that deliver value- through methodologies, algorithms and approaches for big data analytics-Modelling, visualisation, interpretation, assessment, evaluation and iteration; Big Data and Data Mining in Practice- case studies of the world's most successful companies; Design and implement a prototype.

SBA 4203 Business Intelligence   10 Credits
The module gives a Business Intelligence (BI) overview; Adding value through BI; Essentials of BI; BI Architecture; Data integration; Databases & Data warehousing; Online Data Processing (OLAP); Online Transaction Processing (OLTP); Data Marts; BI front-end; Data Mining & Data mining algorithms; BI Application; Extract, Transform and Load concepts and tools.

SORS4208 Statistical Quality Control   10 Credits
The module covers statistical process control, Statistical control charts (chart, R chart, S chart, C chart, C_p chart); Control chart patterns; Action on control charts; Process capability; Reliability of systems; Reliability function, Failure rate function and expected life.

ELECTIVE 2

SBA4201 Location And Modelling   10 Credits
The module explores optimal location procedures, Location problems, Methods for solving location problems: Exact Enumerative, Exact Analytical, Approximate Heuristic Algorithms, Approximate Statistical Algorithms, Exact Mathematical Programming, Approximate Simulation Methods, Location in continuous space, Location on a route structure, Multi-facility location on a network: Minimizing average distance, Minimizing the maximum distance to closest supply centres and minimizing the number of centres required for every demand point.

Think in other terms

SBA4203 Time Series And Forecasting   **10 Credits**

The module looks at smoothing techniques; Moving averages, Simple exponential smoothing, decomposition, identification of trend, seasonal, cyclic and irregular components; Additive and multiplicative models; ARIMA and ARMA models: Model building strategy, models for stationary time series, models for non-stationary time series, parameter estimation, model diagnostics, model specification; Judgmental Forecasting; Seasonality in forecasting; Forecasting errors; Casual Forecasting with Linear Regression; Box-Jenkins method; Modeling volatility using ARCH/GARCH model; Short term and long term forecasting and the use of R in Forecasting.

SBA 4010 Project   **10 Credits**

Projects may be carried out on an individual basis. Where possible the project shall be done in an industrial setting. The projects test students' ability to organize, complete and report on a significant piece of either Operations Research or Statistics or Applied Mathematics.

SBA4205 Advanced Optimisation   **10 Credits**

The module covers the Game Theory: Two-Person zero-sum games; Games with mixed strategies; Graphical solution; Linear Programming and zero-sum games; Introduction to n-Person Game Theory; The Shapley Value; Advanced Markov Chains: Chapman-Kolmogorov equations; Classifications of state of nature of a Markov chain; Continuous time Markov Chains; Markov Decision Processes; Model for Markov Decision Processes; Linear Programming and Optimal Policies and Discounted Cost Criterion.

SBA4206 Advanced Dynamic Programming   **10 Credits**

The module analyses a prototype example of Dynamic Programming; Characteristics of Dynamic Programming Problems; Deterministic Dynamic Programming; Probabilistic Dynamic programming; and the use of computers to solve Dynamic programming Problems.

SBA4207 Global Combinatorial Optimisation   **10 Credits**

The module examines local search methods: descent and ascent methods; Neighbourhood search techniques; Metaheuristics; Cluster Analysis; Discriminant Analysis; Imperfect state information problems for finite-state systems; Sub optimal control; Rollout Algorithms; Infinite Horizon problems; Stochastic shortest path and discounted problems; Average cost problems; Markov processes value and policy iteration procedure and case studies in stochastic control.

SMA4213 Graph Theory   **10 Credits**

This is an introduction to the abstract known as a graph; Definitions and characterisation of classes of special graphs; Distance and connectedness measures; Various algorithms applied to graphs and some of their proofs, classical and contemporary.

Think in other terms

MASTER OF SCIENCE HONOURS IN OPERATIONS RESEARCH AND STATISTICS

1.0 Degree Profile : Master of Science Honours In Operations Research and Statistics

Institution:	National University of Science and Technology
Type Of Degree:	MASTERS
Credit Load:	360 Credits
Level:	SADC-QF - Level 8
Accreditation Organisation(S):	Zimbabwe Council For Higher Education
Period Of Reference:	2018

PURPOSE OF THE PROGRAMME

To develop knowledge skills and competences in the field of Operations Research and Statistics which are relevant to various career paths. To provide a foundation for further studies and research in Operations Research and Statistics.

PROGRAMME CHARACTERISTICS

Areas of Study:	Operations Management, Industrial Statistics, Stochastic Modelling, Simulation Modelling, Information Systems for Management, Operations Research Techniques for Management, Financial Modelling and Forecasting, Quantitative Analysis
Specialist Focus:	Application of necessary tools and conceptual foundations in quantitative reasoning to extract information intelligently from a large pool of data (data mining) and the use robust statistical analysis and mathematical modeling to solve an array of business and organizational problems, as well as improve decision-making.
Orientation:	Real problems solving, research and survey activities, teaching and learning oriented programme.
Distinctive Features:	Provide basic techniques in theory of Operations Research and Statistics and their applications to real-world problems by enhancing analytical skills to attack complex, large-scale optimization problems of both a deterministic and stochastic nature to make better

Think in other terms

decisions that impact society and the world positively.

CAREER OPPORTUNITIES AND FURTHER EDUCATION
Employability: Academia, Transport and logistics, Financial services, Biometricians, Data, Mining, research and Development, Treasury, Monitoring and evaluation, Mining and manufacturing, Health Information management, Bio-informatics, hydrology and Climatology

Further Studies: PhD

TEACHING AND LEARNING
Teaching and Learning Methods: Lectures, tutorials and seminars, computer practical classes, group enquiry and/or problem based study, individual learning, research and research projects, oral tests

Assessment Methods: Written and oral examinations, tests, seminar presentations, mini-research report, final year dissertation report, continuous assessments

2.0   REGULATIONS
These regulations shall be read in conjunction with the Academic General Regulations.

3.0   ENTRY REQUIREMENTS
3.1 Candidates with an Honours Degree in Applied Mathematics/Mathematics, Applied Statistics/Statistics, Operations Research, Computer Science with at least a 2.2 degree class.

3.2   Candidates with at least a 2.1 Honours Degree class in a programme with significant[*] Mathematics content.

3.3   Candidates with at least a 2.2 Honours Degree class in a programme with significant[*] Mathematics content and should also have at least one year's relevant work experience will be accepted.

4.0 DURATION
4.1   Fulltime
The programme will be offered on a full time basis for 18 months or Block Release basis for 24 months (4 semesters) or on part-time basis for at least 24 months.

4.2   Block Release Programme
The programme is offered on block release basis for 2 years (4 blocks). It consists of   two parts. Part I consists of 6 taught Modules for 2 semesters (2 blocks). Part II consists of 4 taught

Modules (3 Modules in block 3) and 1 Module in Block 4 and a dissertation is also done in block 4.

4.3 Part-Time Programme

Students on Part-time shall normally take a maximum of 3 taught Modules per semester over a period of 2 years (4 blocks).

The student will do one Module and a dissertation in the second semester of Part II. The dissertation may commence after the end of second semester (Part I). The dissertation report will normally be submitted to the department one month before the end of the Part II of the degree program.

5.0 AWARD OF THE POSTGRADUATE DIPLOMA

Students who pass, or are credited with, all ten taught Modules, but do not successfully complete the dissertation; will be awarded a Postgraduate Diploma in Operations Research and Statistics.

Students who fail the MSc. degree but who pass, or are credited with, at least eight taught Modules and the dissertation, will be eligible to be awarded a Postgraduate Diploma in Operations Research and Statistics.

6.0 DETERMINATION OF THE DIPLOMA

6.1   The weighting of the components of the diploma for those students who pass all ten Modules but not the project, will be:

Average of all 10 taught Modules 100%

6.2   The weighting of the components of the diploma for those students who pass the project and at least eight taught Modules:

Average of Eight Taught Modules	70%
Dissertation	30%

7.0 ASSESSMENT

Each Module will be assessed at the end of the semester. The final grade in the Module will be based on the marks obtained in the final examination mark and on Module-work. The proportion of the final assessment from Module-work will range from 25% to 100% depending upon the Module. The final grade will be awarded by a panel drawn from members of staff and the external examiner appointed by the department. The grade allocation will be according to the usual university grades, that is; distinction, merit, pass and fail.

Think in other terms

PROGRAMME SUMMARY

PART I

SEMESTER I
SORS 5101   Operations Management
SORS 5102   Stochastic Modelling
SORS 5103   Industrial Statistics

SEMESTER II
SORS 5201   Operations Research Techniques for Management
SORS 5202   Simulation Modelling
SORS   *Elective*

PART II
SEMESTER I
SORS 6101   Applications of Quantitative Analysis
SORS 6102   Forecasting
SORS   *Elective*

SEMESTER II
SORS 6010   Dissertation
SORS   *Elective*

ELECTIVES
SORS 5203   Information Systems for Management and Business
SORS 5204   Spread-sheet Modelling and Visual Basic
SORS 6104   Advanced Optimisation theory and Applications for Management
SORS 6103   Financial Modelling
SORS 6201   Business Management and Consulting Skills
SORS 6202   Network Optimisation
SORS 6203   Supply Chain Management
SORS 6204   Scheduling

NB: Students will be required to choose a minimum of two Modules from the list of elective Modules whose availability shall be subject to expertise and equipment in the Department.

Think in other terms

MODULE SYNOPSES

PART I

SORS 5101 Operations Management
The module looks at the operations strategic objectives; Operations strategy; Design; Planning and control; Improvement; Deterministic and stochastic inventory models Inventory control; Supply chain management; Facility location; Project management; Total quality management and Just-In-Time (JIT.

SORS 5102 Stochastic Modelling
The module covers elements of stochastic processes; Discrete and Continuous time Markov Chains; Markov processes; Birth and Death processes; Stationary processes; Brownian motion and renewal processes.

SORS 5103 Industrial Statistics
The module explores principles of experimental design; Completely randomised designs; Randomised block designs; Balanced incomplete block designs; Latin square and crossover designs; Factorial designs; Fractional factorial designs; Response surface methodology; Nested designs; Split-plot designs; Repeated measures designs; Analysis of covariance; Quality control and Reliability.

SORS 5201 Operations Research Techniques For Management
The module highlights advanced linear programming; Non-linear programming algorithms; Classical optimisation theory: unconstrained and constrained problems; Dynamic programming; Global optimisation techniques and tabu search. Emphasis will be on solving practical problems using tabu search.

SORS 5202 Simulation Modelling
The module examines discrete event simulation; Systems dynamics; Simulation software Sampling methods; Model testing and validation.

SORS 5203 Information Systems For Management And Business
The module outlines management information and information systems; Information and techniques for providing information: database; Fast cycle systems; Fast cycle data entry; Networks and electronic data interchange; Communication networks-standards, applications and

techniques; Expert systems; Determination and implementation of an information strategy: determining strategy, information technology tactics; Internal control and security;

Information for business management; Processing by computers; Design of a database; Administration of a database; Data preparation, coding and validation; Design implementation, testing conversion and evaluation; Office automation; Executive and decision support systems.

SORS 5204 Spreadsheet Modelling And Visual Basic Programming

The module looks at spreadsheet Modelling: Spreadsheet as a tool to support the development of quantitative models; Development of spreadsheet models to support: linear and integer programming, allocation of scarce problems, queuing theory and simulation; Programming simple macros within Excel; Use of management science packages: TORA and MSCI; Visual Basic Programming: Appreciation of the principles behind the structuring and execution of computer programs; Write simple Visual Basic programs; Creating a windows user interface; Planning the design of an application and processing user input.

PART II
SORS 6101 Applications Of Quantitative Analysis

The module looks at Case studies; Presentation skills; Report writing skills; Problem structuring methods: Soft Systems Methodology (SSM), Strategic Options Development and Analysis (SODA) and Strategic Choice (SC).

SORS 6102 Forecasting

The module emphasizes multiple regression modelling; Binary choice models, multiple discrete choice models and limited dependent models; Time series analysis: ARIMA, ARMA and VARMA models.

SORS 6103 Financial Modelling

The module examines arbitrages and equivalent Martingale measures; The one period model; Multi period models; The continous model; Hedging and completeness; Self-financing portfolios; Attainability of a claim; Complete markets; Ito representation theorem; Girsanov's first theorem; Option pricing; European options; American options; The Black Scholes option pricing formula; Optimal portfolio and stochastic control; Stochastic control theory; The Hamilton-Jacobi-Bellman equation; Girsanov's second theorem and the Levy characterization.

SORS 6104 Advanced Optimisation Theory And Applications For Management

The module covers Classical Optimisation Theory: unconstrained and constrained optimization, necessary and sufficient conditions, equality and inequality constraints, Hessian, Lagrange and Jacobian methods; Algorithmic methods to include: steepest descent and ascent, Newton's method, conditional gradient and subgradient optimization, interior-point methods, penalty and

barrier methods; Global optimization: neighbourhood search techniques, metaheuristics, simulated annealing and tabu search and applications to business management.

SORS 6201 Business Management And Consulting Skills

The module explores Business Management: The Business world and the community, Needs and need satisfaction, Business practice and social responsibility, Establishment of a business organization, Drawing up of a business plan, Importance of a business plan, Importance of the environment, General management: importance of management, levels of management; Functional management of organizations; Consulting Skills: Skills required in practical consulting, covering elements such as: What is Operations Research from the point of view of the clients? Problem structuring- immediate feedback to client-importance of eliciting values; who is the client? The consultant's role in context-sponsor, client, partner, significant actors, politics of OR; Interviewing skills; Proposal preparation, covering costing   and making proposals.

SORS 6202 Network Optimisation

The module is an introduction to network models, computational complexity and data structures, Graph search algorithms, Transformations and flow decomposition, Shortest paths: label setting algorithm, the radix heap algorithm, label connecting algorithm; Basic algorithms for the maximum flow problem, Combinatorial applications for maximum flows, Preflow push algorithms, the global min cut algorithm; Minimum cost flows: Basic algorithms, the successive shortest path algorithm, the network simplex algorithm, minimum cost spanning trees, generalized flows and multi-commodity flows.

SORS 6203 Supply Chain Management

The module covers supply chains, Enterprise resource planning, Inventory management, Picking, dispatching, assignment, delivery; Capacity management; Data analysis and business Statistics; Information and data management.

SORS 6204 Scheduling

The module looks at the sequence of scheduling activities; Aggregate planning; Master scheduling; Scheduling services; Maintenance; Material requirements planning and applications to business management.

SORS 6010 Dissertation

Research Projects may be carried out on an individual basis. The research project normally involves work with some outside organization. The research projects test students' ability to organise, complete and report on a significant piece of Operations Research and Statistics.

DEPARTMENT OF SPORT SCIENCE AND COACHING

Lecturer and Chairperson
S. H. Rutsate, MSc (Belgium); MSc (Zim/NSA, Bulgaria), BA (Rhodes, SA)

Senior Lecturers
M. P. D. Gundani, MSc (Zim/NSA, Bulgaria); B Tech (SA)

B. Njekeya, MSc (ZIM/NSA, Bulgaria); BSc (Cuba)

Lecturers
Dr. B. Khumalo, PhD (SA); MSc (Belgium); BSc (Zim)

D. Makaza, MPhil (Zim); BED (Zim); BSc (Zim)

E. M. Tapera, MPhil (Zim); BED (Zim)

M. Ndlovu, MSc (UK); BSc (UK)

J. S. Sibindi, MPhil (Zim); BSc (Zim)

Demonstrator
K. Dlamini, BSc (Zim); Dip (Zim)

Technician
M. Banda, MSc. (SA); BSc (Zim)

UNDERGRADUATE PROGRAMMES

BACHELOR OF SCIENCE HONOURS DEGREE IN SPORT SCIENCE AND COACHING

1.0 Degree Profile of: Bachelor of Science Honours Degree in Sport Science and Coaching

Institution:	National University of Science and Technology
Type Of Degree:	Honours
Credit Load:	500 Credits
Level:	SADC-QF - Level 8
Accreditation Organisation(S):	Zimbabwe Council For Higher Education
PERIOD OF REFERENCE:	2018

PURPOSE OF THE PROGRAMME

To produce graduates capable of developing solutions in Sport Science and its related Industry.

PROGRAMME CHARACTERISTICS

Areas of Study: Sport Science and Coaching

Specialist Focus: Sport Science, Recreation Science and Management, Leisure Studies

Orientation: Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects

Distinctive Features:

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability: Exercise Physiologist, University Researcher, University Academics, Sport Scientist, Kinesiology, Biomechanist, Sport Nutritionist, Sport Coach, Sport Analyst, Sport Psychologist, Human Performance Analyser, Strength and Conditioning Coach, Personal Trainers, Sports Development Officers, Sports Teacher, Sports Managers,

Think in other terms

Physiotherapist

Further Studies: Masters in Sport Science and Coaching, MPhil, PhD

TEACHING AND LEARNING

Teaching and Learning Methods: Lectures, tutorials, laboratory classes, seminars, group work, practical based activities, industrial visits, industrial attachment, research project, individual independent study

Assessment Methods: Written and oral examinations, tests, laboratory reports, seminar presentations, industrial attachment report, mini-research project report, final year research project report.

2.0   REGULATIONS
These regulations should be read in conjunction with the Department of Sport Science and Coaching Regulations and the General Academic Regulations for Undergraduate Degrees hereinafter referred to as General Regulations.

3.0   ENTRY REQUIREMENTS
3.1 The candidate must have obtained a PASS at 'A' level in at least two of the following subjects or their recognized equivalents: -
Physical Education, Sport Science, Biology, Chemistry, Physics, Mathematics and/or any other relevant "A" level qualifications.
3.2 Special entry: candidates who have successfully completed a Diploma in Sport Science or Physical Education or its recognized equivalent may apply.

4.0   DURATION OF THE PROGRAMME
The Programme shall run for a period of four years.

5.0   MODE OF STUDY
The Programme is offered on full time and Block Release.

6.0   STRUCTURE OF THE PROGRAMME
The program shall consist of thirty-six taught modules plus Industrial Attachment/Work Based Experience Report and a final year project.

Think in other terms

7.0   ASSESSMENT OF CANDIDATES

Assessment of modules with a practical component, unless specified otherwise, shall be weighted as follows: continuous assessment 20%, practical 20% and examination 60%.

PROGRAMME SUMMARY

		Module Code	Module Description	Credits
Yar I	Semester I	SSC 1106	The Fundamentals of Sport History and Olympism	10
		SSC 1104	Fundamentals of Athletics	10
		SSC 1105	Fundamental of Gymnastics	10
		SSC 1107	Principles of Human Anatomy	10
		SSC 1108	Principles of Human Physiology	10
		SCS 1100	Introduction to Computer Science (Service Module)	10
	Semester II			
		SSC 1220	Functional Anatomy	10
		SSC 1221	Theory and Methodology of Physical Education	10
		SSC 1222	Introduction to Psychology	10
		SCS 1200	Data Concepts and Data Processing	10
		CTL1101	Conflict, Transformation And Leadership	1010
		SSC	Elective Sports Speciality Modules 1 Level I	10
		SSC	Elective Sports Speciality Modules 1 Level I	

Elective Modules –a student must choose two(2) modules from the list below: **130 Credits**

SSC 1210	Martial Arts I	10
SSC 1211	Gymnastics I	10
SSC 1212	Field and Track Athletics I	10
SSC 1213	Swimming, Life Saving and First Aid	10
SSC 1214	Tennis I	10
SSC 1215	Soccer I	10
SSC 1217	Volleyball I	10
SSC 1218	Basketball I	10
SSC 1223	Cricket I	10

Year 2 Semester I

SSC 2103	Principles of Biochemistry	10
SSC 2104	Biomechanics	10
SSC 2105	Sport Management	10
SORS 2110	Introduction to Applied Statistics for Biological Sciences	10
		10
SSC	Elective Sports Speciality Modules 2 Level 2	10

Think in other terms

SSC   Elective Sports Speciality Modules 2 Level 2

Elective Modules –a student must choose two(2) modules from the list below:

		10
SSC 2111	Gymnastics II	10
SSC 2110	Martial Arts II	10
SSC 2112	Field and Track Athletics II	10
SSC 2113	Swimming II	10
SSC 2114	Tennis II	10
SSC 2115	Soccer II	10
SSC 2117	Volleyball II	10
SSC 2118	Basketball II	10
SSC 2123	Cricket II	

Semester II

SSC 2206	Exercise Physiology and Biochemistry	
SSC 2209	Theory and Methodology of Coaching	
SSC 2216	Testing, Measurement and Exercise Prescription	10
SSC 2220	Research Methodology in the Sports Sciences	10
SSC	Elective Sports Speciality Modules 2 Level 3	10
		10
SSC	Elective Sports Speciality Modules 2 Level 3	10
		10

Elective Modules –a student must choose two(2) modules from the list below:

120 Credits

SSC 2211	Gymnastics III	
SSC 2210	Martial Arts III	10
SSC 2212	Field and Track Athletics III	10
SSC 2213	Swimming III	10
SSC 2214	Tennis III	10
SSC 2215	Soccer III	10
SSC 2217	Volleyball	10
SSC 2218	Basketball III	10
SSC 1223	Cricket III	10
		10

Year 3		SSC3000	Industrial Attachment	**120 Credits**
Year 4	Semester I	SSC 4101	Theory of Sports Training	10
		SSC 4102	Sports Biokinetics	10
		SSC 4103	Sports Psychology	10
		SSC 4104	Nutrition and Sports Nutrition	10
		SSC 4010	Project (weighting of 2 modules assessed in Semester II)	10
		SSC	Elective Sports Speciality Module 3Level 4	10
		SSC	Elective Sports Speciality Module 3 Level 4	10

Elective Modules –a student must choose two (2)modules from the list below:
SSC 4111 Gymnastics IV
SSC 4110 Martial Arts IV   10
SSC 4112 Track and Field Athletics   IV   10
SSC 4113 Swimming   IV   10
SSC 4114 Tennis   IV   10
SSC 4115 Soccer   IV   10
SSC 4117 Volleyball   IV   10
SSC 4118 Basketball IV   10
SSC 1223 Cricket IV   10
                                           10

Semester II	SSC 4207 Health, Exercise and Sports Recreation	10
	SSC 4208 Basic Law, Sports Law and Diplomacy	10
	SSC 4209 Advanced Sports Studies	10
	SSC 4010 Research Project (Weighted as 2 modules)	10
	SSC Elective Sports Speciality Module 1 Level Professional	10
		10
	SSC Elective Sports Speciality Module 2 Level Professional	**130 Credits**

Elective Modules –a student must choose two(2) modules   10
from the list below: 10
SSC 4211 Gymnastics V   10
SSC 4210 Martial Arts V   10
SSC 4212 Field and Track Athletics V   10
SSC 4213 Swimming V   10
SSC 4214 Tennis V   10
SSC 4215 Soccer   10
SSC 4217 Volleyball   **10**

Think in other terms

SSC 4218 Basketball
SSC 1223 Cricket IV

TOTAL CREDITS **500**

MODULE SYNOPSES

YEAR I

SEMESTER I

SSC 1103 The Fundamentals Of Sport History And Olympism   10 Credits
This module shall cover sporting activities of men since early time of their existence. It shall include Ancient Nations to today Modern times including Zimbabwe; The International Olympic Commission (IOC), principles of Olympism, Olympic Solidarity; Code of Ethics and the Anti-Doping Code.; Physical culture, including the significance of sport in society and the trends in elite sports.

SSC 1104 Sports Module (Fundamentals Of Athletics)   10 Credits
Students shall be introduced to the basic foundations of theory and practice of athletics exercise. This module shall also develop awareness in students of athletics as a discipline whose natural movements form a basis for improvement of fitness for other sporting activities and lifelong fitness. Students' shall acquire knowledge and skills in athletic movement in the following athletics events; walking, sprints, relays, hurdles, jumps and throws middle and long distance. Rules of each of the events shall be discussed. The module also covers planning and organization of athletics competitions.

SSC 1104 Sports Module (Fundamentals Of Gymnastics)   10 Credits
This module is aimed at providing students with theoretical knowledge and practical skills in general gymnastics for use of all athletes in sports preparation. Students will be expected to participate in training drills of basic and complex gymnastic exercises and to present a composition.

SSC 1107 Principles Of Human Anatomy   10 Credits
The module is designed as the basis in understanding the movements frequently encountered in the teaching and coaching of sports. This module is also designed for students preparing for future careers in health related professions. The module shall include topics like the organization of the human body, (skeletal, muscular, nervous system and internal organs), principles of support and movement, control system and maintenance of the human body as well as homeostatic mechanisms of the major functional systems.

SSC 1108 - Principles Of Human Physiology   10 Credits
The module looks at the physiology of muscle tissue; The cardiovascular system; Function of the respiratory system; Function of the digestive system; Physiology of the urinary

Think in other terms

system; Physiology of the endocrine system and Physiology of the nervous system (somatic, central and autonomic nervous systems).

Semester II

SSC 1220 Functional Anatomy   10 Credits
The module explores the discipline of Functional Anatomy forms part of the foundation for studies in Exercise Science. A detailed understanding of the musculoskeletal?, cardio-respiratory and neuromotor systems help scientists and therapists to understand how human variation affects our ability to move, exercise and perform within both the competitive sports and industrial settings. Numerous research projects have emanated from the applied anatomy discipline, including studies on the advantageous body size, shape, composition and proportionality in a host of elite sports, as well as identifying factors that predispose individuals to develop joint disease or injury. The module shall enable students to improve their knowledge of the human structure and understand how certain morphological characteristics can provide an advantage for human physical performance. This should enable them to apply theoretical understanding of body modification principles and practical skills in physical capacity measurement to sporting and occupational settings.

SSC 1221 Theory And Methodology Of Physical Education   10 Credits
The module is designed as the basis for understanding the theory and practical issues in the teaching of Physical Education. The module also provides a didactic paradigm for students with no teaching experience hence prepare students to design and conduct practicals in teaching/coaching. The module shall include topics like Foundations of Physical Education. Curriculum issues in Physical Education. Pedagogical issues in Physical Education and Sport.

SSC 1222 Introduction To Psychology   10 Credits
The module covers the scientific study of human behaviour. The module shall include developmental Psychology, which studies the mental development at different stages of ontogenesis. Different personality theories and traits shall be studied so as to enable The Sports Scientist apply himself more effectively in his field of work, in training athletes, coaches, academics and in the Sport Industry. An evaluation of these Psychological theories shall be done so as to come up with a holistic approach to the study of human behaviour.

SSC 1210 Sports Specialty Module (Martial Arts) – Elective   10 Credits
The aims of the module are to provide instructions and practice in basic skills of martial arts. The primary emphasis is to gain an understanding of the history, philosophy and techniques of martial arts, the ethics for developing a powerful sense of character, courage, dedication, tolerance and shall through practical improvement of basic and special self-defense skill

Think in other terms

techniques and tactics. Students shall be expected to master the basic katas, biomechanics of martial arts and the psychological conditioning of martial arts. History, origins and development of martial arts. Structure of martial arts in the modern world. Philosophies of karate with reference to different schools (ryus). Martial art as a sport and martial art as a tradition. Basic techniques in karate (stance, kicks, punches, blocks).

SSC 1212 Sports Specialty Module (Field and Track–Sprints, Relays and Hurdles)
10 Credits
Elective
The following content shall be covered for the sprint start, sprinting, hurdling and relay;. General characteristics; Biomechanical aspects. Biomechanical requirements and consequences for training; Phase structure; Demand profile (strength, speed, endurance, mobility, coordination, technique and mental skills); Test and control methods; Annual Periodization; Training emphases (speed, endurance, strength, mobility, running technique/coordination). Students shall be engaged in practicals to develop basic skills technique and hands on knowledge of training exercises.

SSC 1213 Sports Specialty Module (Swimming) – Elective   10 Credits
Swimming shall focus on the knowledge and skill necessary to handle the body with ease in the water. The module covers basic mechanical, physiological and psychological concepts, fundamental safety skills and basic swimming strokes, the front crawl, the backstroke, the breaststroke and the butterfly stroke. The module is developmental from elementary level, intermediate and advanced swimming levels. At the end of the module one should be able to coach those aspects that shall increase endurance, as well as gain further understanding of mechanical and physiological concepts designed to introduce the skilled swimmer to training concepts in swimming. The module shall enable students taking this Module be able to also identify talent in swimming as well as design swimming training, teaching and coaching programs. The second part of the module shall aim to train students and qualify them for competence as healthcare professionals who are able to offer lifesaving emergency first aid to sick persons or to the injured during sports, occupation and traffic accidents. The students learn and practice to be responsible for managing the pre-hospital treatment, care and movement of patients to hospital without unnecessary delay. This often requires taking potentially life-saving decisions. They are required to work closely with other healthcare professionals and emergency services and are therefore required to be highly trained and skilled in all aspects of pre-hospital care. The module shall also enable the students to study for a swimming lifesaving module for rescue in water.

SSC 1211 - Sports Specialty Module (Gymnastics) – Elective

The module explores introductory movement gymnastics including educational and Olympic gymnastics; Floor movement gymnastics, apparatus movement gymnastics, stunts and transitions, tumbling stunts, static balance stunts. Basic apparatus work and Mass display movement gymnastics.

SSC 1214 Sport Specialty Module (Tennis) – Elective   10 Credits

The aims of the module are to provide students with knowledge about the theory and practice of tennis, develop basic and advanced skills techniques related to actual game strategy and the psychological aspects of competition and how to apply them in the teaching and coaching practice. Emphasis shall be put on: Rules and regulations of tennis; Detection, identification and selection of talents in tennis, modern trends in the development of tennis at grassroots national and internationally.

SSC 1215 - Sport Speciality Module (Soccer) – Elective   10 Credits

The aims of the module are to expand and improve the theoretical knowledge and practical skills of students for effective management of the coaching and teaching high level players, providing them with historical, philosophical knowledge, skill development drills and organizational strategies while working with elite amateur and professional players. Emphasis shall be on: history of soccer, law of the game, modern trends and new concepts of selecting and preparing young and adolescent soccer players.

SSC 1217 Sport Specialty Module (Volleyball) Elective   10 Credits

This module covers the fundamentals of volleyball. Emphasis is placed on the basic skills of serving, passing, setting, spiking, blocking, and the rules and etiquette of volleyball. The module shall focus on individual offensive and defensive skill and focus on the theory and methodology of coaching/teaching volleyball.

SSC 1218 Sport Specialty Module (Basketball) Elective   10credits

The main purpose of this module is to introduce the student to the sport of basketball. The student shall be introduced to the fundamentals of basketballs, and how they may be taught and coached. The module shall focus on individual offensive and defensive skill and also at team offensive skill focusing on 1v0; 1v1; 2v1; 2v2; 3v1; 3v2; 3v3. There shall also be a focus on theory and methodology of coaching/teaching basketball.

SSC 1223 - Sport Speciality Module (Cricket) – Elective   10 Credits

The aims of the module are to expand and improve the theoretical knowledge and practical skills of students for effective management of the coaching and teaching high level players, providing them with historical, philosophical knowledge, skill development drills and organizational strategies while working with elite amateur and professional players. Emphasis will be on:

Think in other terms

History of Cricket, Cricket skills, Law of the game, Modern trends and New concepts of selecting and preparing young and adolescent Cricket players and Level 1 ZCU Certification.

YEAR II

Semester I

SSC 2103 Principles Of Exercise Biochemistry   **10 Credits**
The module is an introduction to the structure of carbohydrates, lipids, amino acids, proteins and nucleic acids; Biology oxidation and oxidative Phosphorylation; Carbohydrate metabolism and its regulation (Glycolysis, citric acid cycle, pentose phosphate pathway, gluconeogenesis, glycogen degradation and synthesis; Lipid metabolism and its regulation (degradation and synthesis of fatty acids); Amino acid metabolism and urea cycle as well as Biochemistry of muscle contraction.

SSC 2104 – Biomechanics   **10 Credits**
The module explores Biomechanical characteristics of movements Static's and Dynamics Linear and Angular mechanical analysis of human motion- Linear Kinematics, Linear Kinetics, Angular Kinematics and Angular Kinetics projectile motion Biomechanics of motor qualities and criteria for qualitative assessment as well as applied software Training simulators and technical aids. The second part of the module shall cover advanced biomechanics topics and methods that shall focus on gait pattern analysis, posture control in children adults and specific populations (geriatrics). Using interfaced forces plates, digital video cameras and 3D movement analysis systems, experience is gained in the collection and analysis of external and internal forces, angular and linear kinematics, and muscle activation. Other advanced analysis techniques like integration using digital methods, inverse dynamics from ground reaction forces and anthropometric constants, centre of pressure, friction and slipping shall be covered. Impulse momentum relationships and leverage using high-impact activities such as running, jumping, swimming, ball game sport and lifting shall be studied.

SSC 2105 – Sports And Recreational Management   **10 Credits**
In this module students shall learn various management theories and how they relate to sports and recreation. Furthermore they shall study the various management challenges that face the recreation industry and the various sporting disciplines in Zimbabwe. They shall also learn basic accounting, financial management, human resources management, economics, and sports marketing. Sport and Recreation management as well as facility and event management, are some of the modules that shall be done to substantiate the sport management field experiences.

SORS 2110 – An Introduction To Applied Statistics   **10 Credits**
The module is an introduction to Applied Statistics. Statistics – its definition and scope. Descriptive Statistics/Initial Data Exploration: Summary statistics, measurements of

central tendency, mean, mode, median, measures of dispersion, range, variance, standard deviation; Graphical presentation of data, stem and leaf plots, histograms, box plots. Point Estimation/Tests of Hypothesis, interval estimation, z-test, t-test; Design and analysis of experiments, completely randomized design, and randomized complete block design, Latin squares, and factorial experiment; Regression analysis, simple linear regression; Statistical Computing. Categorical Data Analysis and the Uvi-square Test for Independence and Homogeneity.

SSC 2110 Sports Specialty Module (Martial Arts) Elective   10 Credits
The module examines the methods for developing and improving the principal physical qualities in martial arts (strength, endurance, agility and flexibility); periodization in karate and tactical and technique training of both advanced and non-advanced karatekas; Biomechanics of martial arts as well as the Management and control of training process in karate.

SSC 2111 Sports Specialty Module – (Gymnastics) Elective   10 Credits
The module looks at gymnastic movements; Floor Exercises stunts and transitions, tumbling stunts, static balance stunts, pyramids and vaulting, planning of training process in gymnastics.

SSC 2112 Sports Specialty Module (Field And Track Jumps) Elective   10 Credits
The following content shall be covered; long jump, triple jump, high jump and the pole vault: General characteristics. Biomechanical Aspects. Technique and phase structure; The training of jumps demand profile (speed, strength, endurance, flexibility, coordination, technique, mental skills); Test and control method; Annual Periodisation; Training emphases (strength, speed, mobility, endurance and technique). Students shall be engaged in practicals to develop personal skills and technique. They shall also go through training exercises to develop hands on knowledge.

SSC 2113 Sports Speciality Module (Swimming) Electives   10 Credits
Students are expected to study the metabolism of energy and swimming performance. Students shall work in the laboratory as well as in the field to understand and apply the metabolism of energy principles. This module shall also equip students with the ability to apply the training principles of swimming, age group training, selection, monitoring and assessment. Students are also expected to continue the training into the intermediate level of swimming. Students shall take lessons in diving and synchronized swimming.

SSC 2114 - Sport Specialty Module (Tennis) Elective   10 Credits
The module explores the characteristics of professional tennis; Development of specific qualities skills and techniques and tactics in tennis; Tennis training and coaching strategies; Psychologies of tennis match, style, ethical norms, conduct typology and behaviour in tennis; Novel concepts and trends in preparing professional and amateur players in tennis; Management and marketing in tennis; Research and applied practice and Planning and developing drills and participation in the tennis.

Think in other terms

SSC 2115 - Sport Speciality Module (Soccer) – Elective   10 Credits
The module covers the development of specific game related qualities and skills, initial training and improvement, technical and tactical training conditioning programs; Health related issues (fatigue recovery, nutrition); Coaching philosophy, intellectual and psychological conditioning and modern tendencies and concepts in the play activity of soccer players.

SSC 2117 Sport Specialty Module (Volleyball) Elective   10 Credits
Students shall learn advanced strategies and skills in volleyball and related Volleyball games, as well as officiating techniques. Many different basic volleyball drills shall be used leading up to game play. Techniques and fundamentals shall be stressed through developmental games and then incorporated into game play. Students shall also advance in volleyball training and coaching, by applying the various coaching theories, talent identification strategies, planning, conditioning and assessment in volleyball.

SSC 2118 Sport Specialty Module (Basketball) Elective   10 Credits
The main purpose of the module is to introduce the student to more advanced basketball training. As well as coaching philosophy, talent identification, selection and development in basketball, practice planning, structure of a practice session, fitness training and assessment in basketball.

SSC 2123 - Sport Speciality Module (Cricket) – Elective   10 Credits
Development of specific game related qualities and skills, initial training and improvement, technical and tactical training conditioning programs. Health related issues (fatigue recovery, nutrition), Coaching philosophy, intellectual and psychological conditioning, modern tendencies and concepts in the play activity of Cricket players. Level 1 ICC Certification.

Semester II

SSC 2206 – Exercise Physiology And Biochemistry   10 Credits
This module is designed to develop students' knowledge and skills in the area of Exercise Physiology and Biochemistry. The module builds upon the foundation of knowledge constructed through basic module-work in Human Anatomy, Human Physiology and Principles of Biochemistry by applying the principles learnt, to how the body performs and responds to physical activity. The following shall be covered; Energy transfer in exercise; Human energy expenditure; Cardiovascular regulation and integration during exercise; Functional capacity of the cardiovascular system; Exercise and pulmonary ventilation; Exercise at medium and high attitude; Exercise and thermal stress; Metabolic adaptations of exercise training; Exercise and endocrine system; (The endocrine system: Organization and acute and chronic responses to exercise; Neural control of human movement; Exercise and immune system and Ergogenic aids.

SSC 2209 - Theory And Methodology Of Coaching   10 Credits
Students in this module shall review Coaching Theory and Methodology within the coaching profession. They shall examine theories specific sports teams, including the development of methodologies and the development of a team, principles for coaches to follow and pass on to teams, and the end of competitive careers in organized sports. Guiding questions include: What sport has done for the player and coach? Why is theory and methodology in sport important? How does leadership and strategy play a role? Students shall develop a coaching philosophy that shall drive their coaching theories and methods. Students shall discover that teaching life lessons through sport is vital to the success of their athletes. The following content shall also be covered: Training as a physiological adaptation process. Biomotor, event, and sports specific training loads and methods. Adaptation process on sports with strength character. Adaptation progress on sports for endurance. Analysis of training loads. Analysis on adaptation process of different motor qualities e.g. Endurance and strength. This module shall provide the students with the scientific principles and the hands-on experience to develop resistance exercise and related conditioning programs for a wide range of populations, including those focusing on general fitness, therapeutic rehabilitation and sport performance.

SSC 2210 Sports Specialty Module – Martial Arts Elective   10 Credits
The module explores mental training; Basic attacking technology; Basic Defending technology; Direct and indirect attacking; Basic katas (II) and Multiple combination.

SSC 2211 Sports Specialty Module (Gymnastics) – Elective   10 Credits
The module looks at advanced gymnastic movements I and apparatus work, identification and selection of talent, conditioning in gymnastics; Teaching and coaching gymnastics.

SSC 2212 – Sports Specialty Module (Field And Track – Throws) Elective   10 Credits
The following content shall be covered for shot put, discus, javelin and the hammer: General characteristics; Both linear and rotational technique in the shot put; Biomechanical aspects and biomechanical requirements together with consequences for training practice; Training for throws (Demand profile – speed, strength, endurance, coordination, flexibility, and technique) Test and control methods; Training emphases (strength, speed, mobility, endurance, technique); Annual periodization; Training plan. Students shall be engaged in practicals to develop personal skills and technique. They shall also go through training exercises to develop hands on applicable knowledge and skills.

SSC 2213 Sports Speciality Module (Swimming) Elective   10 Credits
This is a swimming module development, where students shall scientifically plan for practice sessions; Stroke analysis of the front, back, breast and butterfly strokes; Talent identification and development anddeveloping swimming programs for different age groups.

Think in other terms

SSC 2214 - Sport Specialty Module (Tennis) Elective   **10 Credits**

The focus of this module shall be on the rotation of the ball and the general principles of spin; Analysis of static and dynamic progressions; Analysis of drills and teaching formations at different levels.

SSC 2215 - Sport Speciality Module (Soccer) Elective   **10 Credits**

Focus of this module shall be on psychological and pedagogical orientation, junior soccer training principles, periodization, Conditioning in football, talent identification talent detection, talent development models talent Selection, talent selection models, nutrition for soccer performance.

SSC 2216 Testing, Measurement And Exercise Prescription   **10 Credits**

The module examines testing and Measurement concepts; Importance of Testing and Measurement; Measurement scale;. Discrete and continuous variables; Test validity; content-related evidence of validity, construct related factors affecting the testing programme; Planning test administration; Converting interpreting and evaluating results; Administration of motor skill tests, fitness tests, body composition test and anthropometric tests.

SSC 2217 Sport Specialty Module (Volleyball) Elective   **10 Credits**

In this module emphasis is placed on the refinement of the advanced skills required in the volleyball game as well as the more advanced aspects of setting, hitting, and serving. The 6-2 and 5-1 offensive and defensive systems of play are emphasized. Students shall continue with developing the mastery of the game by coaching, training and designing developmental programs. Students should also develop officiating skills of volleyball. The students shall analyze the psychological skills necessary in volleyball.

SSC 2218 Sport Specialty Module (Basketball) Elective   **10 Credits**

The student shall be introduced to advanced basketball tactical play both offensively and defensively. Offensive and defensive transition, man-to-man defense and offence; zone defense and offence. The students shall analyze the psychological skills necessary for basketball. Students shall be introduced to the legal aspects of basketball teaching and coaching and liability.

SSC 2220- Research Methodology In The Sport Sciences   **10 Credits**

This module focuses on the approaches to research design, data collection and statistical analysis and further discusses quantitative and qualitative research methods and introduces advanced statistical techniques. The module provides an essential introduction to research ethics and the ethical approval procedures when using human participants for research.

Think in other terms

SSC 2223 - Sport Speciality Module (Cricket) Elective   **10 Credits**

The focus of this module will be on psychological and pedagogical orientation, junior soccer training principles, periodisation, conditioning in Cricket, talent identification talent detection, talent development models talent Selection, talent selection models, nutrition for performance and Level 2International Certification.

YEAR III

SSC 3001 – Industrial Attachment   **120 Credits**

This module offers students the opportunity to apply all the theoretical and practical knowledge learned and experienced during the first two years in a working environment. Students have the opportunity to learn to apply principles on the job and get supervised and assessed.

YEAR IV

Semester I

SSC 4101 – Theory Of Sports Training   **10 Credits**

The module is an analysis of stress and adaptation reaction in sports; Types of fatigue and the motor expression of fatigue; Steady state adaptation and the morphological and functional changes in muscles. The module shall allow students gain theoretical and practical knowledge of practitioner skills which they shall apply in a real world sport setting. Students shall apply their knowledge on different types of motor skill e.g. strength training and conditioning. Students shall be able to gain experience by opportunities created during the performance testing of professional teams of any sport. The module is meant to equip the graduate alongside other modules related to training, coaching and performance, relevant, practical and contemporary learning. Students from this module are also able to develop consultancy skills in this field of popular study.

SSC 4102 -Sport Bio kinetics   **10 Credits**

The module will enable students to be able to assess and prescribe preventative or rehabilitative exercise therapy. The module areas shall include the following topics: morphological status, musculoskeletal status, cardiorespiratory status, and metabolic status. Knowledge shall then be applicable to specific applications or chronic conditions, like attenuation & rehabilitation of hypokinetic/Metabolic Disorders, Stress-Related Disorders, Hypertension, Coronary Artery Disease, Stroke, Parkinsosn's Disease, Osteoporosis, Low Back Pain, Arthritis, Hyperlipidemia, Obesity and Diabetes.

SSC 4103 – Sports Psychology   **10 Credits**

The module is designed to help students understand human behaviour in sport and exercise settings with the view of enabling them to use that knowledge to enhance performance of

athletes. The module shall therefore cover; Motor Development and Skill Acquisition during childhood and adolescence; Personality and sport motivation; Arousal, stress and anxiety; Group and team dynamics. Leadership; Communication. Imagery; Concentration, Self-confidence and Psychological skills training.

SSC 4104 – Nutrition And Sports Nutrition   10 Credits
This module will equip the Sport Scientist with the ability to apply the science of nutrition, nutritional issues in general and to sport specific issues. Athletes the worlds over are in search of ergogenic aids to enhance their their performance hence the study should enable anyone to apply nutrition concepts in sports practice.

SSC 4110 Sports Specialty Module – Martial Arts Elective   10 Credits
The module explores umpiring techniquesk Katas (Applications;. Kumite; Management and control of training; Biomechanics of karate; Bone alignment, breath, force production and balance.

SSS 4111 Sports Specialty Module (Gymnastics) Elective   10 Credits
The module is on advanced gymnastic movement II; Apparatus work and routines, teaching and coaching gymnastics and judging in gymnastics.

SSC 4112 – Sports Specialty Module (Field And Track – Middle And Long Distance And Race Walking) Elective   10 Credits
The module looks at the technique of middle and long distance running; Technique of Steeplechase – Clearing the Barriers, Clearing the water jump, Technique of Race Walking; Biomechanical aspects of the events; Strategy and tactics in the events; Demand profile (Biomotor abilities – speed, strength, endurance, mobility and technique); Test and control methods for the events; Annual periodization; Main training emphases (endurance, speed, strength, mobility, technique) and weekly training plans.

SSC 4113 Sports Speciality Module (Swimming) Elective   10 Credits
In this module students are expected to do advanced swimming that is: ensure the correct technique while they swim very fast. They are expected to apply further training principles that shall study: anaerobic thresholds in swimming, endurance swimming, sprint training, specialised forms of training swimmers, and swimming speed development, while continuing to perfect the techniques of the swimming strokes. Age group swim training and development. Students are expected to do a study on developing synchronized swimming in their final year as well.

SSC 4114 Sport Specialty Module (Tennis) – Elective   10 Credits
The focus of this module shall be on the diagnosis and correction of both the techniques and tactics in tennis, attention shall be on all strokes; Psychological and physical; Analysis and

understanding different tournaments of tennis. Fitness for tennis; Chronological age versus developmental age and Equipment, anatomy of the racket.

SSC 4115 Sport Speciality Module (Soccer) – Elective   **10 Credits**
The module emphasizes game concepts, ;game model, tactical strategies, nature and development methods of recording and analyzing individual and team activities analysis of the performance of leading clubs and national teams; Periodization of sports training in preparing young players and professional soccer players, structures of macrocycles and microcycles; Evaluation and follow up assessment of conditioning; Management and marketing in soccer structure and management of a professional club; Contracts and transfer system as well as research and applied practice.

SSC 4117 Sport Specialty Module (Volleyball) Elective   **10 Credits**
This module shall apply the scientific aspects of Sport Science to volleyball. The Module shall examine the study of human movement and its relationship to sports activities. Methods for analyzing and improving performance shall be presented and analysed. The module shall also cover volleyball advanced training techniques, nutritional requirements and volleyball biomechanical analysis.

SSC 4118 Sports Specialty Module Basketball.   **10 Credits**
The aims of this module are to apply the scientific aspects of Sport Science to basketball. Content shall include training in basketball, nutrition in basketball, biomechanical aspects of basketball, pedagogy in basketball, skill acquisition and motor learning in basketball. Students are expected to contextualize the theory of sports science in basketball.

SSC 4123 - Sport Speciality Module (Cricket) – Elective   **10 Credits**
The module looks at game concepts, game model, tactical strategies, nature and development methods of recording and analyzing individual and team activities analysis of the performance of leading clubs and national teams; Periodisation of sports training in preparing young players and professional Cricket players, structures of macrocycles and microcycles; Evaluation and follow up assessment of conditioning;   Management and marketing in Cricket structure and management of a professional club. Contracts and transfer system; research and applied practice and level 3 International Certification.

Semester II

SSC 4206 - Health, Sport And Sports Recreation   **10 Credits**
This module shall lead to the full understanding of the effects of exercise on the physiological as well as the psychological wellbeing using a behavioural epidemiological framework. Physical activity and inactivity within a lifespan shall be studied, together with motivational theories to support and promote a healthy active lifestyle. Other topics to be covered in this module shall include, psychological wellbeing through sport, anxiety and stress, depression, affect and mood,

Think in other terms

self-esteem, biological rhythms, sleep, cognitive function, dependence and the promotion of sport and health. the epidemiology of exercise and coronary heart disease (CHD) and the influence of exercise on the risk factors for CHD shall be studied. The module should also enable students to plan community sport programs that shall enhance activity, exercise and maintain good health.

SSC 4207 Health, Exercise And Sport Recreation   10 Credits
This module will lead to the full understanding of the effects of exercise on the physiological as well as the psychological wellbeing using a behavioural epidemiological framework. Physical activity and inactivity within a lifespan shall be studied, together with motivational theories to support and promote a healthy active lifestyle. Other topics to be covered in this module shall include, psychological wellbeing through sport, anxiety and stress, depression, affect and mood, self-esteem, biological rhythms, sleep, cognitive function, dependence and the promotion of sport and health. the epidemiology of exercise and coronary heart disease (CHD) and the influence of exercise on the risk factors for CHD shall be studied. The module should also enable students to plan community sport programs that will enhance activity, exercise and maintain good health.

SSC4208 Basic Law, Sports Law And Diplomacy   10 Credits
Sports law has emerged as one of the most important and controversial fields of law in the last fifty years. Sports law overlaps with contract law, employment law, competition law, intellectual property law, criminal law, tort law and many others. There are a number of legal issues which are specific to sport such as policy responses to doping and drug use, athlete behaviour and discipline, corruption, and selection processes. The module will examine these several legal issues pertaining to the different Sport areas and analyse the way in which sport and the law interact. The module will provide an overview of some of the unique legal issues which arise in modern elite and professional sports at a national and international level. Subjects covered may include: commercialisation of sport, national and international governance of sport and sporting organisations; employment and contract law issues relating to elite athletes; labour market controls and issues such as salary caps; disciplinary tribunals and the regulation of athlete behaviour; anti-doping policy and cases; restrictive trade practices; and civil/criminal liability for sporting injuries.

SSC 4209 Advanced Sport Studies   10 Credits
This module is designed to give students further enrichment in the content covered in the areas of mostly Testing and Measurement and Exercise Physiology and Biochemistry, through further practical work both field and laboratory, especially in the area of Kinanthropometry and how it relates to sports performance, Physcial Activity and other Sport related fields.

SSC 4210 Sport Specialty Module (Martial Arts) Elective   10 Credits
The focus of this module shall be conditioning exercises, the five categories of conditioning exercises; Advanced katas demonstrations and their applications. Sparring, prearranged and free

sparring; Self defense, principles of self defense and psychology of self defense; Theory of power. Motivation; The progression of physical practice and mental practice; Discipline and respect and Advanced kumite.

SSC 4211 Sports Specialty Module (Gymnastics) Elective   10 Credits
The module focuses on advanced gymnastic movement III; Apparatus work and floor routines, biomechanics of gymnastics and movement analysis; Rhythmic gymnastics is another of the beguiling sports combining athletics with artistry and music.

SSC 4212 Sports Specialty Module (Field And Track – The Combined Events) 10 Credits
The training for the individual events within the combined events follows the same patterns as for those separate events. However, the sequence of the events in a combined meet affects the performance that follow. As such training for combined events has to follow a special system. Hence the content for the module shall cover, Training Theory for Decathlon; Training Theory for Heptathlon; Annual Training for the Decathlo; The training schedules, (special fundamentals of the combined events).

SSC 4213 Sports Speciality Module (Swimming) Elective   15 Credits
Students are expected to continue the development of advanced specialization of individual swimming events. Students shall design and develop training programs for different age group swimmers as well as for special populations. Students shall apply their knowledge in the analysis of the correct swimming techniques in swimming, officiating and judging events. Talent identification and development in swimming shall be done within the clubs that work with the department. Students shall work on a mini project for the application of specific training principles that develop anaerobic and aerobic thresholds in swimming performance. Diving and Synchronized swimming development shall be continued as part of their final year.

SSC 4214 Sport Specialty Module (Tennis) Elective   10 Credits
In this module focus shall be on drills and teaching formations, types of drills and formations. Coaching beginners and intermediate players to play tennis , coaching adult beginners. Coaching beginners and intermediate players with disability : players with amputation, players with cerebral palsy, players with an intellectual disability , players with vision impairment and players with psychiatric disability. Playing the game : tactics and techniques, singles and doubles tactics.

SSC 4215 Sports Specialty Module (Soccer) Elective   10 Credits
In this module, focus shall be on functional tactical, technical, physical and psychological training of all age group soccer players. FIFA, CAF, ZIFA statutes, Managing Football Competitions, Formulation of football Competition rules, FIFA World Cup, AFCON, Euro Technical rules, Fixture formulation, Managing Football conflicts, Ethics and Fair Play in Football.

Think in other terms

SSC 4217- Sport Specialty Module (Volleyball) Elective   10 Credits
This module is designed for advanced skills, principles and techniques necessary and fundamental to understanding and playing at an advanced level. Emphasis shall be placed on the 6-2 and 5-1 team offensive/defensive systems and strategies. This module shall also require that students participate in organized round-robin competition. Students shall also learn how to apply managerial skills in volleyball. The content shall cover planning, implementation and evaluation of volleyball programs and sessions. Students should be able to design long term strategic plans/lesson plans, and to device checklists for monitoring and critique existing volleyball programs.

SSC 4218- Sport Specialty Module (Basketball) Elective   10 Credits
This is a sports specialty module on basketball. The aims of this module are to provide students with knowledge on the managerial aspects of basketball. The content shall cover planning, implementation and evaluation of basketball programs and sessions. Students should be able to design long term strategic plans/lesson plans, to device checklists for monitoring basketball programs, to critique existing basketball programs. Content also includes talent identification in basketball and talent development.

SSC4010 Research Project (Weighted As 2 Modules)   20 Credits

SSC 4223 Sport Specialty Module (Cricket) Elective   10 Credits
This module will focus on functional tactical, technical, physical and psychological training of all age group Cricket players. WR, ARU, ZRU statutes, Managing Cricket Competitions, Formulation of Cricket Competition rules, World Cricket Cup, World Cricket development programs. Contemporary issues in World Cricket, Ethics and Fair Play in Cricket as well as Additional International Certification.

MASTER OF SCIENCE DEGREE IN SPORT SCIENCE AND COACHING

1.0   Degree Profile: Master of Science Degree in Sport Science and Coaching

Institution:	National University of Science and Technology
Type of Degree:	MSc
Credit Load:	300 credits
Level:	SADC-QF - Level 9
Accreditation Organisation(s):	Zimbabwe Council for Higher Education
Period of reference:	Accredited by ZIMCHE 2018

PURPOSE OF THE PROGRAMME

Our innovative, engaging and broad-ranging module will help students to strengthen the practical skills required to work with both elite athletes and the general population. The Master of Science in Sport Science and Coaching degree programme is meant to advance holders of an Honours degrees to Masters Level. It is designed to provide graduates with knowledge of scientific intervention that enhances training and performance, while exercise science has a central role in physical activity programmes aimed at improving the general health. The programme is also meant to cover a wide range of theoretical knowledge, applied practical knowledge and necessary skills to improve the physical health of the nation, to introduce teaching of lifelong fitness strategy, to enhance the performance and physical fitness in sportsmen and sportswomen and to prepare athletes for podium performance. The programme will equip students with practical skills in advanced methods of those areas related to physical activity promotion and implementation, sports training and coaching as well as adequate relevant research methods in sport and exercise science. It will also enable students to become competent in independent work of enhancing sporting endeavours at local, regional and international levels. The program will produce a constant stream of quality graduates who will contribute to the future development of sport and health related exercises thus contributing towards economic development and fulfilling the ZIMASSET aspirations.

2.0   REGULATIONS

The Regulations for the Master of Science Degree in Sport Science and Coaching should be read in conjunction with the Faculty of Applied Science Regulations and the General Academic Regulations.

Think in other terms

3.0   ENTRY REQUIREMENTS

The entry qualification shall normally be an Honours Degree with at least a 2.2 classification in any of the following fields: Sports Science and Coaching, Biokinetics, Kinesiology, Exercise Science, Sport Psychology, Exercise Physiology, Physical Education or any other relevant first degree qualification.

4.0   DURATION
This is a fulltime programme which runs over a period of twenty four months. When offered on block release it shall run over two blocks per year for two years. Each Block comprises of 4 weeks Contact Time. A student shall be required to start working on their research project at the beginning of the second year. He/she will give an oral presentation of his/her project work at least two weeks before the end of the last semester. The research project carries 60 Credits.

5.0   ASSESSMENT
Each module shall be assessed by both continuous assessment (35%) and a written examination (65%) at the end of each semester. The eight taught modules shall contribute 60% while the internship and the Research Project report shall contribute 40% of the overall aggregate mark. The Project and Internship modules shall each contribute 20% towards the 40% of the overall aggregate mark.

6.0   ELECTIVE MODULES
A student may select only one elective module per Semester in Year I. Elective modules   shall be offered subject to availability of staff as well as demand.

7.0   AWARD OF DEGREE
A student shall be required to earn full Credits in all ten (10) modules which shall include two elective modules (sports modules), the internship and research project/dissertation modules. The classification of the Degree shall be based on the Faculty of Applied Science and the University General Academic Regulations.

Think in other terms

PROGRAMME SUMMARY

YEAR

Semester I

Module Code	Module Description	Credit
SSC 5101	Functional Anatomy with Age Morphology	20
SSC 5104	Sports Psychology and Motor Learning	20
SSC 5111	Advanced Biomechanics	30
SSC	Elective Module	20
Total		**90**

Semester II

SSC 5221	Theory of Sports Coaching and Training	20
SSC 5222	Advanced Research Methods in Sports Science	20
SSC 5228	Exercise Physiology and Biochemistry	30
SSC	Elective Module	20
Total		**90**

List of Elective Modules for Year I

YEAR 1

Semester I

SSC	5103	Exercise Biochemistry	20
SSC	5105	Nutrition and Health Related Aspects of Exercise	20
SSC	5106	Psychology and Behavioural Sciences	20
SSC	5107	Kinesiotherapy and Physical Activity Therapy	20
SSC	5108	Adapted Physical Activity	20
SSC	5109	Recreation and Leisure Studies	20

SEMESTER II

SSC	5212	Track and Field Athletics (Short, Middle and Long Distances/ Jumps/Throws)	20
SSC	5215	Field Sports (Soccer/ Rugby /Field Hockey/Cricket/Handball/Baseball)	20
SSC	5218	Court Sport Games	20

Think in other terms

		(Basketball/Netball/Volleyball/Tennis/Teniquate/Badminton/ Squash	
SSC	5213	Water Sports (Swimming/Diving/Canoeing/Water Rafting)	20
SSC	5211	Gymnastics/Mass Display/Dance Sport (Aerobics, Traditional and Modern Dance)	20
SSC	5219	Combat Sports (Boxing/ Weightlifting /Wrestling/Martial Arts (Judo/ Karate)	20
SSC	5220	Tourism, Trekking and Rafting	20

YEAR II
SEMESTER I

SSC	6129	Internship	60
SSC	6010	Research Project	
		Total	**60**

SEMESTER II

SSC	6010	Research Project	**60**
		Total Year II	**60**
		Grand Total of Credits	**300**

Think in other terms

MODULE SYNOPSES

YEAR I

SSC 5101 Functional Anatomy With Age Morphology   20 Credits

The module explores human anatomy and age morphology as the basis to understand the nature and function of human movement and specific movement patterns in sport, dance, physical recreation, and rehabilitation; Body axes and planes - positions and directions; Systemic and structural arrangement of living matter; The locomotive apparatus as a whole; Age morphology - origin, growth and aging; The study of bones; Kinematic units; Study of Joints; The vertebral column; The thorax; Skull bones; Bones of the upper extremity - the shoulder girdle and the upper arm, elbow and lower arm; Bones of the lower extremity - the pelvis and upper leg, lower leg, ankle and foot; Connections of bones by articulation; Continuous (immovable) articulation - types; Discontinuous (movable) articulation; Elements of the joints; Mechanics of the joints - freedom and range of movement; Kinematic chains; Articulations between the bones of the upper extremity and of the lower extremity; Connections between vertebrae; The vertebral column as a whole - arches, mechanics, age specificity; Connections between the bones of the chest; Age and kinesiological characteristics of the human bone-joint apparatus; The study of muscles; Systems of internal organs; Circulatory system, Humoral regulation of vital functions; Nervous system and the organs of the senses.

SSC5103 Exercise Biochemistry   20 Credits

The module focuses on Bioenergetics and oxidative Phosphorylation, Metabolic pathways of carbohydrates, lipids, amino acids, nucleic acid metabolism and protein biosynthesis, metabolism of the muscle tissue; Regulation and the integration of metabolism, metabolic and hormonal adaption; Amino acids and proteins, function of proteins, enzymes, structure of carbohydrates; Bioenergetics, Biologic Oxidation; Oxidative Phosphorylation; Role of ATP/ADP cycle; Basic concepts of Metabolism; Glycolysis; Citric acid cycle; Gluconeogenesis; Cori cycle; Glycogen degradation and synthesis, co-ordinated control by enzymatic cascade; Lipids and lipid metabolism; Degradation and synthesis of fatty acids; Ketone body formation; Lipoprotein and cholesterol metabolism; Steroid metabolism; Amino acid metabolism; Urea cycle; Conversion of amino acids to specialised products; Nucleic acid metabolism; Biosynthesis of DNA; Gene rearrangements, transportation and cloning; Biosynthesis of RNA's; Protein biosynthesis; Metabolism of nervous tissue; Na+ K+ ATPase; Biochemistry of neurotransmission; Metabolism of muscle tissue; Biochemistry of muscle contraction; Muscle fiber types; Biochemistry of hormones; Mechanism of action; Transduction by cell-surface receptors; Intracellular messenger systems and transduction by intracellular receptors;

SSC5104 Sports Psychology And Motor Learning   20 Credits

The module examines fundamentals of the theory of motor learning, Analysis and prediction of motor learning strategies; Sports Psychology; Sports education and contemporary culture; Motor learning cognition - diagnostics and prognostics in the motor learning activity; The process of motor learning and training; Nature, specificity, structure and characteristics; Motor learning

strategies in the sport Sports Psychology activity; The learning process; Self-education; Development and education; Factors of personality development; Behavioural strategies in the sport pedagogical activity; Pedagogical communication and training in the sport pedagogical activity; Professional and personality model; Age and Sports Psychology; Age psychology and sports psychology, Mental development and psychological sports conditioning from preschool age to advanced and elderly age; Competitive and recreational sports psychology, Regulation and self-regulation of start and pre-start anticipation, Personality enhancement and motivation management, communication and interaction in team sports, conflict resolution and conflict management and overall psychological conditioning of sports activities.

SSC5106 Psychology And Behavioural Sciences   **20 Credits**
The module covers the psychological and mental factors that influence and are influenced by participation and performance in sport, exercise, and physical activity, Human behaviour: observation in natural settings; survey research: questionnaire and interviewing, experiment; data analyzing, ethical considerations; Personal development through the lifespan: infancy, childhood, adolescence, maturity, old age; gender-related psychology; Perception: perception for self and others; social roles, social influence, attitudes, group processes, cross-cultural perspectives, groups in society, etc memory and learning, thinking and language, emotions, individual differences in intelligence; Personality: Theories of personality: psychoanalytical and Psychodynamic theories, social learning theory and humanist approaches.

SSC5105 Nutrition And Health Related Aspects Of Exercise   **20 Credits**
The module outlines digestion, absorption and bioenergetics of the food macro and micronutrients, their role in metabolism and energy yield during exercise training and recovery; Use of different nutrients for enhancing physical performance during training, competitions and for effective recovery; Use of different nutrients for enhancing physical performance during training, competitions and for effective recovery; Optimal nutrition for different kinds of sports events and in extreme environmental conditions - heat, high humidity, cold, high altitude; Thermoregulation, fluid balance and dehydration during exercise; The role and place of the food supplementation in exercise and training; Quantity, quality and timing of administration of food supplements determining desirable effect on the performance and recovery or on the body composition ;Ergogenic aids - definition and classification; Pharmacological, chemical and nutritional ergogenic aids evaluated ;Permitted ergogenic aids and their proper administration for enhancing the sports performance and body composition for specific sport events; Body composition assessment - definition and comparative description of the methods of measurement; Reference man and reference woman, essential and storage fat-their optimal content in the body of athletes with different sport specialisation and in the general population; Obesity and weight control; Determining goal body weight/composition and desired energy balance; Designing scientifically controlled weight loss/gain programs; Eating disorders in sportsmen and sportswomen (anorexia nervosa, bulimia nervosa, female athlete triad) and their impact on the health and performance; Athletes at risk and means for minimising the hazards; Physical activity in the population; Ageing, physical activity, health and longevity; Coronary

heart diseases and pre-exercise evaluation osteoporosis and exercise; Physical activity, fitness and hypertension; Physical exercise programmes and their use for the treatment of diabetes and cancer, cardiovascular and pulmonary rehabilitation.

SSC5107 Kinesiotherapy And Physical Activity Therapy   20 Credits
The module focuses on neurologic Care, Orthopedic Care, Cardiac Rehabilitation, Pediatric Care, Psychiatric Care, Geriatric Care, Wellness/Fitness Programs, Post-Rehabilitation Programs, therapeutic exercise, aquatic therapy, learning to walk, using prosthetics/orthotics and developing a lifelong exercise regimen.

SSC5108 Adapted Physical Activity   20 Credits
The module looks at society and persons with disability, Universal Programming and Facilitation, Policy Analysis and Development, Communication and Relationship Management, Wellbeing Health and Disability, Inclusive Sports, Dance ability, Inclusive Fitness, Research Studies in Adapted Physical Activity; Adventure Therapy and Adapted Outdoor Education.

SSC5109 Recreation And Leisure Studies   20 Credits
The module highlights community recreation studies, leisure services in diverse and changing communities, including management, community development and the needs of participants; Outdoor recreation focuses on leadership in the natural environment; Therapeutic Recreation focuses on the goal of ensuring that all individuals, regardless of ability, have access to meaningful leisure in their lives; Students shall gain hands-on experience in providing services to marginalized individuals (people with disabilities and illnesses, recent immigrants, people who experience poverty and older adults) using leisure to improve functional abilities and quality of life; Activities include lectures, outdoor and experiential activities and small group work.

SSC5111 Biomechanics   30 Credits
The module explores mathematical bases; Relationships and their presentation; Applied software; Biomechanical characteristics of movements; Statics; Dynamics; Kinematics and kinetics; Spatial, temporal, and spatial-temporal characteristics; Types of motion and movements; Biochemical classification; Force characteristics -forces, force impulse, quantity of motion, work, energy, power, etc; Inertia characteristics; Body stability variables, torque and momentum of force; Management and control of equilibrium stability; Biomechanics of the human locomotive apparatus; Distribution of mass in the human body; General and specific centers of gravity; Mass and inertia characteristics; Biomechanical properties and characteristics of the motor apparatus; Applied software; Principles for management and control of the motor apparatus; Force structure; Interaction between external and internal force fields (forces of elastic deformation, resistance, friction, drag, specific environmental variables, etc);Biomechanics of the motor qualities and criteria for their quantitative assessment; Training simulators and technical aids; Biomechanical methods of analysis; Kinematographic methods of registration, analysis and modelling using applied software; The main reverse problem and task of biomechanics; Motor control; Management of specific movements; Biomechanical feasibility

and expediency; Criteria for assessment of specific motor activities; Complex (functional-anatomical, video-computer, bio-dynamic) analysis and modelling of movement patterns and motor activities.

SSC 5210 Martial Arts (Judo, Karate)   **20 Credits**

The emphasis of the module is on applied Research Methods, Contemporary Approaches and Modern trends to player Selection and Development in Martial Arts, History, origins, development and distribution of judo in the world, Expertise and Skill Acquisition in Martial Arts (Defense and Attack), Martial Arts Coaching Cultures, Independent Projects, Performance and Match Analysis in Martial Arts , Biomechanics of Martial Arts Players, Professional Development in Martial Arts Coaching , Periodization of sports training in professional Martial Arts, Management and marketing in Tennis and Field Hockey; Refereeing Martial Arts and Advanced Tactics in Martial Arts.

SSC 5211 Gymnastics And Mass Display   **20 Credits**

The following 7 kinds of specific gymnastics recognized as disciplines by FIG (International Gymnastics Federation) will be studied in the module: artistic gymnastics men, artistic gymnastics women, rhythmic gymnastics, trampoline and tumbling (trampolining), sports acrobatics, sports aerobics, general gymnastics; sports dances , choreography and rhythmics; Complex gymnastic exercises. The module will also look at Analysis and feedback to practice Physical Conditioning, Developing a specific physical conditioning programme for the different age groups, Analysis and evaluation, Research and Practical Activities; Applied Research Methods, Contemporary Approaches and Modern trends in Gymnast Selection and Development, Expertise and Skill Acquisition in Gymnastics, Gymnastics Coaching Cultures, Independent Projects, Performance and Analysis in Gymnastics, Biomechanics of Gymnastics, Professional Development in Gymnastics Coaching , Periodization of sports training in professional in Gymnastics Management and marketing in Gymnastics and Judging Gymnastics.

SSC5212 Track And Field Athletics (Short, Middle And Long Distances/ Jumps/Throws)
                                                              20 Credits

The module looks at the historical origins, humanistic bases, conceptual contents and terminology of track and field athletics, Social, biomechanical and physiological bases of walking and running, Sports, technique training, biomechanical and physiological bases of track and hurdle runs, jumps, throws, sprint (dash), (speed, strength and endurance), Specifics of the athletic exercises and drills for girls and women, Medical supervision and prevention of injuries; Principles and rules of using track and field athletics in the educational system as a tool to improve physical development, enhance fitness, and promote health and vitality, Track and field athletics exercises at the first level of physical education, Track and field athletics exercises at the second level of physical education, Track and field athletics exercise at the third level of physical education, Track and field athletics exercise in the system of colleges and universities;

Think in other terms

Evaluation and assessment, Athletics conditioning; Development of the different forms of speed, strength, power, endurance; Training models for (aerobic) endurance, aerobic-anaerobic endurance, speed (alactic and glycolytic) endurance, jumping power, maximal strength and power, Complex training models and control tests for developing athletic conditioning and fitness at home; Models for recreational track and field athletics in different settings.

SSC 5213 Water Sports (Swimming/Diving/Canoeing)   **20 Credits**
The module focuses on the theory and fundamentals of swimming as a competitive sport, Different techniques and styles of swimming based on the principles and laws of hydrodynamics, Fundamental principles and laws of buoyancy and interaction with the water environment; Characteristics of the specific techniques of swimming movements and aquatic activities, Technique of Swimming and Cycling styles: (Front Crawl, Back Stroke, Breast Stroke, Butterfly); Applied Research Methods, Contemporary Approaches and Modern trends to player Selection and Development in Swimming and Cycling, Expertise and Skill Acquisition in Swimming and Cycling, Swimming and Cycling Coaching Cultures, Independent Projects, Performance and Analysis in Swimming and Cycling, Biomechanics of Swimmers and Cyclists, Professional Development in Swimming and Cycling Coaching , Periodization of sports training in professional   Swimming and Cycling, Management and marketing in Swimming and Cycling; Refereeing Swimming and Cycling as well as the art of Competition Swimming.

SSC 5214 Tennis /Badminton/Squash   **20 Credits**
The module explores applied Research Methods, Contemporary Approaches and Modern trends to player Selection and Development in Tennis and Field Hockey, Expertise and Skill Acquisition in Tennis and Field Hockey (Defense and Attack), Tennis and Field Hockey Coaching Cultures, Independent Projects, Performance and Match Analysis in Tennis and Field Hockey, Biomechanics of Tennis and Field Hockey Players, Professional Development in Tennis and Field Hockey Coaching , Periodisation of sports training in professional   Tennis and Field Hockey, Management and marketing in Tennis and Field Hockey; Refereeing Tennis and Field Hockey; Advanced Tactics in Tennis and Field Hockey.

SSC 5215 Soccer (Football)/ Rugby/Field Hockey   **20 Credits**
The module examines applied Research Methods, Contemporary Approaches and Modern trends to player Selection and Development in Rugby and Soccer and Field Hockey, Expertise and Skill Acquisition in Football (Defense and Attack), Rugby and Soccer and Field Hockey Coaching Cultures, Independent Projects, Performance and Match Analysis in Football, Biomechanics of Rugby and Soccer and Field Hockey Players, Professional Development in Football Coaching, Periodization of sports training in professional Soccer, and Rugby, Management and marketing in soccer and rugby; Refereeing Rugby and Soccer and Field Hockey; Advanced Tactics in Rugby and Soccer and Field Hockey.

Think in other terms

SSC 5218 Basketball And Volleyball   **20 Credits**

The module explores applied Research Methods, Contemporary Approaches and Modern trends to player Selection and Development in Basketball and Volleyball, Expertise and Skill Acquisition in Basketball and Volleyball (Defense and Attack), Basketball and Volleyball Coaching Cultures, Independent Projects, Performance and Match Analysis in Basketball and Volleyball, Biomechanics of Basketball and Volleyball Players, Professional Development in Basketball and Volleyball Coaching , Periodization of sports training in professional   Basketball and Volleyball, Management and marketing in Basketball and Volleyball; Refereeing Basketball and Volleyball as well as Advanced Tactics in Basketball and Volleyball.

SSC 5219 Boxing/Weight-Lifting/Wrestling   **20 Credits**

The module examines applied Research Methods, Contemporary Approaches and Modern trends in Weight-lifting and Wrestling Development, Expertise and Skill Acquisition in Weight-lifting and Wrestling, Weight-lifting and Wrestling, Coaching Cultures, Independent Projects, Performance and Analysis in Weight-lifting and Wrestling, Biomechanics of Weight-lifting and Wrestling, Professional Development in Weight-lifting and Wrestling Coaching , Periodization of sports training in professional   in Weight-lifting and Wrestling, Management and marketing in in Weight-lifting and Wrestling; Judging Weight-lifting and Wrestling; History of Weight-lifting and Wrestling from Antiquity to present day, Development and improvement of the rules and regulations of competitive Weight-lifting and Wrestling, Tactical preparation of the Weight-lifting and Wrestling Physical conditioning of the wrestler - development and improvement of strength, speed, endurance, agility and flexibility; Biomechanical characteristics of Weight-lifting and Wrestling as a competitive sport; Psychological conditioning of the Weight-lifting and Wrestling Management and control of training and coaching in Weight-lifting and Wrestling.

SSC 5220 Tourism, Trekking And Rafting   **20 Credits**

The module emphasizes health and functional fitness improvement, Emotional and aesthetic appreciation, Educational and intellectual advancement, Introduction to the study of high altitude and its significance, Physical factors of high altitude, High altitude flora and fauna; Wildlife conservation; Lungs ventilation and heart function at high altitude; High altitude pulmonary edeme; Myocardial metabolism, Adaptation and acclimatization, Descent to sea level, Climbing, Mountain travel and wilderness adventure, Trekking in different mountains - grading of altitude; Three-grade classification, Exercise, fatigue and recovery in mountain trekking, Management and control of sports training and conditioning in mountain trekking, Modern trends in mountaineering, sports climbing, high altitude tourism (alphinism), Modern approaches in developing general fitness and specific physical qualities needed for mountaineering.

SSC 5221 Theory Of Sports Coaching And Training   **20 Credits**

The module focuses on the theory and Methodology of Sport Training, Training as an adaptation process; Training and Development in different ages and gender groups, Training for Sedentary and Active persons, Stress and adaptation reactions in sport, Specific nature of training loads, Specifics of the immediate adaptation, fatigue and recovery, Specific features of the steady-state

adaptation; Training state and top form, Specifics of the adaptation process in strength (power) sports, Specifics of adaptation in endurance sports, Specifics of adaptation in speed sports, Specific features of the adaptation process in non-specific conditions; Planning, management, periodization and control of the training (conditioning) process of highly qualified athletes in different sports and sport disciplines, identifying relevant trends and forecasting top sport performance.

SSC 5222 Advanced Research Methods In Sports Science   20 Credits
The module looks at the research Methods of Sports Training and Coaching, Applied statistics in sports, Physical Education, Kinesiotherapy, and Sports Management; efficacy and evaluating the efficiency of various methods used for recovery after the application of kinesitherapeutic procedures and problems related to the rehabilitation of specific injuries; Descriptive Statistics (Frequency Tables and Graphs, Statistics by Computer), Probability Distributions (Binomial, Continuous, Normal, etc;), Sampling and methods of sampling, Point Estimation (mean, Mode, Median), Regression - relating two or more variables (single, multiple regression and extensions, correlation, multicollinearity); Analysis of variance by regression – ANOVA and MANOVA, ;Confidence Intervals, Hypothesis Testing (Two-Sided Test), Nonparametric Statistics (confidence test for the median and confidence interval for the median), Tests of Variance (one-way and two-way ANOVA), Methods for evaluation and estimation of different variables and sets of variables.

SSC 5223 Cricket And Baseball   20 Credits
The module covers the foundations of Cricket and baseball Development; Principles and Practice of Cricket and Baseball Coaching; Scientific Analysis of Cricket and Baseball Coaching; Sport Event Operations; Motor Skill Progression; Contemporary Issues in Sports Coaches; Applied Performance Analysis in Cricket and Baseball; The Sports Entrepreneur; Cricket and Baseball Dynamics; Developing cricket and Baseball from childhood strategies; Sport Event Marketing; Strategic Planning for Sport Events and Facilities; Personal Growth and Team Building Through Outdoor Adventurous Activity in Cricket and Baseball; Cricket and Baseball as a Sport Touristic Industry; Sponsorship and Fundraising.

SSC 5224   Netball And Handball   20 Credits
The module focuses on the foundations of Netball and Handball Development; Principles and Practice of Netball and Handball Coaching Scientific Analysis of Netball and Handball Coaching; Sport Event Operations; Motor Skill Progression; Contemporary Issues in Sports Coaches; Applied Performance Analysis in Netball and Handball; The Sports Entrepreneur; Netball and Handball Dynamics; Developing Netball and Handball from childhood strategies; Sport Event Marketing; Strategic Planning for Sport Events and Facilities; Personal Growth and Team Building Through Outdoor Adventurous Activity in Netball and Handball; Netball and Handball as a Sport Touristic Industry; Sponsorship and Fundraising.

SSC 5225 Aerobic Dance Sport   20 Credits

The module examines the aerobic Activities benefits and values in different communities; Aerobic Dance Sport Background and Origins; Medical Restrictions; Heart Rate Formula; Physical Tests; Aerobic Workout Cardio, Leg Work, Upper Body Strength Work and Abdominal Work; Circuit Training Exercises Used for Aerobic Workout; Dance choreography, Dance displays, dance biomechanics, dance modifications, Modern dances, contemporary dances, current dance trends in different societies; Dances and Research.

SSC5226 Traditional And Modern Dance   20 Credits

The module explores historical/cultural heritage; Cultural, Historical, and Artistic Diversity of dances; Dance phrases, moods, Space Usage and Awareness; Dance choreography, Dance displays, dance biomechanics, dance modifications, Modern dances, contemporary dances, current dance trends in different societies; Dances and Research.

SSC5228 Exercise Physiology And Biochemistry   30 Credits

The module examines exercise metabolism, hormonal adaptation and stress during physical exercise and training, Physiological and biochemical determinants of sports performance; Banned substances and the health hazards of their use, Energy transfer in exercise; Human energy expenditure during rest and physical, exercise; Regulation of pulmonary ventilation during exercise; Acid-base regulation exercise; Cardiovascular regulation and integration during exercise; Functional capacity of the cardiovascular system; Training for anaerobic and aerobic power; Neuronal control of human movement; Muscular strength and strength training; Metabolic adaptation to exercise; Biochemical and physiological principles of sports training; Biochemical and physiological basis of exercise fatigue and post exercise recovery; Exercise and endocrine system; Hormonal response to exercise and sports training; Adaptation and stress; Exercise and immune system; Exercise and thermal stress; Exercise at medium and high altitude; Assessment of physiological and biochemical determinants of sports performance; Banned substances doping);Biochemistry of doping; Mechanism of action; Physiological and pathophysiological impact on the performance and health of sportsmen and anti-doping control.

YEAR II

SSC 6129 Internship   60 Credits

This is a practical module designed to enable the student to refine Sport Science related professional practice, in the chosen field of specialization. The module is designed to enhance theoretical, practical, and soft skills in an applied setting during the Graduate Internship Program.

SSC6010 Research Project   60 Credits

The research project shall be undertaken by all students during the final year of year II of the program. This module is designed to develop and provide a critical overview of the main methods and approaches used for research into topics areas related to sport nutrition, exercise

Think in other terms

physiology, biomechanics, physiology, psychology, physical activity, exercise and health, training and coaching, and to equip the student to apply this knowledge in the planning a research proposal. Students will also have an opportunity to appraise the strengths and weaknesses of published work in their specialisation area. The research project must enable students explore philosophical, ethical and methodological differences which underpin various approaches to knowledge generation that can inform Sport Development applications and health care work. The module will ensure students undertake inter-professional workshops which will develop the research proposal, its adequacy and limitations, as the researcher is enabled to read and justify the approaches taken to investigate the study.

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FACULTY OF THE BUILT ENVIRONMENT

Dean

B. Gaule, MPhil, (*Leeds Met.*), BSc (Hon) Construction Mngt, (*Leeds Met.*)

Senior Assistant Registrar

S.P. Tshabalala, MBA (*NUST*), B.Ed. (*UZ*), Cert. of Edu. (*UCE*)

Chief Secretary

Z. Mloyi, B.Com (*NUST*), Dip in Bus Mngt (NUST), Dip Sec Studies

A/Chief Technician

D. Msimanga, Computer Studies (Speciss)

Technician

M. Mhlophe, Computer Studies (Bulawayo PolyTech)

FACULTY REGULATIONS

1.0   PREAMBLE

1.1   These regulations should be used in conjunction with the General Academic Regulations for Degrees which take precedence over the Faculty Regulations where applicable.

1.2   The appropriate degree shall be awarded to a student who has successfully completed an approved programme in accordance with these Regulations.

2.0   PROGRAMMES OFFERED IN THE FACULTY
The Faculty of the Built Environment is made up of three (3) departments which offer the following programmes:

2.1   **DEPARTMENT OF ARCHITECTURE**

   2.1.1   **Undergraduate**
   2.1.1.1   Bachelor of Architectural Studies Honours

   2.1.2   **Postgraduate**
   2.1.2.1   Master of Architecture

2.2   **DEPARTMENT OF LANDSCAPE ARCHITECTURE AND URBAN DESIGN**

   2.2.1   **Undergraduate**
   2.2.1.1   Bachelor of Science Property Development and Estate Management (BPE)

   2.2.2   **Postgraduate**
   2.2.2.1   Master of Urban Design (MUD)
   2.2.2.2   Master of Land Architecture (MLA)

2.3   **DEPARTMENT OF QUANTITY SURVEYING**

   2.3.1   **Undergraduate**
   2.3.1.1   Bachelor Quantity Surveying Honours (BQS)
   2.3.2   **Postgraduate**
   2.3.2.1   Master of Science in Construction Project Management (MSc CPM)

Think in other terms

3.0   ENTRY REQUIREMENTS

3.1   Applicants to the Faculty of The Built Environment programmes of study may be accepted provided they have satisfied the entry requirements prescribed under the General Regulations for acceptance to NUST and the following Faculty entry requirements:

A minimum of 5 subjects at `O' level at Grade C or better including Mathematics and English Language and at least THREE of which should be in the following list of subjects, or their recognized equivalents:

- Art or Craft & Design,
- Accounts,
- Building Studies or Technical Drawing/Graphics,
- Environmental Studies,
- Geography,
- History,
- General Science or Physics with Chemistry.

3.2   Other qualifications may be considered by the Senate on the recommendation of the Department and Faculty concerned. Normally, for such qualifications the University shall require proof of relevant experience and may require applicants to pass a qualifying examination to decide on their eligibility for admission.

DEPARTMENT OF ARCHITECTURE

Lecturer and Chairperson

T. Nyamande, B.A.S (NUST), B.Arch. (NUST)

Secretary

T. Dewa, Dip in Sec Studies (Bulawayo PolyTech)

ACADEMIC STAFF

Associate Professor

Professor I. Ahmed, B.Arch. (Bangladesh)

Lecturers

V. Madiro, Dip. Ing. MSc. Arch. (Bratislava)

C. Manyepa, B.A.S (NUST), B.Arch.(NUST), MSc.CPM. (NUST)

A. Furusa, B.A.S (NUST), B.Arch. (NUST)

Q. Ndebele, B.A.S (NUST), B.Arch. (NUST)

M. V. Mudombo, B.A.S (NUST), B.Arch. (NUST)

F. M. Svinurai B.A.S (NUST), B.Arch. (NUST)

B. Ncube, B.Arch. (UCLV, Marta Abreu), B.Arch. (NUST)

S. T. Katurura B.A.S (NUST), B.Arch. (NUST)

B. Madondo B.A.S (NUST), B.Arch. (NUST)

S. Zavirima B.A.S (NUST), M.Arch. (NUST)

UNDERGRADUATE DEGREE PROGRAMME

SPECIAL REGULATIONS

BACHELOR OF ARCHITECTURAL STUDIES HONOURS DEGREE

1.0 PREAMBLE

1.1 The Bachelor of Architectural Studies Honours Degree Programme is a five-year design oriented programme structured to integrate the basic elements of architecture (construction, structure, function, form and space) with the professional requirements of architectural practice responsive to the changing needs of society in the contemporary world.

1.2 To qualify, register and practise as architects, graduates must satisfy the educational and professional practice requirements of the Institute of Architects of Zimbabwe and the Architects Council of Zimbabwe.

1.3 These include five years of full-time higher education in Architecture, and two years of work experience in an architectural office under the supervision of a registered architect, followed by an examination in Professional Practice.

1.4 The Department has established and maintains close ties with institutions such as the Institute of Architects of Zimbabwe, the Zimbabwe Institute of Quantity Surveyors, the Association of Building Contractors as well as the building industry in Zimbabwe.

1.5 Graduates can look forward to employment by developers, architects, engineers (civil, structural, mechanical and hydraulic) local government and central government agencies, contractors and sub-contractors in the project planning and implementation of a variety of projects.

2.0 ENTRY REGULATIONS

Applicants may be required to attend a special interview and/or to submit a portfolio of work.

Students admitted who do not have `A' Level Mathematics or Physics are required to take BAR 1106 - Introduction to Architectural Mathematics in the first semester of Year One.

2.1   **NORMAL ENTRY**
        Applicants must have a pass at 'A' Level or its equivalent in Mathematics, Physics, Art, Geometrical & Mechanical Drawing, or Design Technology, Building Technology and Design, and two other approved subjects at 'A" Level.

2.2   **SPECIAL ENTRY**
        Applicants must have a National Diploma in Architecture, Architectural Technology and Architectural Graphics. Relevant experience preferably under a registered Architect will be an added advantage.

2.3   **MATURE ENTRY**
        General Regulations shall apply.

3.0 STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

3.1   The Bachelor of Architectural Studies Honours Degree Programme is a five-year design oriented programme structured to integrate the basic elements of architecture (construction, structure, function, form and space) with the professional requirements of architectural practice responsive to the changing needs of society in the contemporary world. The programme shall be offered on a full-time basis.

3.2   The Five-year Bachelor of Architectural Studies programme includes a minimum of 28 weeks of supervised Industrial Attachment. The attachment shall normally be taken during Year IV of the programme. During Industrial Attachment Year the student shall be governed by the General Regulations for Industrial Attachment as well as any other Faculty/Departmental Regulations where applicable. Students, who wish to have their Industrial Attachment Year outside Zimbabwe, must seek, and obtain Academic Board approval on recommendation by the Department and Faculty.

4.0 ASSESSMENT OF CANDIDATES

4.1   **Mode of Assessment**

        The assessment of a module is based on formal Examinations and Continuous Assessment. Unless otherwise specified, the formal Examination shall normally contribute 50% and Continuous Assessment/Module work shall contribute 50% of the final marks.

4.2   Examinations

Final Examinations shall take place towards the end of each Semester for each Module, at dates to be specified in the University Calendar.

4.3   Minimum Pass Mark and Aggregate Marks

4.3.1   The minimum pass mark for a module shall be 50% as prescribed in the General Regulations.

4.3.2   Modules within each Year of the degree programme are weighted according to the notional study hours spent on the module: Weight values are shown against each module title in the List of Modules.

4.3.3   The aggregate mark for a Year shall be the weighted average of aggregate marks for the modules constituting the programme of study for that Year.

4.3.4   The overall aggregate mark shall be the weighted average of aggregate marks for the Years constituting the programme of study for the degree.

4.4   Proceeding to the following Year

4.4.1   A student may proceed to the following Year upon satisfying the examiners in all the modules for the Year.

4.4.2   Subject to the provisions in the General Regulations, a student may proceed to the following Year provided he\she gets an aggregate of 50% or more and has passed at least 75% of the modules.

4.4.3   A student shall not be permitted to proceed to the following Year carrying Design Studio or a module which is prerequisite to the next module.

5.0 AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

In determining a student's Degree Classification, the Years of the Degree Programme shall be weighted and credited as follows:

Year I   10%
Year II   15%
Year III   25%
Year IV   10%
Year V   40%

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PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
BAR 1001	Design Studio I	64
BAR 1102	Architectural Presentation Techniques/ Descriptive Geometry I	8
BAR 1103	History of Architecture I	6
BAR 1104	Introduction to Materials & Construction I	6
BAR 1105	Society & the Built Environment I	6
BAR 1106	Introduction to Architectural Mathematics	4
BAR 1107	Fine Art I	4
BAR 1202	Architectural Presentation Techniques/ Descriptive Geometry II	8
BAR 1203	History of Architecture II	6
BAR 1204	Introduction to Materials & Construction II	6
BAR 1205	Society & the Built Environment II	6
BAR 1206	Applied Structural Statics and Dynamics	4
CTL 1101	Conflict Transformation & Leadership	10

YEAR II

Module Code	Module Description	Credits
BAR 2001	Design Studio II	64
BAR 2102	Building Construction I	12
BAR 2103	Computer Aided Architectural Design I	8
BAR 2104	Environmental Design I	6
BAR 2105	Structural Design I	4
BAR 2106	Introduction to Economics	4
BAR 2107	Fine Art II	4
BAR 2202	Building Construction II	12
BAR 2203	Computer Aided Architectural Design II	8
BAR 2204	Environmental Design II	6
BAR 2205	Structural Design II	4
BAR 2206	Zimbabwe Housing	4

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YEAR III

Module Code	Module Description	Credits
BAR 3001	Design Studio III	64
BAR 3103	Building Services I	6
BAR 3104	Contemporary History & Theory of Architecture I	6
BAR 3105	Issues of Housing Supply in Developing Countries	4
BAR 3106	Urban Planning and Design I	6
BAR 3107	Fine Art III	4
BAR 3108	Building Construction III	12
BAR 3203	Building Services I	6
BAR 3204	Contemporary History & Theory of Architecture I	6
BAR 3207	Urban Planning and Design I	6
BAR 3208	Building Construction III	12
BAR 3209	Research Methods	4
BAR 3210	Introduction to Architectural Office Practice	4

YEAR IV

Module Code	Module Description	Credits
BAR 4001	Industrial Attachment	100
BAR 4004	Dissertation	
BAR 4005	Architectural Office Practice	20

YEAR V

Module Code	Module Description	Credits
BAR 5001	Design Studio IV	80
BAR 5102	Building Construction V	16
BAR 5103	Dissertation	24
BAR 5104	Introduction to Professional Practice	7
BAR 5105	Environmental Impact Assessment	7
BAR 5203	Topics in Rural Design	6
BAR 5204	Topics in Urban Design	6

TOTAL CREDITS FOR THE PROGRAMME

Part I	134
Part II	136

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Part III	140
Part IV	120
Part V	140
Total minimum credits:	**670**

MODULE SYNOPSES

BAR 1001   Design Studio   64 Credits

The teaching of architectural design in the studio is the core module of the programme of architectural studies and is the foundation of the education of every architect. As a discipline architectural design is a synthesis of the principles of composition animated by designer's creativity, and the functional requirements of human needs and purposes. An architect long ago identified the essential ingredients of architecture as: commodity, firmness and delight. The first two components require the architect to be a social scientist, knowledgeable about and responding to human needs and the ordering of society, and a technologist, capable of ensuring that his buildings are structurally sound, and work efficiently; the final component, delight, is less tangible, less easy to define. The capacity to create buildings that lift the spirit, give pleasure to the user and the visitor, and that enhance the environment requires the architect to be an artist.

Architectural students, therefore, need to acquire skills and develop capabilities in all three areas, as social scientists, as technologists, and as artists: and to apply these skills and capabilities holistically. All the theoretical and practical modules in the five-year Bachelor of Architectural Studies programme teach skills and develop capabilities in one or other of these three areas. Design Studio in every Part of the programme, not only nurtures the architectural student as a creative designer, as an artist, but also draws all the areas of knowledge, all the disciplines together in one indivisible whole. At the end of the Part, students assemble a portfolio for review by staff to determine their attainment of the necessary design knowledge and skills for continuing into Part II.

Module Assessment: 100% Continuous Assessment

BAR 1102/1202 Techniques of Architectural Presentation/ Descriptive Geometry I/II
8 Credits

The first semester module is an introduction to the purpose of architectural drawings and the process of communication through architectural drawings. It covers types of two-dimensional and three-dimensional drawings and their uses as well as the relationship between scale and degree of detail. It also provides for architectural lettering, the use of hatching and shading, the layout of architectural drawing sheet. The second semester module continues with more complex presentation techniques: exploded 3 - dimensional projections, 1, 2 and 3-point perspectives. It sums it up with applications of Descriptive Geometry, Reprographic Techniques and the nature and function of working drawings.

Module Assessment: 100% continuous assessment

BAR 1103/1203   History of Architecture I/II   6 Credits

The first semester module aims to demonstrate the relevance of architectural history to contemporary practice, to equip the student with a basic vocabulary and the ability to recognize

and interpret key historical architectural forms and ideas, and to impart an enthusiasm for historical architecture, rather than rote-learning of facts and figures. The second semester module examines the major architectural and urban design developments of the 19th and 20th Centuries and the underlying theories of form, function, composition and expression.

Module Assessment: 100% continuous assessment

BAR 1104/1204   Introduction to Materials and Construction I/II   6 Credits

This is an introductory review of the materials used in construction, of their physical properties and characteristics, and the processes they undergo to convert them to building materials. The module in the second semester, explores constructional systems, and the ways in which materials are used in construction; with visits to construction sites.

Module Assessment: 30% Module work 70% Examination

BAR 1105/1205   Society and the Built Environment I/II   6 Credits

The module is a study, through selected readings and discussions, of the relationship between types of settlement and community structure and the built environment, and of the ways in which men and women, through the way they live and the work they do, shape their environment. In the second semester, the module introduces students to the basic principles of African cultures and to the architectural and settlement formation patterns derived from those principles. The impact of the slave trade, colonisation and of the modern global economy on African development is examined, and the ways these impacts are reflected in the built environment.

Module Assessment: 50% Module work 50%Examination

BAR 1106   Introduction to Architectural Mathematics   4 Credits

This is a module for those students who do not have `A' level Mathematics to prepare them for the module AAR 1206, Applied Structural Statics and Dynamics.

Module Assessment: 100% Continuous Assessment

BAR 1107   Fine Art Studio I   4 Credits

Creativity, the ability to conceive designs for buildings and spaces, to visualize design concepts and to convey these in a comprehensible way graphically to people who have no architectural training, is a talent few people are born with but all can acquire. This module and its successors in Parts II and III are designed to enable students to develop their individual creativity through a variety of fine art experiences. The Fine Art Studio programme begins with life drawing, line drawing and sketching.

Module Assessment: 100% Continuous Assessment

BAR 1206   Applied Structural Statics and Dynamics   4 Credits

This module is an introduction to the static and dynamic behaviour of the major structural systems applied in architecture and an examination of monolithic wall, post-and-lintel and multi-storey framed construction, tunnels, vaults and domes, suspended, catenary and tensile structures, etc., to enable the students to develop their understanding of the structural principles that underlay their physical structural forms. It is also an investigation of the performance of structural systems subjected to variable loads and case studies to demonstrate the practical application of structural theory. Students are encouraged to develop their analytical capabilities in relating the sizes of components to the physical characteristics of structural elements and the analysis of forces acting on them.

Module Assessment: 50% Module work 50% Examination

BAR 2001   Design Studio II   64 Credits

The main emphasis in the second-year studio is the integration of structural and environmental factors (as taught in the parallel lecture modules) into the design of a building of moderate size and complexity. The studio shall investigate the application of a variety of constructional, structural and environmental systems, and assess the appropriateness of alternative technologies. In addition, students shall continue to develop an understanding of the decision-making processes of architectural design; they shall continue to develop their critical and analytical skills, and how to learn from architectural precedent. They shall prepare and submit a major integrated design project at the end of the year.

Module Assessment: 100% Continuous Assessment

BAR 2102/2202   Building Construction I/II   12 Credits

The modules examine the construction process and the materials used in construction through lectures, case studies and project assignments. Students shall be required to study a building under construction and create a portfolio for documenting the project. The second semester of the module investigates a range of conventional construction systems, for foundations, walls, suspended floors and roofs. Systems are compared in timber, steel, masonry, as well as reinforced and precast concrete. Lectures are supplemented by demonstrations and site visits.

Module Assessment: 30% Module work 70% Examination

BAR 2103/2203   Computer Aided Architectural Design I/II   8 Credits

Module work in this module focuses on thinking skills, creativity and expression and provides a practical introduction to the use of computers in design, various electronic graphic representations used in design, and functionality and structure of modern CAD systems. Students are later given theoretical and practical introduction to the computer-based drawing and design tools and techniques through lectures and hands-on instruction and demonstration. Emphasis is

Think in other terms

placed on the creation of three-dimensional models using computer facilities, which includes PCs, plotters, digitisers, laser printers etc.

Module Assessment: 100% Continuous Assessment

BAR 2104/2204   Environmental Design I/II   6 Credits

This module is an introduction to the ways in which buildings respond to and modify the environment, with emphasis on thermal, acoustic and lighting performance. Simple methods of calculation are introduced. An investigation of the climatic factors derived from several African climatic zones, the influence of topography, surrounding buildings and open spaces on the micro-climate of buildings, and the principles of thermal comfort is done. In the second semester students shall be given guidance on the environmental design of their integrated design project in the studio and shall be required to present a detailed report.

Module Assessment: 100% Continuous Assessment

BAR 2105/2205   Structural Design I/II   4 Credits

The module is an introduction to structural systems, and their underlying physical principles, using historical and contemporary precedents. Simple methods of calculation are introduced and field trips and laboratory demonstrations are included. Students are shown a range of contemporary structures, and the rationale underlying their use. Special emphasis shall be placed on the enclosure of space, and the relationship between the functional uses of underlying (or overlying) spaces and the form of structure that encloses (or supports) them. Attention is given to detailed design and jointing systems. Students shall be given guidance on the choice and design of structure for their integrated design project in the studio, and shall be required to present a detailed report.

Module Assessment: 30% Module work 70% Open Book Examination

BAR 2106   Introduction to Economics   4 Credits

The objectives of the module are to familiarize students with the basic principles of economics and the relationship between economics and development. The module is a prerequisite for modules AAR 2206, AAR 3105 and AAR 3106. Topics covered include: Basic Principles of Economics; The economic basis of national development, and the role of the building industry; the relationship between the urban economy of cities and the national economy; the roles of property, infrastructure, and investment in the development of the urban economy; the effects of globalization on the national economy; the roles of international agencies (e.g. the World Bank) and Multi-national corporations in national development.

Module Assessment: 50% Module work 50%

Think in other terms

BAR 2107   Fine Art Studio II   **4 Credits**

The Fine Art Studio programme continues with studies and exercises in the perception, application and use of colour in a variety of media.

Module Assessment: 100% Continuous Assessment

BAR 2206   Zimbabwe Housing   **4 Credits**

This module is an investigation of the various types of housing that have been provided traditionally by local communities and more recently by (1) the state, (2) by individuals, non-governmental agencies and community groups, in terms of planning, design, production and delivery systems and household satisfaction.

Module Assessment: 50% Module work 50% Examination

BAR 3001   Design Studio III   **64 Credits**

The main emphasis in the third-year studio is the integration of Architectural Design Studies, so that students can understand the relationships, in formal and social terms, between the city, the settlement, the individual building and the people who live or work in them. Emphasis shall be placed on urban morphologies, and the spaces between buildings, and the interrelationships between form, structure, technology and detail. Selected specialised building types shall be explored within the urban context. Architectural and Urban Design Projects shall be set requiring students to develop their design brief, study and analyse the site, apply appropriate design methods to develop their design proposals and to present these to develop their design competence in the related Building Construction, Building Services, Environmental Design and Structural Design.

Module Assessment: 100% Continuous Assessment

BAR 3103/3203   Building Services I & II   **6 Credits**

The modules introduce students to the important subject of building services, giving sufficient coverage of the topics to provide solid theoretical groundwork together with practical knowledge of the infrastructural services required in buildings. These include cold water supply and distribution, hot water supply and distribution, solid waste and rain water drainage, sewage treatment and its disposal, refuse/garbage removal and disposal, electrical and telephone services for buildings, ventilation and air conditioning, acoustics, services access (lifts and escalators), external access to buildings, fire-fighting. Apart from lectures, students are required to use their knowledge and understanding on practical projects in Design Studio. Investigative assignments are also undertaken on chosen sites which require students to liaise with public offices such as City Planners, Engineers and Surveyors. This enhances skills in preparation for office practice.

Module Assessment: 50% Module work 50% Examination

Think in other terms

BAR 3104/3204 Contemporary History and Theory of Architecture I & II   6 Credits

At the end of the modules, the student should be able to identify and classify historical and theoretical facts about the twentieth century architecture through their characteristics, as well as apply the same in practical use, in the process of application of these facts in their own discussions, works and designs.

Module Assessment: 100% Continuous Assessment

BAR 3105 Issues of Housing Supply In Developing Countries   4 Credits

This module is a series of lectures/seminars exploring the issue of housing in consideration of specific topics as related to socio-cultural, economic and political factors, building materials, structural systems, shelter accessories, and manufacturing technologies. The module examines major development theories and contemporary design issues and characteristics of low-income housing needs and housing delivery systems. It also examines the formal and informal housing sector and asks why the housing sector is important for both national governments and international organisations.

Module Assessment: 50% Module work 50%

BAR 3106/3207   Urban Planning and Design I/II   6 Credits

The modules examine the evolution of the city in history and its contemporary manifestations in Africa and world-wide. The operations of several cities and metropolitan areas are analysed. A general survey is made of major development theories and contemporary issues and the characteristics of high, medium and low-income societies that establish contexts for development planning and policy-making. The module provides the theoretical basis for the Urban Design Project to be undertaken in Design Studio III. It examines settlement patterns, education, health and recreational facilities, streets and circulation/transportation networks, infrastructural provisions and services, and reviews and evaluates urban management systems. Students shall be introduced through design exercises to the vocabulary of design elements, both natural and artificial, that are available to the landscape architect, and to the scope of landscape planning at regional and district levels, and of landscape design in urban and rural context.

Module Assessment: 50% Module work 50% Examination

BAR 3107   Fine Art Studio III   4 Credits

The Fine Art Studio programme concludes with elective studies in calligraphy, graphic design, interior decoration, photography and theatre design.

Module Assessment: 100% Continuous Assessment

BAR 3108/3208   Building Construction III & IV   12 Credits

These modules shall deal with the construction process and techniques of larger buildings and special topics in construction practice. Subsoil analysis and foundations for larger buildings, floors, roofs and wall construction systems for larger buildings, exclusion of rain water, internal components and finishes, industrial buildings. It covers structural fire protection and temporary works: formwork systems, shoring, scaffolding, underpinning, demolition works, construction plant and equipment. External work: roads, paving, durability and maintenance as well as building codes. (Site visits and site reporting shall be an integral of the module). An introduction to Building Economics is included in Semester 2 (AAR 3208).

Module Assessment: 50% Module work 50% Examination

BAR 3209   Research Methods   4 Credits

The purpose of the module is to introduce the student to the role and purpose of research in the study and practice of architecture, and to research principles and techniques generally; to guide him/her in the selection of a research topic and the preparation and drafting of a research proposal; and to instruct the student in the techniques of research writing. This module has particular relevance to the selection and approval of the student's dissertation topic and it is a prerequisite for AAR 5103 Dissertation.

Module Assessment: 100% Continuous Assessment

BAR 3210 Introduction to Architectural Office Practice   4 Credits

The module is an introduction to the practice of architecture within the architectural office, in preparation for the year of Industrial Attachment. Topics covered include preparation and execution of working drawings, compliance with building codes and byelaws, office and site meeting procedures. It is a prerequisite for AAR 4005 Architectural Office Practice

Module Assessment: 100% Continuous Assessment

BAR 4001   Industrial Attachment   100 Credits

Students on completion of Parts I - III of the Bachelor of Architectural Studies programme shall be attached to architectural offices, to work as architectural assistants for a period of one full year of supervised Industrial Attachment.

Module Assessment: 100% Continuous Assessment

BAR 4004   Dissertation

During their year of Industrial Attachment, students are required to register and set aside time outside normal working hours to work on their dissertations. The dissertation proposal is to be ready for presentation at a seminar about the middle of Semester I, following the approval of

Think in other terms

which, the student shall proceed with conducting the research. Supervision shall be provided, and periodic seminars shall be held to review progress during the year of Industrial Attachment.

BAR 4005   Architectural Office Practice   **20 Credits**

During their year of Industrial Attachment, students are required to complete log sheets as part of the training process.

Module Assessment: 100% Continuous Assessment

BAR 5001   Design Studio   **80 Credits**

In Semester 1, through the medium of a major urban design/comprehensive development project for a down town area of a major city, issues of urban design, and landscaping of major public open spaces, architectural integrity, conservation of historic buildings, commercial viability and social and cultural acceptability are examined. The integration of technology, construction and services with the overall architectural and urban design concept is a major objective of the individual design projects developed by each student. The final Graduation Design Project which occupies the whole of Semester 2, is a major building or group of buildings of the student's own choice for a site also selected by the student, subject to the approval of the Departmental Board. The project is intended as a vehicle for the demonstration of the designer's competence in all aspects of design and technology, and is developed in depth and in detail and presented graphically. The Project Report completes the regular sequence of supporting studies required by students working on their graduation project. It is devoted to the development of the project proposal. Students shall also programme and develop a site analysis. Weekly seminars shall be held during each Semester to monitor progress. The final written report establishes the feasibility of the project and contains all the relevant research data and developmental design studies is an essential component of the Graduation Project. The Project Report is descriptive and an analytical record of the development of a complex architectural project.

Module Assessment: 100% Continuous Assessment

BAR 5102   Building Construction V   **16 Credits**

The module investigates a range of innovative building construction systems, their applications and techniques generally, and with specific reference to Zimbabwe: industrialised building systems; portal frames; claddings to framed structures; pre-stressed concrete; and innovative roof structures - space frames, conoid shell roofs, folded plate roofs, tensile structures, etc.

Module Assessment: 100% Continuous Assessment

BAR 5103   Dissertation   24 Credits

During their year of Industrial Attachment, students are required to register and set aside time outside normal working hours to work on their dissertations. The dissertation proposal is to be ready for presentation at a seminar in the middle of Semester I, following the approval of the Department after which, the student shall proceed to conducting the research. Supervision shall be provided and periodic seminars shall be held to review progress during the year of Industrial Attachment. In Year 5 of the programme of study, the final stages of the production of the dissertation which began during the Industrial Attachment are completed, and the dissertation is submitted for examination.

Module Assessment: 100% Continuous Assessment

BAR 5104   Introduction to Professional Practice   7 Credits

This module provides a lecture/seminar format to discuss the historic development of the profession, role of the architect in contemporary society, current forms of practice and emerging trends, contractual relationships, ethical responsibility, office management and promotion. Case studies are used to demonstrate the practical application of information as well as analytical techniques to strengthen design and planning abilities.

Module Assessment: 100% Continuous Assessment

BAR 5105   Environmental Impact Assessment   7 Credits

The concepts and issues in environmental planning and ecological conservation are covered in the module. Covered here are also objectives of and statutory provisions for EIA's in Zimbabwe, EIA techniques and analyses; migratory measures and project implementation. The module includes a case study of EIA's of infrastructural, industrial and urban developments.

Module Assessment: 100% Continuous Assessment

BAR 5203   Topics in Rural Design (Elective)   6 Credits

The module offers a multi-disciplinary approach leading to the understanding of the political, socio-economic, and technological framework of rural systems and their dynamic interrelationships.

Module Assessment: 100% Continuous Assessment

Think in other terms

BAR 5204   Topics in Urban Design (Elective)   6 Credits

The module offers a multi-disciplinary approach leading to the understanding of the political, socio-economic, and technological framework of urban systems and its dynamic interrelationships.

Module Assessment: 100% Continuous Assessment

Think in other terms

MASTERS DEGREE PROGRAMME

SPECIAL REGULATIONS

MASTER OF ARCHITECTURE

1.0 PREAMBLE

1.1 The Master of Architecture Degree Programme is a one-year design and practice oriented programme structured to integrate the elements of architecture with the professional requirements of architectural practice responsive to the changing needs of society in the contemporary world.

1.2 To qualify, register and practise as architects, graduates must satisfy the educational and professional practice requirements of the Institute of Architects of Zimbabwe and the Architects Council of Zimbabwe. These include five years of full-time higher education in Architecture, and two years of work experience in an architectural office under the supervision of a registered architect, followed by an examination in Professional Practice.

1.3 The Department has established and maintains close ties with institutions such as Institute of Architects of Zimbabwe, the Zimbabwe Institute of Quantity Surveyors, the Association of Building Contractors as well as with the building industry in Zimbabwe.

1.4 Graduates can look forward to employment by developers, architects, engineers (civil, structural, mechanical and hydraulic) local government and central government agencies, contractors and sub-contractors in the project planning and implementation of a variety of projects.

2.0 ENTRY REGULATIONS

2.1 Students must be holders, of at least a Lower Second Class (2.2) of the Bachelor of Architectural Studies Honours Degree or its recognised equivalent. Students with a Pass Class (3) should have a minimum of twelve months' relevant post graduate work experience.

2.2 Students with a first degree in Architectural Studies awarded after a three-year programme of studies shall be required to register for and be examined in Part IV and V of the NUST Bachelor of Architectural Studies Honours programme prior to admission to this programme.

3.0 STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

A one year (two semesters) professionally oriented graduate programme structured to integrate advanced design studies with the professional requirements of architectural practice in the contemporary world.

4.0 ASSESSMENT OF CANDIDATES

4.1 Mode of Assessment

The assessment of a module is based on formal Examinations, Continuous Assessment and Module work. Unless otherwise specified, the formal Examination shall normally contribute 50% and Continuous Assessment/Module work shall contribute 50% of the final marks.

4.2 Examinations

Final Examinations shall take place towards the end of each Semester for each module, at dates to be specified in the University Calendar.

4.3 Pass Mark and Aggregate Marks

4.3.1 The pass mark for a module shall be 50% as prescribed in the General Regulations.

4.3.2 Modules within each part of the degree programme are weighted according to the notional study hours spent on the module. Weight values are shown against each module title in the List of Modules.

4.3.3 The aggregate mark for a Part shall be the weighted average of aggregate marks for the modules constituting the programme of study for that Part.

4.3.4 The overall aggregate mark shall be the weighted average of aggregate marks for the Parts constituting the programme of study for the degree.

4.4 Proceeding to the following Part

4.4.1 A student may proceed to the following Part upon satisfying the examiners in all the modules for the Part.

4.4.2 Subject to the provisions in the General Regulations, a student may proceed to the following Part provided he\she gets an aggregate of 50% or more and has passed at least 75% of the modules.

4.4.3   A student who fails the Design Studio module shall repeat the Part.

5.0.   AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

In determining a student's Degree Classification, the Degree Programme shall be weighted and credited as follows:

Part I   100%   Minimum Credits 300

80% and above	-	DISTINCTION	(D)
70% - 79%	-	MERIT	(M)
60% - 69%	-	CREDIT	(C)
50% - 59%	-	PASS	(P)
Below 50%	-	FAIL	(F)

Think in other terms

PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
BAR 6001	Design Studio	120
BAR 6102	Research for Architectural Design I	52
BAR 6103	Professional Practice and Management I	20
BAR 6104	Architectural Conservation and Heritage Management	18
BAR 6105	Computer Aided Design and Management	18
BAR 6106	Environmental Conservation	18
BAR 6107	Urban Sociology	18
BAR 6202	Research for Architectural Design II	52
BAR 6203	Professional Practice and Management II	20

TOTAL CREDITS FOR THE PROGRAMME

PART I   **300**

Total minimum credits: **300**

Think in other terms

MODULE SYNOPSES

BAR 6001   Design Studio   **120 Credits**

The Design Thesis Studio is an opportunity for graduate students to explore and develop their understanding of and competence in aspects of architecture which are of special interest to them, with the tutorial guidance of staff and visiting professional architects. Initially, students must identify the architectural issues which are to form the basis for their final projects. When the nature and scope of those issues have been identified, then the appropriate building type and location can be identified. The objectives of the module are to test the ability of the students to identify and define architectural issues and design opportunities and to plan the programme for the completion of the project within the time frame, of the academic year. The self-selected architectural problem must contain sufficient complexity and potential richness opportunity to enable the students to reveal and demonstrate their knowledge, competence and maturity as architectural designers, and their ability to integrate theoretical design issues with technological substantiation at a high level. Students shall be required to present and defend their final projects before a panel of staff and invited critics.
Module Assessment: 100% Continuous Assessment

BAR 6102/6202   Research For Architectural Design I/II   **52 Credits**

Within the architectural profession, design work is often preceded and substantiated by research studies in a variety of fields and disciplines. This module provides the student with an introduction to an overview of the major areas of design research and offers appropriate methodologies. Through the study of professional examples and through exercises that focus on and apply specific methodologies, the students carry out relevant research for their Graduate Design Studio project and equip themselves for their future role as design professionals. The module includes an overview of the following major areas of design research. Urban Analysis (site and context), Historical Precedent and Typology, Anthropological, Sociological and Behavioural Studies; Technological Strategies; and Project management and Cost Control are covered.

Module Assessment: 100% Continuous Assessment

BAR 6103/6203   Professional Practice and Management I/II   20 Credits

The module introduces the student to the contractual, administrative managerial and legal responsibilities of and constraints on the practicing architect in principle, and registered architectural practices in Zimbabwe. Issues of professional indemnity insurance, arbitration and litigation are examined. With specific reference to the student's final project of graduate Design Studio, students are assigned three pieces of module work: Pre-contract Programme; Post-Contract Programme and a Cost Plan.
Module Assessment: 100% Continuous Assessment

BAR 6104 Architectural Conservation & Heritage Management (Elective)   18 Credits

The module introduces the student to the principles and practice of architectural conservation, and examines the following aspects of the subject: conservation of historic buildings, of vernacular and traditional buildings, of colonial buildings, of vernacular and traditional building crafts and skills, and of areas of historical, cultural environmental value; the revitalization and adaptive re-use of old or obsolete buildings. The statutory provisions for the identification, protection and public accessibility for the architectural and built environment heritage are investigated, techniques for recording, repairing, consolidating and maintaining old buildings examined. The theoretical content of the module is supplemented by case studies and visits to representative examples of conservation practice.
Module Assessment: 100% Continuous Assessment

BAR 6105   Computer Aided Design and Management (Elective)   18 Credits

Through a series of seminars and computer based exercises, the module provides an update of a rapidly developing and expanding information technology, through exploration of new and more complex applications in technical drafting, architectural representation and animation, other computer-based architectural presentation techniques. Storage, administration and management of building projects using computer-based programmes are examined.
Module Assessment: 100% Continuous Assessment

BAR 6106   Environmental Conservation (Elective)   18 Credits

The module aims at introducing students to issues of environmental awareness with regards to the impacts of human activities and strategies for coping with the changing environment. The module is to be conducted through lectures, case studies and seminars. The following broad topics are relevant: The environment-ecology of the environment; The ecosystems types and components; Impacts of man's activities on the ecosystem; Types of impacts; Concept and issues

Think in other terms

in environmental impact assessment (EIA); Case studies of sustainable communities and Indigenous knowledge and sustainability. The module also looks at the principles of architectural design for the survival of earth's resources and materials: the conservation of energy; respect for site, culture, climate; holism with reference to inventory of resources: natural systems; man-made systems and keeping with the earth's carrying capacity. Also a comprehensive plan for dynamic conservation: Environmental protection; the planned community; towards a green aesthetic and Integrating development and conservation are covered.

Module Assessment: 100% Continuous Assessment

BAR 6107   Urban Sociology (Elective)   18 Credits

The module provides a lecture/seminar format to discuss the historic development of the profession, role of the architect in contemporary society, current forms of practice and emerging trends, contractual relationships, ethical responsibility, office management and promotion. Case studies are used to demonstrate the practical application of information as well as analytical techniques to strengthen design and planning abilities.

Module Assessment: 100% Continuous Assessment

Think in other terms

DEPARTMENT OF QUANTITY SURVEYING

Lecturer and Chairperson

R. Mabhayila, BSc QS (NUST), MSc CPM (NUST),

Secretary

A. Diya, Dip (Byo Poly), B Comm. (LSU),

ACADEMIC STAFF

Lecturers

R. A. Dhliwayo, BSc (NUST), MSc (NUST)

M. Mukawa, Dip (Harare Poly) BSc (NUST), MSc (NUST)

M. E. Manyangarirwa, Dip (Byo Poly) BSc (NUST), MSc (NUST)

T. Moyo, BSc (NUST), MSc (NUST)

C. Moyo, BSc (NUST), MSc (NUST)

UNDERGRADUATE DEGREE PROGRAMME

SPECIAL REGULATIONS

BACHELOR OF QUANTITY SURVEYING HONOURS DEGREE

1.0 PREAMBLE

1.1 The Bachelor of Quantity Surveying Honours Degree Programme is a four-year programme structured to integrate the basic elements of quantity surveying (measurement, estimating and pricing, building construction, construction law, and construction economics) with the professional requirements of quantity surveying practice responsive to the changing needs of society in the contemporary world.

1.2 To qualify, register and practise as quantity surveyors, graduates must satisfy the educational and professional practice requirements of the Zimbabwe Institute of Quantity Surveyors and the Quantity Surveying Council of Zimbabwe.

1.3 These include four years of full-time higher education in Quantity Surveying, and two years of work experience in a quantity surveying office under the supervision of a registered quantity surveyor, followed by a Test for Professional Competence examination.

2.0 ENTRY REGULATIONS

2.1 **Normal Entry**
Applicants must have at least a pass at "A" Level in Mathematics or Physics with a "C" or better, and any other two subjects at "A" Level approved by the University.

2.2 **Special Entry**
2.2.1 Applicants must have a minimum of a National Diploma in Quantity Surveying with a pass at "O" Level in Mathematics and English.

2.2.2 Applicants shall attend selection interview.

2.3 **Mature Entry**
General Regulations shall apply.

3.0   STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

3.1   The Bachelor of Quantity Surveying Honours Degree Programme is a four-year full-time programme structured to integrate the basic elements of quantity surveying (measurement, estimating and pricing, building construction, construction law, and construction economics) with the professional requirements of quantity surveying practice responsive to the changing needs.

3.2   The four-year Bachelor of Bachelor of Quantity Surveying programme includes a minimum of 28 weeks of supervised industrial attachment. The attachment shall normally be taken during Year 3 of the programme. During Industrial Attachment, the student shall be governed by the General Regulations for Industrial Attachment as well as any other Faculty/Departmental Regulations where applicable. Students, who wish to have their Industrial Attachment outside Zimbabwe, must seek, and obtain Academic Board approval on recommendation by the Department and Faculty.

4.0   ASSESSMENT OF CANDIDATES

4.1   **Mode of Assessment**

The assessment of a module is based on formal Examinations, Continuous Assessment. Unless otherwise specified, the formal Examination shall normally contribute 60% and Continuous Assessment shall contribute 40% of the final marks.

4.2   **Pass Mark and Aggregate Marks**

4.2.1   The minimum pass mark for a module shall be 50% as prescribed in the General Regulations.

4.2.2   Modules within each Year of the degree programme are weighted according to the notional study hours spent on the module. Weight values are shown in brackets against each module title in the List of Modules.

4.2.3   The aggregate mark for a Year shall be the weighted average of aggregate marks for the module constituting the programme of study for that Year.

4.2.4   The overall aggregate mark shall be the weighted average of aggregate marks for the Year constituting the programme of study for the degree.

Think in other terms

4.3   **Proceeding to the Next Year**

4.3.1   A student may proceed to the next Year upon satisfying the examiners in all the modules for the Year.

4.3.2   Subject to the provisions in the General Regulations, a student may proceed to the next Year provided he\she gets an aggregate of 50% or more and has passed at least 75% of the modules.

4.4   **Carrying Over**

4.4.1   No student may be permitted to proceed to the next Year carrying BQS1001 Measurement I, BQS2001 Measurement II and BQS2002 Construction Estimates and Pricing modules.

5.0   AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

In determining a student's Degree Classification, the Degree Programme shall be weighted and credited as follows:

Part I	10%	130 credits
Part II	35%	140 credits
Part III	10%	120 credits
Part IV	45%	135 credits
Total	**100%**	**525 credits**

Think in other terms

PROGRAMME SUMMARY

YEAR I

Module Code		Module Description	Credits
BQS	1001	Measurement 1	26
BQS	1101	Theory and Practice of Quantity Surveying I	10
BQS	1102	Descriptive Geometry	12
BQS	1105	Introduction to Construction Legislation	8
BQS	1106	Introduction to Construction Materials I	8
BQS	1107	Principles of Economics	10
BQS	1110	Building Construction I	10
BQS	1111	Statistics	8
BQS	1201	Theory and Practice of Quantity Surveying II	10
CTL	1101	Conflict, Transformation, and Leadership	10
BQS	1205	Law: Construction and Engineering I	8
BAR	1206	Introduction to Applied Statics and Dynamics	4
BQS	1206	Introduction to Construction Materials II	8

YEAR II

Module Code		Module Description	Credits
BQS	2001	Measurement II	30
BQS	2002	Construction Estimates and Pricing	20
BQS	2104	Building Construction II	10
BAR	2105	Structural Design I	6
BQS	2106	Law: Construction and Engineering II	10
BQS	2110	Engineering Surveying	10
BAR	3103	Building Services I	6
BQS	2201	Building Construction III	10
BQS	2202	Research Skills	10
BQS	2206	Construction Economics	10
BQS	2207	Computer Applications in Quantity Surveying	12
BAR	3203	Building Services II	6

Think in other terms

YEAR III

Module Code	Module Description	Credits
BQS 3001	Industrial Attachment	120

YEAR IV

Module Code	Module Description	Credits
BQS 4001	Quantity Surveying Research Practical Project	25
BQS 4102	Contract Administration I	10
BQS 4103	Construction Site Management	10
BQS 4106	Construction Accounting	10
BQS 4107	Measurement III	15
BQS 4108	Construction Equipment and Methods	10
BQS 4202	Contracts Administration II	10
BQS 4203	Construction Finance	10
BQS 4204	Measurement IV	15
BQS 4208	Property Studies	10
BQS 4209	Professional Practice & Procedure	10

TOTAL CREDITS FOR THE PROGRAMME

Part I   130

Part II   140

Part III   120

Part IV   135

Total minimum credits: 525

Think in other terms

MODULE SYNOPSES

BQS1001　　Measurement I　　　　　　　　　　　　　　　　**26 Credits**

This is an introduction to Mensuration and Measurement in accordance with the System of Measurement of simple structures e.g. foundations, brickwork, surface beds, carpentry, joinery and ironmongery, glazing, doors, windows, floors and paving. Lectures shall also focus on measurement of simple structures e.g. internal and external finishes, and roof work. The module shall be examined at the end of Semester 2. The module is a prerequisite to BQS2001 Measurement II.
Module assessment: 50% Examination and 50% Continuous assessment

BQS1101　　Theory and Practice of Quantity Surveying I　　　　**10 Credits**

The module covers and introduction to quantity surveying and the construction industry professionals. It gives an overview of the building design and construction process, the scope of the activities of construction and the responsibilities of the stakeholders and discussion of the work environment in engineering architecture and site construction.

BQS1102　　Descriptive Geometry　　　　　　　　　　　　**12 Credits**

This module gives an introduction to the purpose of architectural drawings and the process of communication through presentation and working drawings, types of two dimensional drawings and their uses. It also looks into architectural lettering, relationship between scale and degree of detail, the use of hatching, the layout of architectural drawing sheets, dimensions- are some of the topics also covered in this module. Quantity surveying professionals deal with working drawings and also architectural presentation drawings. The main aim and objectives of this module is to make students able to interpret the architectural presentation and working drawings in detail.
Module assessment: 100% Continuous assessment

BQS1105　　Introduction to Construction Legislation　　　　　　**8 Credits**

An introduction review to risk and safety regulations, accident prevention, public welfare, discussion of laws, safety equipment and inspection procedures. Lectures and seminar discussions also cover other legal obligations and model building by-laws in Zimbabwe.

BQS1106   Introduction to Construction Materials I   8 Credits

The module is an introduction review of the materials used in construction, of their physical properties and characteristics, and the processes they undergo to convert them to building materials.

BQS1107   Principles of Economics   10 Credits

The model explores definitions of Economics, Economics as a social science Differences between Macro Economics and Micro Economics: Wants, Needs and Demand, Scarcity, Choice and Opportunity Cost, The Economic problem, Factors of production and Economic Systems. It seeks to introduce students to how economic aggregates such as national income, investment, savings, taxation, imports, exports, government expenditure, fiscal and monetary policies/employment/ unemployment and inflation are related to micro-economic behaviour. Emphasis is put on the definition; measurement and inter-linkage of these.

BQS1110   Building Construction I   10 Credits

The module examines the construction process and the materials used in construction of simple structures through lectures, case studies and project assignments. Students shall be required to study a building under construction and create a portfolio for documenting the project.

BQS1111   Statistics   8 Credits

Aspects covered in this module include: Randomness, probability. Random variables, probability distribution and density function as well as binomial, Poisson, exponential and normal distributions.

BQS1201   Theory and Practice Of Quantity II   10 Credits

The module covers an introduction to quantity surveying and the construction industry professionals. It gives an overview of the building design and construction process, the scope of the activities of construction and the responsibilities of the stakeholders and discussion of the work environment in engineering architecture and site construction.

Think in other terms

CTL 1101 Conflict, Transformation and Leadership   **10 Credits**

The module is tailored in a manner to provide students with intellectual skills on the symbiotic relationship that exist on the three tier terms (peace, leadership and conflict). The module attempts to probe into the interplay between these thematic motifs and show their role ad complementarities in the process of human development. The module further seeks to provide a skills kit on how to analyse conflicts, identify their underlying causes, evaluate hoe conflict undermines the productive use of resources thereby plaguing development and how responsible leadership transforms adversity into peaceful, equitable and just global society in harmony with nature.

BQS1205   Law: Construction and Engineering I   **8 Credits**

This module has lectures covering an introduction to Law to Tort and Contract, product liability, professional liability, surveying law as well as patents.

BAR1206   Introduction to Applied Statics and Dynamics   **4 Credits**

This module is an introduction to the static and dynamic behaviour of the major structural systems applied in architecture. It is also an examination of monolithic wall, post-lintel and multi-story framed construction, tunnels, vaults and domes, suspended, catenary and tensile structures, etc., to enable the students to develop their understanding of the structural principles that underlay their physical structural forms.

BQS1206   Introduction to Construction Materials II   **8 Credits**

This is a continuation of the module taught in the first semester, with an examination of constructional systems, and the ways in which materials are used in construction, and visits to construction sites.

BQS2001   Measurement II   **30 Credits**

This module is an introduction to Measurement of plumbing and drainage, complex structures e.g. reinforced concrete multi-storey frames – the framed foundations, stepped foundations, reinforced concrete beams, columns, slabs, flat roofs, complex roofs, alterations and additions to existing structures. The module shall be examined at the end of Semester 2. The module is a prerequisite to BQS 3001 Industrial attachment.
Module assessment: 50% Examination and 50% Continuous assessment

BQS2002   Construction Estimates and Pricing   20 Credits

The module explores concepts and techniques of estimating cost of engineering, construction and service operations, equipment, projects and systems; preliminary, detailed procedures, for example elemental, analytical etc., considering qualitative and quantitative aspects and using computer method. The module shall be examined at the end of Semester 2. The module is a prerequisite to BQS 3001 Industrial Attachment.
Module assessment: 50% Examination and 50% Continuous assessment

BQS2104   Building Construction II   10 Credits

The module examines the construction process and the materials used in construction of multi-storey buildings through lectures, case studies and project assignments. The module also studies roads and bridge construction. Lectures are supplemented by demonstrations and site visits.

BAR2105   Structural Design I   6 Credits

The module gives an introduction to structural systems and their underlying physical principles, using historical and contemporary precedents. Simple methods of calculation are introduced, and field trips and laboratory demonstrations are included.

BQS2106   Law: Construction and Engineering II   10 Credits

This module is a continuation from I, Second Semester with Lectures and seminar discussions covering in detail topics of contracts, product liability, professional liability, surveying law, patents, and preparation of documents utilized by quantity surveyors, engineers and architects, proposals and bidding, technical investigations, test reports and design documents.

BQS2110   Engineering Surveying   10 Credits

The module introduces students to definitions, classes and branches of surveying. It also covers theory of errors, chain surveying. Theodolites work: Triangulation: Calculations and theory Resection: Calculations Areas and Volumes: Setting out engineering plans and specifications. Curve Ranging; Quality take off, planning and scheduling Deformation Survey.

BAR3103   Building Services I   6 Credits

This module is a study of infrastructural services of water supply, drainage, sewage treatment: electricity: and telephone installations.

Think in other terms

BQS2201   Building Construction III   **10 Credits**

The module investigates a range of conventional construction systems, for foundations, walls, suspended floors and roots. Systems are compared in timber, steel, masonry, and reinforced precast concrete. Lectures are supplemented by demonstrations and site visits.

BQS2202   RESEARCH SKILLS   **10 Credits**

The module is an introduction and development of use of exploring source and preparation of specialised and technical information, document research organisation, format and style. It covers drafting and interpretation of in-depth technical reports, proposals and dissertations. Data analysis techniques: Histograms, Standard estimations and their distribution, confidence intervals, Hypothesis testing, and linear regression. Comprehensive specification in the various forms of surveying, construction and engineering shall be prepared.

BQS2206   Construction Economics   **10 Credits**

This module is a study of fundamental principles and basic techniques used in economic comparisons of various investment options, project appraisals, cost analyses of equipment and facility/ property ownership, retirement and replacement, considering the time value for money, inflation, depreciation, maintenance and related costs. Principles of engineering/technological economics, including compound interest, present worth, annuity, sinking fund, capital recovery, equivalence and uniform gradient series, are conceptualized. It also explores the efficient use of resources in the pursuit to increase the rate of growth in construction and development work in the most efficient manner. An examination is made into the cost implications of various building forms, functional requirement and construction methods. Influences of site and market conditions, and economics of fabrication and industrialisation, as well as in use techniques in Building design, are also studied.

BQS2207   Computer Applications in Quantity Surveying   **12 Credits**

This module is practical application of computer software in Quantity Surveying context; software instruction, including word processing, use of spreadsheets, data bases and specialised

Quantity Surveying Software. Emphasis is laid on the generation of technical documents, bills of quantities, cost and tender reports, and interim valuations.
Module assessment: 50% Examination and 50% Continuous assessment

BAR3203   Building Services II   **6 Credits**

The module covers mechanical, electrical and telecommunications systems that enable large complex buildings to function efficiently. Air conditioning systems and Acoustics are also covered.

BQS3001   Industrial Attachment   **120 Credits**

The four-year Bachelor of Quantity Surveying Honours Degree Programme shall have 28 weeks of Supervised Industrial Attachment either with a professional quantity surveying firm or with a building contract. This attachment shall expose the students to commercial systems and practicalities not encountered in the classroom. The Industrial Attachment shall be taken during Part III of the programme before they return to NUST for the final Year.

BQS4001   Quantity Surveying Research Practical Project   **25 Credits**

The focus of this module is on preparation of dissertations. With practice and lectures, students shall choose topics of their choice and prepare a dissertation individually. The module shall be examined at the end of Semester 2:
Module assessment: 100% Continuous assessment.

BQS4102   Contracts Administration II   **10 Credits**

 The module is a practical application of the Standard forms of Contract for Buildings and Civil Engineering.

BQS4103   Construction Site Management   **10 Credits**

This module focuses on the history and development of management, functions of management, organisational structures, decision making, communication centralisation and decentralisation, delegation, leadership and motivation, budgetary and non-budgetary controls. It also focuses on fundamentals of planning and scheduling of construction projects. The principles of operations management, including Network Analysis, Transport and Assignment models, are conceptualized.

Think in other terms

BQS4106   Construction Accounting   10 Credits

This module offers an examination and analysis of the practices of financial and management accounting in the construction industry, including accounting processes, internal control, cost elements, overhead allocation and financial reports.

BQS4107   Measurement III   15 Credits

This module introduces students to measurement of different types of civil engineering works and structural steel works. The focus is on external works in roads, bridges, and surface and subsurface drainage systems.
Module assessment: 50% Examination and 50% Continuous assessment

BQS4108   Construction Equipment and Methods   10 Credits

This module is an advanced study in method of planning scheduling projects relate to heavy and large-scale construction, module work focusing on the more complex issues of building construction estimating, considering both quantity surveying and pricing of labour, materials and equipment costs to determine resource allocations, levelling cost curves; application of manual computer network systems as well as team Research Project.

BQS4202   Contracts Administration II   10 Credits

This module offers a technical and legal assessment of market potential that develops overseas strategies, appraising alternative funding opportunities, estimating and tendering joint ventures and partnership.

BQS4203   Construction Finance   10 Credits

This module explores the critical factors in national, regional and local markets that determine development opportunities, business and construction cycles, regional and urban growth trends restructuring of urban space, commercial and industrial location theories, and demographic analysis and projection techniques; principles of managerial finance focusing on financial markets, financial statement analyses, planning and control, working capital management and international finance, discussion centred on the research required to find the best financial packages projected development, including assessment of market potential strategies, appraising

Think in other terms

alternative funding opportunities, capital budgeting and estimating debt, cash flow and appraisal techniques, joint ventures and partnerships, various loan structures and micro-computer applications.

BQS4204   **Measurement IV**   **15 Credits**

The module is to equip students with skills of measurement with special focus on electrical and mechanical services. It also includes measurement of specialist items found in building works. Mode of assessment: 50% Examination and 50% Continuous assessment

BQS4208   **Property Studies**   **10 Credits**

This module has lecture and discussion topics including techniques for selecting, organising, and managing the development team, scheduling and risk management, negotiating strategies, utilising government financing and subsidy programmes and marketing, managing completed projects, tax assessment procedures and appeals, negotiating public private partnerships, various loan structures and micro-computer applications.

BQS4209   **Professional Practice and Procedure**   **10 Credits**

This module explores the ethics of the profession: values, ethical theory and practice; moral reasoning; morality in law and codes, Professional standards and societies. It includes an extensive use of case studies.

Think in other terms

MASTERS DEGREE PROGRAMMEs

SPECIAL REGULATIONS

MASTER OF SCIENCE DEGREE IN CONSTRUCTION PROJECT MANAGEMENT

1.0   PREAMBLE

1.1   The MSc in Construction Project Management degree is an 18 month programme structured to integrate the project management knowledge areas with the professional requirements of construction project managers responsive to the changing needs of clients and society in the contemporary world.

1.2   The Department has established and maintains close ties with institutions such as the Institute of Architects of Zimbabwe, the Zimbabwe Institute of Quantity Surveyors, the Zimbabwe Association of Consulting Engineers, the Construction Industry Federation of Zimbabwe and the Zimbabwe Building Contractors Association.

1.3   Graduates can look forward to employment by developers, architects, engineers (civil, structural, mechanical and hydraulic), local government and central government agencies, contractors and sub-contractors in the project planning and implementation of a variety of projects.

2.0   ENTRY REGULATIONS
To be admitted to the MSc in Construction Project Management degree programme, applicants must meet the following requirements:

2.1   Have at least an undergraduate degree in the following disciplines: Quantity Surveying, Architecture, Rural and Urban Planning, Building Economics, Civil Engineering and Property Management. Other programmes offered in the Built Environment shall be considered on individual merits. A minimum overall pass of lower second class (2.2)

2.2   Additional qualifications and work experience may be an added advantage. In special circumstances, the Department may conduct selection interviews.

3.0   STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

3.1   This is a Full time/Part time programme. The programme shall run over a period of 18 months for full time and 36 months for part time.

3.2   For full time, the first 12 months shall be devoted to the taught component of the

Think in other terms

programme and shall be divided into two semesters. The last 6 months shall be devoted to the writing of the dissertation.

3.3 For part time, the first 24 months shall be devoted to the taught component of the programme and shall be divided into four semesters. The last 12 months shall be devoted to the writing of the dissertation.

3.4 On completion of the dissertation, a student shall submit two leather bound copies of the dissertation for assessment.

3.5 Students must take any one of the electives which they are expected to pass in each of the first and second stages of the programme for full-time and part time.

4.0 ASSESSMENT OF CANDIDATES

4.1 Mode of Assessment

4.1.1 The assessment of a module is based on formal Examinations and Continuous Assessment. Unless otherwise specified, the formal Examination shall normally contribute 60% and Continuous Assessment shall contribute 40% of the final marks.

4.1.2 In the case of dissertation, oral examination (Viva voce) shall be conducted by a Departmental panel of examiners.

4.2 Pass Mark and Aggregate Marks

4.2.1 The pass mark for a module shall be 50% as prescribed in the General Regulations.

4.2.2 Modules within each part of the degree programme are weighted according to the notional study hours spent on the module: Weight values are shown in brackets against each module title in the list of modules.

4.2.3 The aggregate mark for a part shall be the weighted average of aggregate marks for the module constituting the programme of study for that Part.

4.2.4 The overall aggregate mark shall be the weighted average of aggregate marks for the Part constituting the programme of study for the degree.

In the event of a student failing, the following conditions shall apply:

4.2.4.1 A student must clear all modules before proceeding to the next Part.

4.2.4.2 A student who fails the dissertation with a mark of at least 45% shall be allowed to resubmit within 3 months of publication of results.

Think in other terms

5.0   AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

In order to be awarded the degree, a student shall be required to pass all the modules registered in the programme.

In determining a student's Degree Classification, the Degree Programme shall be weighted and credited as follows:

Part I	35%	100 credits
Part II	35%	120 credits
Part III	30%	80 credits
Total	**100%**	**300 credits**

PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
BQS 5101	Contracts Procurement and Administration	20
BQS 5102	Advanced Construction, Planning and Management	20
BQS 5103	Resources Management	18
BQS 5104	Cost Management	16
BQS 5106	Construction Project Finance	16
BQS 5107	Communication Management (elective)	10
BQS 5108	Integrative Studies (elective)	10

PART II

Module Code	Module Description	Credits
BQS 5200	Research Methods	24
BQS 5206	Safety, Health and Construction Environments	18
BQS 5208	Principle of Construction Law	18
BQS 5209	Construction Risk Management	18
BQS 5210	Construction Time Management	16
BQS 5212	Sustainable Construction	16
BQS 5202	`Team Development and Management (elective)	10
BQS 5203	Partnerships and Joint Ventures Management (electives)	10

PART III

Module Code	Module Description	Credits
BQS 6100	Dissertation	80

Think in other terms

MODULE SYNOPSES

BQS 5101 Contracts Procurement and Administration   **20 Credits**

This module aims to provide an understanding of the principles required for the efficient development, negotiation, management and administration of contracts in the project. The objectives are to determine procurement requirements, establish agreed procurement processes, conduct procurement process activities, implement contracts and manage contract finalization procedures.

BQS 5102 Advanced Construction, Planning and Management   **20 Credits**

This module shall cover project planning and control, project internal and External Environment, Project Planning and Development, Project Management and Systems Theory, Project Organisation and Administration, The Project Manager's Role, Project Quality Management Principles, Project Appraisal, Project Management and Management Techniques, Project Practice and Management. The module forms the basis of managing the construction process. The aim is to take students through the project execution process from the time the project starts right up to the time the project closes. Areas to be covered include project start up, project execution plan, material management, construction productivity, cost control, resource allocation, resource estimation, forecasting and availability, supply management and project close up, information technology and equipment technology.

BQS 5103   Resources Management   **18 Credits**

The need to possess strong skills in organizational planning, team building, acquire resources and to undertake projects within the stipulated time are the cornerstone of resources management. The module provides students with a variety of tools and techniques of dealing with human resources, time management, procurement techniques, construction economics, plant and equipment. These are critical inputs in Project Management since they are the key determinants to project completion.

BQS 5104   Cost Management   **16 Credits**

The module aims to provide a working knowledge of Project Management, Cost Management Responsibilities that include cost estimation, budget establishment, construction economics, cost monitoring and control, financial accounting system, links and project pricing.

Think in other terms

BQS 5106   Construction Project Finance   16 Credits

The module provides students with competency in financial management principles, theory and practice as applicable to the construction industry, project appraisal, capital investment appraisal techniques and their suitability to different client requirements.

BQS 5107   Communication Management   10 Credits

The aim of the module is to provide a working knowledge and the skills and procedures required to successfully provide effective communication management as well as information technology.

BQS 5108   Integrative Studies   10 Credits

In this module students are expected to simulate real life situations and apply project management techniques to a project throughout the project life cycle. They must be able to prepare marketing brochures, project briefs, and project   proposals, carry out feasibility and project appraisal reports and produce professional services contracts.

BQS 5200   Research Methods   24 Credits

The module consists of comprehensive essays of Project Management topic of the student's choice. Areas to be covered shall include; foundation of empirical Research, the scientific Approach, Conceptional Foundation of Research, Ethics in research, design, and structuring research, sampling and sample designs, data collection, observation methods and questionnaire construction. The module provides theoretical basis on areas such as secondary Data Analysis, Data Processing and Analysis, Data Preparation and Analysis, the Universal Distribution, Bivariate Analysis; Control, Elaboration and Multivariate Analysis, Index Construction and Scaling Methods; Inferences.
Module Assessment: 100% Continuous Assessment

BQS 5206 Safety, Health and Construction Environment   18 Credits

The module covers areas such as understanding the work and health standards in construction environments; construction safety, based on constructions codes and safety standards and personal protection, equipment and accident investigation.

BQS 5208   Principles of Construction Law   18 Credits

The module covers introduction to the legal system, law of contract; law of restitution, contract formation, and contractual terms, misrepresentation, duties and undue influence, illegal contracts, discharge and contractual obligation, contracts and negotiations, conflict management, law of purchase and sale, credit agreement law and arbitration.

BQS 5209   Construction Risk Management   18 Credits

The module covers identification of risks, analysis techniques, response decisions, policies and strategies, risks versus opportunities and insurance against risks.

BQS 5210   Construction Time Management   16 Credits

This module covers Gantt Charts, Sloping Bar Charts, Pert, Critical Path and Precedence networks, line balancing programming, resource levelling and constraints, cash flow manipulations, contractual implications of time planning, path floats and information technology.

BQS 5212   Sustainable Construction   16 Credits

The module covers sustainable development dimensions and their integration into the construction industry. It also outlines the sustainable construction principles, goals, processes and technology as well as sustainable construction practices in the construction industry.

BQS 6100   Dissertation   80 Credits

Students are required to select a dissertation topic of their own choice with tutorial guidance, and to prepare a plan of work for reading, survey and documentation, research and analysis, and writing, editing and production stages of its execution. The dissertation shall on its own constitute the final Part of the programme.
Module Assessment: 100% Continuous Assessment

BQS 5202   Team Development and Management   10 Credits

The aim of this module is to provide Project Managers with the working knowledge, skills and attitude necessary to manage the performance of teams in the project environment.

Think in other terms

BQS 5203 Partnerships and Joint Ventures Management   **10 Credits**

The thrust of this module shall be on infrastructure project finance and especially the use of Built Operate and Transfer (BOT) schemes to finance infrastructure projects such as, railroads, bridges, telecoms, hospitals, waste, water etc. The areas covered shall include general principles, risk analysis and allocation, project feasibility and credit factors, structuring and funding, tenders, legal documentation issues and some case studies.

TOTAL CREDITS FOR THE PROGRAMME

PART I   100

PART II   120

PART III   80

Total minimum credits: 300

DEPARTMENT OF LANDSCAPE ARCHITECTURE AND URBAN DESIGN

Lecturer and Chairperson

Mr T Madyangove, BSc RUP (UZ), MSc UD (NUST)

Secretary

N Maduma, HND (Byo Poly), BSc (Hons) Pending (ZOU)

ACADEMIC STAFF

Lecturers

Dr B Chigara, BSc RUP (UZ), MSc CPM (NUST), PhD (Nelson Mandela Metropolitan)

Mr A B Ncube, BSc RUP (UZ), MSc RUP (UZ), MSc CPM (NUST)

Mr A Chigwenya, BSc RUP (UZ), MSc RUP (UZ), PhD Pending (SA)

Mr P Ndhlovu, BSc RUP (UZ), MSc CPM (NUST)

Mr J Mlotshwa BSc RUP (UZ), MSc UD (NUST)

UNDERGRADUATE DEGREE PROGRAMME

SPECIAL REGULATIONS

BACHELOR OF SCIENCE IN PROPERTY DEVELOPMENT AND ESTATE MANAGEMENT HONOURS DEGREE

1.0   PREAMBLE

The Bachelor of Science Honours in Property Development and Estate Management is developed to meet the needs of new entrants or aspiring professionals seeking to work in the property profession. Equally, the programme is relevant to those individuals already working in the property industry (as property developers and managers, estate managers, agents and Valuers) who seek to enhance their skills and knowledge on how to deal with real property challenges. Overall the programme equips graduates with analytical and problem-solving skills, and academic qualification necessary to practice in property development, management and valuation division of the property profession. The strength of the programme emanates from its ability to marry issues from the property development discipline to those from the estate management discipline including the legislative framework governing property development, management, transaction economics and property investment markets. It takes a theoretical and practical approach to study. Students shall be exposed to real property challenges or problems in valuation and management discipline.

2.0   ENTRY REGULATIONS

2.1   Normal Entry

Applicants must have at least 2 Advanced Level passes, in any of the following: Geography, Mathematics, Accounting, Economics, Business Studies or Management of Business, Geometrical and Mechanical Drawing, Law, Art, Physics, Sociology and Agricultural Studies.

2.2   Special Entry

A minimum of a National Diploma in any of the following: Town Planning, Valuation and Estate Management, Quantity Surveying, Architectural Technology, Construction, Agricultural Studies, Mining Estates, Tourism, Marketing, Civil Engineering, Banking,

Finance and Business Studies; The Real Estate Institute of Zimbabwe certification or its equivalence.

2.3 **Mature Entry**

The admission of mature entry applicants shall be considered as provided in the General Regulations.

3.0 STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

3.1 All candidates shall pursue a four-year full-time programme of study in which the third year shall be spent wholly on Industrial Attachment/Work-based experience in an institution or organization relevant to their degree programme. Candidates shall be required to obtain a total of 495 credits to be awarded the degree.

3.2 The four-year Bachelor of Bachelor of Property Development and Estate Management programme includes twenty-eight months of supervised industrial attachment. The attachment shall normally be taken during Part III of the programme.

4.0 ASSESSMENT OF CANDIDATES

4.1 Unless specified otherwise in the module synopses, all taught theory modules shall be assessed through continuous assessment in the form of assignments, tests, quizzes, short projects or oral and other presentations, and a formal 3-hour written examination.

4.2 The weighting of written examinations and continuous assessment shall be 70% and 30%, respectively.

4.3 The final year project shall be carried out over two semesters and shall be weighted as two standard modules, i.e. 20 credits.

5.0 AWARDING OF A DEGREE AND CLASSIFICATION OF THAT   DEGREE

In determining a student's Degree Classification, Years of the Degree Programme shall be weighted and credited as follows:

Year I   10%
Year II   30%
Year III   10%
Year IV   50%

Think in other terms

PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
BLP1101	Principles of Property Development	15
BLP 1102	History of Urban Development	12
BLP 1103	Property Construction Material I	8
BLP 1104	Economic Principles	10
BLP 1105	Statistics for Property	8
BLP 1106	Introduction to Technology and Application	10
BLP 1201	Property Accounting	12
BLP 1204	Construction Law	12
BLP 1205	Property Construction material II	10
BLP 1206	Urban Planning and Environmental Design	12
BLP 1207	Land Economics	10

PART II

Module Code	Module Description	Credits
BLP 2101	Property Development II	12
BLP 2102	Property Valuation I	12
BLP 2104	Building Economics	10
BLP 2105	Property Law I	8
BLP 2106	Estate Planning	12
BLP 2107	Architectural Presentations	10
BLP 2108	Municipal Services	8
AQS1107	Techniques of Gathering Materials, Report Writing & Specifications I	8
BLP 2201	Property Valuation II	12
BLP 2202	Property Law II	10
BLP 2203	Land Economics	10
BLP 2205	Building Services	8
BLP 2206	Building Construction	8
BLP 2207	Research Tools and Techniques	10
BLP 2208	Property Management	12

PART III

Think in other terms

549

Module Code	Module Description	Credits
BLP 3001	Industrial Attachment	120

PART IV

Module Code	Module Description	Credits
BLP 4001	Property Studies Research Project	20
BLP 4101	Property Valuation III	12
BLP 4102	Estate Management I	12
BLP 4103	Property Taxation	10
BLP 4104	Project Planning and Management	12
BLP 4105	Urban Management	12
BLP 4106	Sustainable Property Development	12
BLP 4201	Property Valuation IV	12
BLP 4202	Professional Practice and Procedure	10
BLP 4204	Property Development Finance	8
BLP 4205	Real Property Marketing	10
BLP 4206	Property and Facilities Management	12

TOTAL CREDITS FOR THE PROGRAMME

Part I	125
Part II	120
Part III	120
Part IV	130

Total minimum credits: 495

Think in other terms

MODULE SYNOPSES

BLP1101   Principles of Property Development   15 Credits

The module introduces property development - definitions / structure of the real property industry & its links with the construction industry, characteristics of the real property industry, the property development process, actors in the property development process, managing risk in property development, feasibility studies and site appraisals, cost benefit analysis, real property industry and the economy (property cycles), property market research, team development & managing property development resources, contractual obligations and managing the property development.

BLP1102   History of Urban Development   12 Credits

The module covers City in history, [Paleolithic, Mesolithic and Neolithic period]. A general survey is made of major development theories and contemporary issues and the characteristics of high, medium and low-income societies that establish contexts for development planning and policy- making. Industrial cities and their problems, urban Legislation, Public Health Act 1848 and 1875, need for urban planning, design concepts [Radburn, neighbourhoods concept], the post-world war industrial city [modern city], new towns concept. The operations of several cities and metropolitan areas are analysed.

BLP1103   Property Construction Materials I   8 Credits

The module is an introductory review of the materials used in construction, of their physical properties and characteristics, and the processes they undergo to convert them to building materials. It also covers primary and unprocessed construction materials and secondary and industrially processed construction materials and their behavioural changes to environmental exposure. The advantages and disadvantages of different substituting construction materials are explored.

BLP 1104   Economic Principles   10 Credits

This module covers basic foundation for the subject matter of Economics to enable students to prepare themselves to use the concept of rationality to analyzing behaviour at a micro-level and

Think in other terms

macro levels. The topics to be covered include: the economic problem, demand and supply, determination of market prices, theory of the firm, macro-economic analysis, national income, fiscal and monetary policies, inflation & unemployment.

BLP1105   Statistics for Property Studies   8 Credits

This module covers basic concepts of statistics and probability theory. The topics covered include concepts of probability, basic statistical inference procedures of estimation, confidence interval and hypothesis testing, descriptive statistics, normal and Poisson distributions, T-test, analysis of variance, multiple regression, non-parametric procedures and the analysis of categorical data directed towards application in Property Development and Estate Management.

BLP1106   Introduction to Information Technology and Applications   10 Credits

This is a module work based module on computer aided designs and applications to provide an insight into the use of computers in design and functionality of Modern CAD and GIS integrated systems. Emphasis is placed on the generation and use of software applications in property development and estate management such as MS Project, Primavera, Model Marker, Spreadsheets and so forth. Students should always be kept updated and abreast with IT changes and improvements.
Module Assessment: 100% Continuous Assessment

BLP1201   Property Accounting   12 Credits

This module examines accounting for property rentals/commission; cash transfers and disbursements that include associated accounting records, reconciliation statement, financial statement, financial reports, cash flow statements, contract accounting, accounting ratios, trading, profit and loss account and stock control procedures. It also focuses on the production of balance sheets, assets and liabilities with particular reference to the real estate industry as well as trust accounting, management of trust funds

BLP1204   Construction Law   10 Credits

The module focuses on the principles, purpose and sources of law, law of contract, terms of contracts, essentials of a contract, valid and void contracts and remedies thereto, law of restitution, law of tort, (misrepresentation, negligence, duress, undue influence, trespass,

nuisance). Building contracts formation, general conditions of contract, standard building and civil engineering contracts, different types of building construction contracts and procurement systems are also analysed.

BLP1205   **Land Economics**   **10 Credits**

The module looks at the Supply and demand of land, location theory, determination of the price of land, rent-earning capacity and land use thresholds, a general pattern of urban land use, the impact of government economic policy objectives on land resources, urban land zoning, subdivisions and consolidations and land values.

BLP1206   **Urban Planning and Environmental Design**   **12 Credits**

The module examines the development planning process and paradigms. These include comprehensive, sectoral, transport, strategic and contingency planning. Development Plans (master and local plans, layout, site and building plans), subdivision and consolidation, incorporations, zoning and development control are covered. It also covers participatory, advocacy and lobbying works as well as the planning theories and models and their influences on the urban space (practice). Problems of urban growth and solutions are explored together with different types of land reforms and tenure systems, property development and reforms and institutional economics. It also covers rural properties, rights of access, control and ownership of common properties. Climatic issues, environmental site planning, outdoor designs, building envelops (internal), designs, natural versus artificial systems design, ecological and biodiversity, adverse weather conditions and design for adversities, fabrics, facades and landscaping ar also looked into.
Module Assessment: 100% Continuous Assessment

BLP1207   **Property Construction Materials II**   **8 Credits**

This module is a continuation of the first semester module through site visits and field studies, with an examination of construction systems, and the ways in which materials are used in construction and various financial and environmental costs implications. Aspects of Construction materials modeling and simulations are explored. Project based assignments and models are assessed as continuous assessment (CA).
Module Assessment: 100% Continuous Assessment

BLP 2102   Property Valuation I   **12 Credits**

The module is an introduction to property valuation, reasons for valuation, methods of valuation (comparative, residual valuation, contractor's' method investment method), factors affecting property values. Discussions on real property rights/interests and the effect on property values and management are done.

BLP 2104   Building Economics   **10 Credits**

The module explores the concepts and techniques of pricing, forecasting and estimating using preliminary methods of estimating [unit, cube superficial, approximate quantities, storey enclosure method] on building projects; Discussions are done on the fundamental principles and basic techniques used in economic comparisons of various investment options, project appraisals, cost analyses of equipment and facility/property ownership, retirement and replacement, considering the time value for money, discounted cash flow analysis, inflation, depreciation, maintenance and other related costs - principles of engineering/technological economics as they apply to evaluation of construction projects, assets, plant and equipment.

BLP   2105   Property Law I   **8 Credits**

The module looks into property rights and legal descriptions (real vs. personal rights, fixtures, minerals, air & water rights; estates in land), Land tenure systems, Legal interests in real property [freehold, leasehold, condominium, etc.], landlord and tenant law, private restrictions on ownership (liens, covenants, easements, licenses, encroachments), licenses in real property, real property sales contract and case laws shall be used in the module of st

BLP   2106   Architectural Presentations   **10 Credits**

The module gives an introduction to the purpose of architectural designs and drawings. It considers an appreciation of site layout planning, two to three dimensional drawings and their uses and the relationship between scale and degree of details, lettering, hatching, shading and colour detailing and their meanings. The overall elevations and three-dimensional presentations in different forms are explored.
Module Assessment: 100% Continuous Assessment

Think in other terms

BLP   2107   Estate Planning   **12 Credits**

The module covers estate planning, probate, inheritance, shall trusts, revocation, conveyance, hereditaments and the Administration of Estates Act and related legislation. Students should familiarize themselves with other relevant legal instruments. Estate planning and administration issues are covered as well as east planning processes such as probate, revocation and inheritance laws and systems. Formation and types of shall and trusts together with the effects of tenure, real rights and title systems on property and Afro-centric systems are explored.

BLP   2108   Municipal Services   **8 Credits**

This module is a study of the infrastructural services of water supply, roads, drainage, and sewerage and sewage treatment, energy, and telephone installations. Student are expected to do Geographic Information (GIS) Mapping, photogrammetric remote sensing and practical surveys. The module includes case studies and project based assessments.
Module Assessment: 100% Continuous Assessment

BLP   2201   Property Valuation II   **12 Credits**

The module look at mathematics of valuation, compound interest, present worth (uniform series, dual rate), term and reversionary valuations, Annual sinking fund, capital recovery [annuity $1 shall purchase] as well as application of mathematics of valuation to practical valuation of properties.

BLP   2202   Property Law II   **10 Credits**

The module examines extracts and cases as they relate to the business of real estate: Estate Agency Act, Valuers Act, RTCP Act, Urban Councils Act, Rural District Councils Acts, Deeds Registry Act, Land Acquisition Act, Environmental Management Act, Utilities and Infrastructure-related Acts and Commercial and Residential Rent Regulations, Property transactions laws & procedures, commission and other statutory fees.

BLP   2205   Building Services   **8 Credits**

The module is a study of the integrated mechanism, electrical and telecommunications systems that enable large complex buildings to function efficiently as working environments. Air conditioning, acoustics, lighting, heating and fluid reticulation systems are covered.

Think in other terms

BLP 2206 Building Construction   **8 Credits**

The module investigates a range of conventional construction systems, for foundations, walls, suspended floors and roofs. Systems investigations and analysis such as timber, steel, masonry, and reinforced and precast concrete. Lectures are supplemented by demonstrations and site visits. The module examines the construction process and materials used in construction through lectures, case studies and project assignments. Students shall be required to study a building under construction and create a portfolio for documenting the project.
Module Assessment: 100% Continuous Assessment

BLP 2207 Research Methods   **10 Credits**

The module is an introduction and development of use of exploring source and the preparation of specialised and technical information, document research organisation, format and style. Drafting and interpretation of in-depth technical reports and comprehensive specification in the various forms of surveying, construction and engineering drawings are covered. Research approaches and design, research topic formulation, data collection methods, objectives setting, hypothesis formulation, data presentation and analysis, research design, ethics in research, sampling techniques, questionnaire design, data gathering techniques, research proposal writing skills, research project documentation and reporting skills. Issues relating to professional communication and academic writing shall be covered.
Module Assessment: 100% Continuous Assessment

BLP 2208 Property Management   **12 Credits**

The module focuses on an introduction to property management, estate setting, formation of estates, Lease agreements, rent regulations in Zimbabwe, Rent determination for retail, residential, industrial, office use; Role of Estate Agents in Property Management; Identification and assessment of building defects; repair and maintenance of buildings; aspects of architectural additions as well as alterations on buildings.

BLP 3001 Industrial Attachment   **120 Credits**

The industrial attachment shall cover Twenty-eight weeks in compliance with University Regulations and Procedures. Students may be attached to professional Valuers and Estate Agents firms, Estates Department of Local Authorities, Parastatals, Central government, Building Societies and Commercial Banks, Insurance companies, contractors and property developers. This attachment should expose students to practical property development processes and

Think in other terms

applications, valuation, management and conveyancing experiences. Furthermore, students are expected to use the attachment period to identify potential research areas in preparation for their dissertations in Part IV.

BLP   4001   Property Studies Research Project   20 Credits

The module borders on the preparation for dissertations. With the aid of lectures, students shall choose topics of their choice and prepare a dissertation individually.
Module Assessment: 100% Continuous Assessment at the end of academic year.

BLP   4101   Property Valuation III   12 Credits

The module applies theories, principles and concepts of valuation to different sectors of real property. Emphasis shall be put to practical valuation assignments of office blocks, industrial properties, plant and equipment. Also included in this module is the preparation of a valuation reports, certificates, and calculation of professional fees for valuation using prevailing scale of fees. Risk and uncertainty, investment appraisal, component variables of a valuation are covered.
Module Assessment: 100% Continuous Assessment

BLP   4103   Property Taxation   10 Credits

This module looks at the general direct taxation and land resources, income tax, capital gains tax, stamp duty, estate duty, tax concessions in special areas, effect of taxation on property transactions. Computations of various forms of taxes and assessing their effect on real estate business are done.

BLP   4104   Project Planning and Management   10 Credits

The module introduces the student to general management principles as applied to construction projects. Areas to be covered include: construction theory and practice, project planning and control, project scheduling, the project manager's role, project quality management principles, project proposal writing, project appraisal/assessments, project internal and external environment, project procurement requirements and process, project resources management.

BLP   4105   Urban Management   12 Credits

The module focuses on the provision and management of urban infrastructure, housing and related   community facilities. These include transport, water, sewage, electricity and communication supply services. The Intervening issues such as waste management, urban

Think in other terms

agriculture and disaster management systems. Addresses governance, legal and policy frameworks for sustainable urban and land development projects. It also considers the paradigm shift from traditional systems to the development and management of sustainable city concepts. The Provision and maintenance of urban infrastructure services through the use of Public Private Partnerships (PPP) arrangements is covered together with creation and management of urban institutions & urban governance systems.

BLP   4106   Sustainable Property Development   12 Credits

The module introduces the principles of sustainable development to real property. Sustainability principles, Location and sustainability of buildings, property-related environmental issues, the economics of sustainable buildings, the use of sustainability rating tools in real property, design & procurement of sustainable buildings, environmental laws, stakeholder participation on sustainable / green projects are covered in this module.

BLP   4201   Property Valuation IV   12 Credits

The module builds on the provisions of the previous valuation modules. It intends to prepare the student to the practical realm of valuation of real property as they graduate. The module shall focus on advanced valuation of specialized property like hotels, chalets, recreational properties. Also included is statutory valuation (for taxation, compulsory acquisition etc.), and deceased estates valuation, valuation of property in a rural setting. More emphasis shall be placed on the legal issues relating to valuation of such properties.
Module Assessment: 100% Continuous Assessment

BLP   4202   Professional Practice and Procedure   10 Credits

This module aims to inculcate the expected minimum expectations of a property professional. The discussions and seminars on ethical procedures, professionalism and, duty of care when dealing with other people's properties will be done and issues of corruption and gender in property industry will be conducted together with the professional role of a property Valuer and manager and how the property professional should diligently execute his/her professional duties.

BLP   4204   Property Development Finance   10 Credits

The module explores sources finance for real property development, private versus public sources of capital, cost of capital, types of loans & mortgages to finance real estate, factors affecting financing of real property development, exploring the critical factors in national,

Think in other terms

regional and local markets that determine real property development opportunities; business and construction cycles, principles of managerial finance focusing on financial markets, planning and control, working capital management and international finance. Discussions centred on finding best financial packages for property development, including assessment of market and potential strategies, appraising alternative funding opportunities and estimating debt, cash flow and capital investments appraisal techniques will be done.

BLP   4205   Real Property Marketing and Sales   10 Credits

The module covers the concept of real estate asset & space markets, pricing of various categories of real estate, principles of marketing, methods/ strategies of marketing real property, property marketing research techniques, real property conveyancing (complete and incomplete buildings), memorandum of agreement, deeds of sale, change of ownership of real property, registration of property, commission and other statutory fees as well as the challenges in marketing of real property.

BLP   4206   Property and Facilities Management   12 Credits

The module focuses on understanding property portfolio and its development, investment analysis, principles behind portfolio and strategy, asset-mix ratio, getting tenants for property portfolio, tenant mix, managing a property portfolio, legal issues related to estate management, insurance regarding real property, scheduling of operation and maintenance of buildings and its environments, property management reports on management of public estates and institutions, management of the environs and facilities in and around the property, environment, health and safety of users of the building space, waste management, space allocation and management, demolition of leased premises & security deposit, role of facilities manager as well as .integrated property and facilities management
Module Assessment: 100% Continuous Assessment

Think in other terms

MASTERS DEGREE PROGRAMME

SPECIAL REGULATIONS

MASTER OF URBAN DESIGN

1.0 PREAMBLE

Urban Design deals with the urban microform at the macro-scale. The focus is on the shaping of various pieces of urban land at meso-scale and with spaces between them at micro-scale. It also deals with designing and construction of urban elements. In this regard, this programme aims at educating students with a background in town planning, architecture and other related disciplines in this subject. The main objective is to develop theoretical frameworks that will be used in practice.

2.0 ENTRY REGULATIONS

2.1 **Normal Entry**

At least successfully completed undergraduate degree in the following disciplines: Urban Design, Architecture, Rural and Urban Planning, Building Economics, Civil Engineering and Property Management and any other programmes offered in the built environment shall be considered on individual basis with a Minimum overall pass of lower second class (2.2).

3.0 STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

3.1 This is a full time / part-time programme that shall extend over a period of 18 months on full time and 36 months for part-time. For full time, the first 12 months shall be devoted to taught component of the programme and shall be divided into two semesters and the last 6 months shall be devoted to the writing of a supervised dissertation. For part-time, the first 24 months shall be devoted to teach component of the programme and shall be divided into three semesters. The last 12 months shall be devoted to the writing of the dissertation.

3.2 **Elective Modules**

Only two electives will be selected from the list of modules, candidates will not be permitted to choose elective modules they have already studied.

4.0 ASSESSMENT OF CANDIDATES

4.1 Unless specified otherwise in the module synopses, all taught theory modules shall be assessed through continuous assessment in the form of assignments, tests, quizzes, short projects or oral and other presentations, and a formal 3-hour written examination.

4.2 The weighting of written examinations and continuous assessment shall be 70% and 30%, respectively.

4.3 The final year project shall be carried out over two semesters and shall be weighted as two standard modules, i.e. 60 credits.

5.0 AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
BUD 6101	Principles and Practice of Urban Design I	16
BUD 6102	Urban Policy and Infrastructure	14
BUD 6103	Urban Design Studio	20
BUD 6105	Transportation Engineering	12
BUD 6106	Project management for Urban Design	12
BUD 6107	Environmental Design and Conservation	12
BUD 6108	Urban Economics	14

PART II

BUD 6201	Principles and Practice of Urban II	16
BUD 6202	Research Methods in Urban Design	14
BUD 6203	Urban Design Studio II	20
BUD 6204	Urban Design Seminars	18
BUD 6205	Geographic Information Systems (GIS)	12

PART III

BUD 7101	Dissertation	60
BUD 7102	Urban Design Thesis	60

TOTAL CREDITS FOR THE PROGRAMME

PART I	106
PART II	100
PART III	120

Total minimum credits: **326**

Think in other terms

MODULE SYNOPSES

BUD 6101 Principles and Practice Of Urban Design I   **16 Credits**

The module covers basic theory and practice of urban design. Topics include history of urban form; buildings and spaces; urban design analysis; urban design approaches; efficiency of urban design and evaluation criteria; case studies. A student shall not proceed to do Principles and Practice of Urban Design II before clearing this module.

BUD 6102   Urban Policy and Infrastructure   **14 Credits**

Against relevant aspects of land use theory and implications for site planning, the module introduces the principles and practice of site planning and infrastructure design for large urban developments. Topics include reclamation, land use and density thresholds, settlement capacity, infrastructure master planning, utilities planning, site layout and future design trends.

BUD 6103   Urban Design Studio I   **20 Credits**

This module shall focus on the introduction to urban design graphics and computer aided design: an introduction to basic drafting, graphics and computer-related tools and techniques in professional practice. The module shall cover:

- **Urban Design Project I**

A series of sessions that will encompass practical drawings and sketches of urban design proposals for selected sites in Zimbabwe.

- **Urban Design Project II**

A group project which will normally be a real-life large-scale urban design and development project involving land reclamation and infrastructure provision leading to a 3-D built form. Designed to professional standards involving relevant urban design theory and implementation criteria, and conducted with participation of professionals in both public and private sectors.

BUD   6107   Environmental Design and Conservation   **14 Credits**

The module aims at introducing students to issues of environmental awareness with regards to the impacts of human activities and strategies for coping with the changing environment. The module is conducted through lectures, case studies and seminars. The following broad topics are relevant: the ecology of the environment; the ecosystems-types and components; impacts of man's activities

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Think in other terms

on the ecosystem and types of impacts; concepts and issues in environmental impact assessments. The design of environmental spaces both external and internal spaces versus natural environment.

BUD 6108   Urban Economics   14 Credits

This module covers main economic forces that lead to the existence of cities and regional agglomeration. It studies the economics of cities and urban problems by understanding the effects of geographic location on the decisions of individuals and firms. The topics include, inter alia: location decisions of firms and households; the role of spatial economics in shaping the internal structure of cities, role of cities in aggregate economic development, institutional economics and the economics of sustainable designs.

BUD 6201 Principles and Practice Of Urban Design II   16 Credits

This advanced module in urban design attempts to build a coherent build a coherent theory of urban form from the historical and material conditions of production. Hence the lectures/seminars progress in three main stages. Firstly, the economic and political determinants in the production of urban space are considered (urban politics, the state, ideology, social class, professionalism etc.). Secondly, considerations in the technology of form (forms of space, analogical models, and problems of aesthetics). Thirdly, a case study of Zimbabwe which moves from the realm of theory into concrete social practices - urban planning, high-density development, public housing, and the other formal properties of a major world city.

BUD 6202   Research Methods in Urban Design   12 Credits

The module focuses on various methods and techniques fundamental in data collection, analysis and presentation. The overall objective of the module is to impart skill to students that can assist them in preparing technical reports and dissertations.

BUD 6203   Urban Design Studio II   20 Credits

The urban design project 3 module is a series of sessions encompassing the practical management and implementation of urban design proposals involving larger sites, taking into account issues such as land acquisition, planning approvals, concept development, financing, the consultancy team, construction and marketing among others.

Think in other terms

BUD 6204   Citizen-Led Urban Design Seminars   18 Credits

This is a cross cutting module in which seminars introduce students to the designing and management of urban places. The focus is on issues arising in current urban design practice. The subject matter includes current contexts for urban design; the role of urban design in the development process; different urban design roles and levels of influence; public sector urban design, framework plans, design guidelines and implementation strategies. The module addresses urban economic analysis in the planning and development of urban areas from the point of view of practitioners and community studios in the field as well as feedbacks. During the module of the semester, each student will prepare a thesis proposal. The module emphasizes citizen and community participation frameworks in urban planning, design and sustainable development and management.

BUD 6205   Geographic Information Systems   12 Credits

This module builds on spatial land-use analysis techniques. Focus is on the advanced theory and practice of Geographic Information Systems (GIS); GIS applications; design and implementation of GIS applications.

BUD 7101   Dissertation   `   60 Credits

This is an in-depth investigation of urban design or development issues which relate directly to the physical planning problems and potentials of urban areas. The topic chosen should be both academic and practical in nature and a report not exceeding 20,000 words or equivalent is required.

BUD 7102   Urban Design Thesis   60 Credits

This is an in-depth urban design project based on a specific urban case study. The expected work at this level is of advanced standing and allows an in-depth exploration of complex design problems. In addition, it must be conducted in collaboration with city agencies addressing identified needs.

BUD   6106   Project Planning and Management (Elective)   12 Credits

This module will cover a wide range of issues relating to project planning and control, project internal and external environment, project planning and development, project organisation and administration, the project manager's role, project quality management principles, project

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Think in other terms

appraisal, project management techniques, project practice and management. Project management knowledge areas such as cost, scope, time, risk, quality, performance, communication and so forth are also covered.

BUD 6105 Transportation Planning and Management (Elective)   12 Credits

The focus of this module is on the traditional transport study which focuses on trip generation, trip distribution, modal distribution and trip assignment; land-use modelling; the town and regional planner's contribution to transport planning.

BUD 6207 Professional Practice For Urban Design (Elective)   12 Credits

This module examines practice management and project management in the built environment professions. Topics in practice management include: ethical practice; the character and operation of practices; legal requirements; corruption; running a business; professional memberships and its registration; risk and professional liability; and personal career planning. Topics in project management include: project stages; procurement and feasibility; statutory requirements; management of time, cost and quality; and contracts and contract administration in private and public realms. Alternative and innovative pathways through the profession are also considered.

MASTER OF LANDSCAPE ARCHITECTURE

SPECIAL REGULATIONS

1.0 PREAMBLE

The continual growth of both the population and the urban environment does have implications on the social, economic and physical environment. This growth is having implications on the planning and designing of human settlements. In this regard, the Masters in Landscape Architecture is designed to prepare students in planning and designing the physical and built environment within sustainable means. Focus is therefore on the relationship between people and their environment. It provides an opportunity to be creative in engagement with the environment through fundamental theories and techniques designed to positively influence the human habitat.

2.0 ADMISSION/ENTRY REQUIREMENTS

To be admitted to the Masters in Landscape Architecture and Urban Design degree programme, a candidate must meet the following requirements:

2.1 At least successfully completed an undergraduate degree in the following disciplines: Landscape Architecture, Urban Design, Architecture, Rural and Urban Planning, Building Economics, Civil Engineering and Property Management. Other programmes offered in the built environment shall be considered on individual basis.
2.2 Minimum overall pass of lower second class (2.2).
2.3 Additional qualifications and work experience may be required from all candidates.
2.4 Submission of portfolio of work and/or special interviews shall be conducted where necessary.

3.0 STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES
This is a full time / part-time programme.

3.1 The programme shall extend over a period of 18 months for full time and 36 months for part-time.
3.2 When feasible the programme can be run on block release.
3.3 For full time, the first 12 months shall be devoted to taught component of the programme and shall be divided into two semesters. The last 6 months shall be devoted to the writing of a supervised dissertation and landscape design studio project.

Think in other terms

3.4   For part-time, the first 24 months shall be devoted to taught component of the programme and shall be divided into three semesters. The last 12 months shall be devoted to the writing of the dissertation and design studio project.

3.5   Students must take any one of the electives which they are expected to passing each of the first and second stages of the programme for full-time and part-time.

4.0   ASSESSMENT OF CANDIDATES

No exemptions shall be allowed for any module on the basis of modules that were taken at undergraduate level or any programme of study that is deemed to be equivalent to an undergraduate degree. In exceptional cases, recommendations for exemption shall be sought from the Senate for modules that have been undertaken at postgraduate level and are deemed equivalent to modules being offered in this programme.

4.1   EXAMINATIONS

4.1.1   Formal examinations shall be conducted at the end of each semester for all modules with the exception of dissertation and integrative studies.

4.1.2   Candidates shall be required to pass all the modules as indicated in the programme.

4.1.3   Each candidate shall be required to write a one three-hour paper in each of the modules for which he/she registered in addition to the dissertation.

4.1.4   Each module, as well as the dissertation shall be marked out of one hundred percent.

4.1.5   Each module as well as dissertation where applicable shall have its assessment mark for presentation to the Board of Examiners' meeting.

4.1.6   In certain modules such as dissertation, oral examination shall be conducted by Departmental panel of examiners.

4.1.7   Each candidate shall be required to satisfy the examiners in the following areas:
    i.   Continuous assessment component   30%
    ii.   Written examination   70%

4.1.8   For dissertation, a resubmission period of three months shall normally be required.

4.2   The University marking scheme shall apply in all examinable modules as follows:

80 – 100 %	-	Distinction	(D)
70 – 79 %	-	Merit	(M)
60 – 69 %	-	Credit	(C)
50 – 59 %	-	Pass	(P)
0 – 49 %	-	Fail	(F)

4.3   A candidate must pass all registered modules. In the event of a candidate failing, the following conditions have to be noted:

4.3.1   A candidate must clear all modules before proceeding to the next Part

Think in other terms

4.3.2 A candidate who fails the dissertation with a mark of at least 45% shall be allowed to resubmit within 3 months of publication of results.

4.3.3 A candidate who fails the Landscape Design Studio Project shall be allowed to repeat the module.

4.3.8 On completion of the dissertation, a candidate shall submit two typed and spiral bound copies of the dissertation for assessment.

4.3.9 On completion of the Landscape Design Studio Project, the candidates shall submit a portfolio of designs and two typed and spiral bound copies of the written statements.

4.3.10 A candidate must pass all modules to qualify for the award of the Master of Urban Design degree.

4.3.11 The determination of the overall degree programme aggregate shall be:

Part	I	25%	Minimum 80 Credits
Part	II	25%	Minimum 80 Credits
Part	III	50%	Minimum 140 Credits

5.0 AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

5.1 Candidates for the degree programme must satisfy the examiners in all the prescribed modules and in all requirements for the programme

5.2 For the degree to be awarded, the minimum number of 300 credits must be satisfied. The classification of the degree programme shall be as in the General Regulations

Think in other terms

PROGRAMME SUMMARY

PART   I   **80 CREDITS**

Module Code	Module Description	Credits
BLA 6101	Landscape Architecture Studio I	20
BLA 6102	Landscape Architecture Theory and Practice	14
BLA 6103	Landscape Sciences	12
BLA 6104	Landscape Construction I	12
BLA 6105	History of Design in the Environment	12

PART II   **80 CREDITS**

BLA 6201	Landscape Architecture Studio II	20
BLA 6202	Rural and Urban Landscape Planning	12
BLA 6204	Landscape Construction II	14
BLA 6205	Design with Plants and Management of Organic Landscapes	12
BUD 6202	Research Methods in Urban Design	12

PART   III   **140 CREDITS**

BUD 7101	Dissertation	50
BUD 7102	Landscape Design Studio Project	90

ELECTIVES (A Candidate shall be required to select 1 elective for Parts I and II)

BUD 6205	Geographic Information Systems	10
BUD 6105	Transportation Planning and Management	10
BUD 6106	Project Planning and Management	10
BUD 6207	Environmental Design and Conservation	10

TOTAL CREDITS FOR THE PROGRAMME

PART I   80

PART II   80

PART III   140

Total minimum credits: 300

Think in other terms

MODULE SYNOPSES

BLA 6101   Landscape Architecture Studio I   20 Credits
This is a timetabled studio based module involving, briefing and critiques. These will include abstract design exercises, and life design projects for up to 6 weeks duration. The focus is on introductory projects that help to understand fundamental design compositional principles and developing a hand and digital-based approach to exploring design problems.

BLA 6102 Landscape Architecture Theory and Practice   14 Credits
This module shall be bases on lectures and seminars in natural processes, social processes, methodology, technology and values. The module explains the modern designed landscape as a distinct mode of cultural production. It examines design treaties, manifestos and contemporary theoretical writings from outside the design field.

BLA 6103   Landscape Sciences   12 Credits
This module shall be based on lectures and practicals in basic geology, soils, ecology, and horticulture. Field skills that are necessary for reading the land such as identification of plant communities, orientation, geology, hydrology, topography and soils will also be explored. Using this knowledge, site design issues will be explored and how they relate to be urban and non-urban environments.

BLA 6104   Landscape Construction I   12 Credits
The module shall be based on lectures site visits and exercises. Focus will be on site investigation, earthworks and grading, land drainage, roads paving and hard surfaces, fences, gates and walls. It empowers students with tools and skills for exploring, designing and critiquing the interrelationships of sites and the dynamic ecological systems that shape them.

BLA 6105   History of Design in the Environment   12 Credits
The module will give lectures on the history of design with focus on African, European, and Eastern examples of design and the environment concepts, historic purposes of designs, religious, symbolic display and function. Understanding of design concepts will be from the scale of the city, developing an understanding of the design process and compositional strategies in architectural and landscape architecture.

BUD 6202   Research Methods in Urban Design   12 Credits
The module focuses on various methods and techniques fundamental in data collection, anal]ysis and presentation. The overall objective of the module is to impart skill to students that can assist them in preparing technical reports and dissertations.

Think in other terms

BUD 6203   Urban Design Studio II   **30 Credits**

Urban design project 3: a series of sessions encompassing the practical management and implementation of urban design proposals involving larger sites, taking into account issues such as land acquisition, planning approvals, concept development, financing, the consultancy team, construction, marketing among others.

BUD 6204   Urban Design Seminars   **12 Credits**

This is a cross cutting module in which seminars introduce students to the designing and management of urban places. The focus is on issues arising in current urban design practice. The subject matter includes current contexts for urban design; the role of urban design in the development process; different urban design roles and levels of influence; public sector urban design, framework plans, design guidelines and implementation strategies. The module addresses urban economic analysis in the planning and development of urban areas from the point of view of practitioners in the field. During the module of the semester, each student shall prepare a thesis proposal. The module emphasises citizen and community participation frameworks in urban planning, design and sustainable development and management.

BUD 7101   Dissertation   **50 Credits**

This is an in-depth investigation of urban design or development issues which relate directly to the physical planning problems and potentials of urban areas. The topic chosen should be both academic and practical in nature and a report not exceeding 20,000 words or equivalent is required.

BUD 7102   Urban Design Studio Project   **90 Credits**

This is an in-depth urban design project based on a specific urban case study. The expected work at this level is of advanced standing and allows an in-depth exploration of complex design problems. In addition, it must be conducted in collaboration with city agencies addressing identified needs.

ELECTIVE MODULES

Only two electives shall be selected from the following list:

BUD   6207   Environmental Design and Conservation   **10 Credits**

The module aims at introducing students to issues of environmental awareness with regards to the impacts of human activities and strategies for coping with the changing environment. The module is conducted through lectures, case studies and seminars. The following broad topics are relevant: the ecology of the environment; the ecosystems-types and components; impacts of man's activities on the ecosystem and types of impacts; concepts and issues in environmental

impact assessments. The design of environmental spaces both external and internal spaces is alos explored.

BUD   6106   Project Planning and Management **10 Credits**

This module shall cover a wide range of issues relating to project planning and control, project internal and external environment, project planning and development, project organisation and administration, the project manager's role, project quality management principles, project appraisal, project management techniques, project practice and management. Project management knowledge areas such as cost, scope, time, risk, quality, performance, communication and so forth are also covered.

BUD 6205   Geographic Information Systems **10 Credits**

This module builds on spatial land-use analysis techniques. Focus is on the advanced theory and practice of Geographic Information Systems (GIS); GIS applications; design and implementation of GIS applications.

BUD 6105   Transportation Planning and Management **10 Credits**

The focus of this module is on the traditional transport study which focuses on trip generation, trip distribution, modal distribution and trip assignment; land-use modelling as well as the town and regional planner's contribution to transport planning.

FACULTY OF COMMUNICATION AND INFORMATION SCIENCE

Dean
Mr. S. Chabikwa, MSc in Library and Information Science, (NUST) PG Diploma in Media and Communication, (UZ)**,** BA (Gen), UZ

Professor
(Vacant)

Acting Assistant Registrar
Mrs. M.N. Mandiringa, BA Media Studies (ZOU)

Acting Chief Technician
Mr. M. Ruzive, Msc Information Systems (NUST), Bsc Computer Science (NUST), HND Computer Studies (Byo Poly), ND Computer Studies (Byo Poly)

Chief Secretary
Mrs. S.M. Makgatho, B. Comm Business Management, (MSU), ND Secretarial Studies, Byo Poly
NC Secretarial Studies (Byo Poly)

Senior Secretary
Ms. R. Ndlovu, BA English and Communication (ZOU), BA Special Honours in Lit. (ZOU), HND Office Management (Byo Poly), ND Secretarial Studies (Gweru Poly), NC Secretarial Studies (Gweru Poly)

FACULTY REGULATIONS FOR UNDERGRADUATE DEGREE PROGRAMMES

1.0   PREAMBLE

1.1   Faculty Regulations complement the General Academic Regulations for undergraduate degrees herein to be referred to as the General Regulations.
1.2   Faculty of Communication and Information Science offers the following undergraduate degrees: -
-    Bachelor of Science Honours Degree in Journalism and Media Studies
-    Bachelor of Science Honours Degree in Library and Information Science
-    Bachelor of Science Honours Degree in Publishing Media and Technology Studies
-    Bachelor of Science Honours Degree in Records and Archives Management
1.3   Undergraduate degrees offered by the Faculty of Communication and Information Science may be studied on a full-time basis over four Academic years, with one-year (at least 30 weeks) ear-marked for industrial attachment. A student placed under an organisation during Industrial Attachment period will be required to submit himself/herself to Rules and Regulations as apply to the employees of that organisation. Should it become necessary for the student under attachment to change the organisation, permission must be granted by the University.

2.0   ENTRY REGULATIONS

2.1   Applicants must satisfy conditions for entry to undergraduate degree programmes stipulated in the General Regulations.
2.2   For entry into undergraduate degree programmes in the Faculty of Communication and Information Science, applicants must have passed five (5) subjects at Ordinary Level (or its equivalent).
2.3   The five (5) subjects should include English Language. Mathematics with at least a C grade is an added advantage.
2.4   Apart from five (5) subjects at Ordinary Level, an applicant must have passed at least two (2) subjects at Advanced Level.
2.5   Applicants without a pass in Mathematics at Ordinary Level may be considered for admission to an undergraduate degree programme in the

Faculty when vacancies are available.

2.6 In approved cases a student may be exempted from Part I or Part II modules or both on condition that the student does not complete the full-time programme in less than three full academic years.

2.7 Holders of the Zimbabwe National Diploma from the Polytechnic colleges or the Technical Colleges (or their equivalent) who have passed the Diploma with merit (credits and distinctions) in half of the programme modules may qualify for entry into Part II of the Faculty of Communication and Information Science Undergraduate Honours Degree Programme.

3.0 EXAMINATIONS

3.1 Formal examinations will normally be held at the end of each semester of the programme.

3.2 Students to be admitted to the examination must have: -

3.2.1 Satisfactorily attended approved modules of study including submission of required written assignments.

3.2.2 Attended compulsory classes.

3.2.3 Participated in prescribed seminars, tutorials and practical classes.

3.2.4 Paid required fees in accordance with the General Regulations.

3.3 Formal examinations will normally be by written papers, but in some circumstances the examiner may test the student orally.

3.4 Module work may account for 30% of the overall assessment, while the formal examination will account for 70% of the overall assessment.

3.5 The pass mark will be 50%.

3.6 When the student is permitted by the Board of Examiners he/she may carry forward into the subsequent academic year not more than two modules which were not satisfactorily completed in the previous year, provided that the module(s) is (are) not pre-requisite(s) for the subsequent part.

3.7 In circumstances, a student may be allowed to re-write an examination without remaining in full-time study at the University or repeating the module of study.

4.0 DEGREE   CLASSIFICATION AND NOTIFICATION OF RESULTS

4.1 For purposes of degree classification, the parts of all degree programmes in the Faculty of Communication and Information Science will be weighted as follows: -

Part   I   10%
Part   II   20%
Part   III   20%
Part   IV   50%

4.2 For the purpose of degree classification Part I, Part II, Part III and Part IV

Think in other terms

results will be taken into consideration.

4.3 Results lists may be published in accordance with the provision of Section 13 of the General Regulations.

FACULTY REGULATIONS FOR POSTGRADUATE STUDIES

1.0 PREAMBLE

The following guidelines refer specifically to Diplomas and Masters Degrees by Module work. They set the procedure for Postgraduate programmes in the Faculty of Communication and Information Science, addressing issues such as application, admission, registration and examination. These guidelines should be read in conjunction with the University regulations for Higher Degrees.

2.0 POSTGRADUATE PROGRAMME DURATION

2.1 Postgraduate Diplomas

Refer to General Academic Regulations

2.2 Masters Degree Programmes by Module work

Refer to General Academic Regulations

3.0 ENTRY REQUIREMENTS

3.1 Postgraduate Diplomas

Refer to General Academic Regulations

3.2 Masters Degree

Refer to General Academic Regulations

4.0 SUBMISSION OF APPLICATIONS

4.1 Postgraduate Diplomas and Masters Degrees by Module work

Refer to General Academic Regulations

5.0 GRADING SCHEME AND CLASSIFICATION

5.1 Postgraduate Diplomas and Masters Degrees by Module work

Postgraduate Diplomas and Masters Degrees by Module work shall be awarded in the following categories: Distinction, Merit and Pass

The following Marking Scheme shall be used for the Module and Programmes:

Think in other terms

Marks	Description	Grade
80%	Distinction	(D)
70% - 79%	Merit	(M)
60% - 69%	Credit	(C)
50% - 59%	Pass	(P)
Below 50%	Fail	(F)

6.0 ASSESSMENT

Refer to General Academic Regulations

7.0 DETERMINATION OF CANDIDATES' RESULTS

Refer to General Academic Regulations

8.0 FAILURE TO SATISFY EXAMINERS

Refer to General Academic Regulations

9.0 CARRYING OVER

Candidates may be allowed to proceed carrying only two (2) modules to the next Stage or Part.

No candidates may carry over a particular Module for more than two (2) years.

No candidate will be allowed to proceed to Stage 3 (Dissertation) without clearing all Modules in Stage 1 and 2.

10.0   APPEALS AGAINST TERMINATION OF STUDIES

Refer to General Academic Regulations

11.0   AEGROTAT PROVISIONS

Refer to General Academic Regulations

12.0   PLAGIARISM AND MISCONDUCT AT EXAMINATIONS

Refer to General Academic Regulations

DEPARTMENT OF JOURNALISM AND MEDIA STUDIES

Lecturer and Chairperson
T. Mpofu, BA Gen, Postgrad Dip in Media & Comm Studies (UZ). MSc. Journalism & Media Studies (NUST)

Secretary
S. Sibanda, BSc. Entrepreneurship (LSU), HND office Management (Byo Poly)

Technician
M.N. Sibanda, BSc Computer Science (NUST), MSc Computer Science (NUST)

ACADEMIC STAFF

Professor
(Vacant)

Associate Professor
(Vacant)

Senior Lecturers
(Vacant)

Lecturers
Mphathisi Ndlovu, PhD (Stellenbosch), MA, Journalism & Media Studies (Rhodes University), BSc. (Hons) Journalism & Media Studies (NUST)

S. Mpofu, PhD, (Stellenbosch), MA Journalism, (Westminster London), BA Media Studies (ZOU), ND Mass Comm. (HP)

B. J. Ncube, PhD (University of Johannesburg), (in progress), MSc Journalism & Media Studies (NUST), PGDHE (NUST), BA Gen, Postgrad Dip in Media & Comm Studies, (UZ), Certificate in Broadcasting Radio (Netherlands Training Centre)

N. Ndlovu, PhD (Rhodes University) (in progress),MA, Journalism & Media Studies (Rhodes University) BSc. (Hons) Journalism & Media Studies (NUST)

T. Nkomo, PhD (UNISA), SA (in progress),MSc Journalism & Media Studies (NUST), BSc. (Hons) Journalism & Media Studies (NUST)

Think in other terms

L. Chidyagwayi, PhD (Rhodes University)(in progress),MSc Journalism & Media Studies (NUST), BSc. (Hons) Journalism & Media Studies (NUST), BA English & Philosophy, (UZ).

B. T. Jona, MSc Journalism & Media Studies (NUST), BSc. (Hons) Journalism & Media Studies (NUST)

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L.A. Tshuma, PhD (University of Johannesburg), (in progress),MSc Journalism & Media Studies (NUST), BSc(Hons) Journalism & Media Studies (NUST)

C. Moyo, MSc Journalism & Media Studies (NUST), BSc. (Hons) Journalism & Media Studies (NUST) (Temporary Full-time Lecturer)

Staff Development Fellow
(Vacant)

Tutorial Assistants
S. Mushava, BSc Journalism and Media Studies (NUST)

N. Boka, BSc Journalism and Media Studies (NUST)

M. Sibanda, BSc Journalism and Media Studies (NUST)

T. Moyo, BSc Journalism and Media Studies (NUST)

Research Fellows
(Vacant)

Professional Instructors
B. B. Tshuma, MSc Journalism & Media Studies (NUST), BSc. (Hons) Journalism & Media Studies (NUST)

M. Ndlovu, BSc. (Hons) Journalism & Media Studies (NUST) (Temporary-Full-time Professional Instructor)

Demonstrator
(Vacant)

Think in other terms

BACHELOR OF SCIENCE HONOURS DEGREE IN JOURNALISM AND MEDIA STUDIES

1.0   PREAMBLE

The Bachelor of Science Honours Degree in Journalism and Media Studies programme is aimed at students who are keen to pursue careers in the media and communication fields. The programme seeks to equip students with theoretical knowledge and practical skills to work in the media and communication industry that is being constantly transformed by political, economic, social and technological changes.

2.0   REGULATIONS

2.1   These regulations should be read in conjunction with the general university regulations for undergraduate studies, and the regulations of the Faculty of Communication and Information Science.

2.2   The Degree shall be awarded to students who have successfully completed the programme and passed the examinations in accordance with the regulations set out below.

3.0   ENTRY REQUIREMENTS

3.1   **Normal Entry**

Applicants must have the following qualifications (or their equivalent):

3.1.1   Five 'O' Level passes including English Language. Mathematics with at least a C grade is an added advantage.

3.1.2   Applicants with English Literature and/or Ndebele/Shona and any other approved 'A' Level Arts subject may be admitted into the BSc in Journalism and Media Studies.

3.2   **Special Entry**

3.2.1   Applicants who have successfully completed a National Diploma in Mass Communication, or have otherwise obtained equivalent qualifications, may apply for direct entry into Part I, depending on the experience acquired at the time of application.

3.2.2   Applicants who have a first degree from this or any other recognised institution may be allowed into the BSc (Hons) in Journalism and Media Studies.

4.0   PROGRAMME PROFILE

Degree type	Bachelor of Science Honours
Credit Load	532-534
SADC-QF Level	8
Accrediting authority	Zimbabwe Council for Higher Education (ZIMCHE)
Date of Accreditation	

4.1   **Structure of Programme**

   4.1.1 The degree programme may be studied on a full-time basis over four academic years. At Part I, students shall take modules on media theory, as well as several practical modules on print and broadcast media. At Part II, they shall have a choice of two practical electives.

   4.1.2 One year of the programme (at least 30 weeks) is earmarked for industrial attachment. A student placed under an organisation for attachment shall be required to submit himself/herself to rules and regulations as apply to the employees of that organisation. Should it become necessary for the student under attachment to move to another organisation, permission must be granted by the University.

   4.1.3 In the first semester of Part IV, a student shall take six core modules and one beat elective. The majority of these electives shall be taught at an advanced level in the second semester of Part IV. In the second semester of Part IV, a student shall take three core modules and shall choose two practicals and one beat elective. However, a student who has taken an introductory beat elective in the first semester and does not wish to continue to an advanced level can choose a non-advanced Part IV beat elective, or a Part II practical elective.

4.2   **Purpose of the Programme**

The aim of the Bachelor of Science (Hons) in Journalism and Media Studies is to produce graduates who can work in an industry that is facing various challenges, and which is being transformed by political, economic, and technological changes. The degree, therefore, seeks to equip students with skills that enable them to work in various media fields.

4.3   **Programme Characteristics**

   4.3.1 **Areas of Study**

   The programme focuses on several key areas, including:
   ● Media theories, media ethics and media law.
   ● News and feature reporting and writing.
   ● Information technology and online journalism.
   ● Public relations and advertising.

Think in other terms

4.3.2 Specialist Focus
- Print, broadcast and online journalism.
- Public relations.
- Media studies.

4.3.3 Orientation
The programme gives equal weight to theory and practice.

4.4 Career Opportunities and Further Education
Graduates can work in several fields, including newspapers, magazines, television, radio, online publications, public relations, advertising, government, non-governmental organisations, and in academia. Graduates of the programme can also proceed to Master's programmes in journalism and media studies, public relations, advertising, and developmental studies, among others.

4.5 Programme Delivery
Teaching and learning methods include lectures, tutorials, seminars, laboratory practicals, group work, industrial visits, industrial attachment, research projects and independent study. Students are assessed through essays, tests, oral presentations, practical work (news and feature stories, documentaries, radio programmes, etc), published news and feature stories, industrial attachment assessment, industrial attachment reports and dissertations among other means. Students taking practical modules are expected to produce industry-standard work.

4.6 Programme Competencies
4.6.1 Generic Competencies
- Ability to analyse and synthesise information.
- Methodological problem solving.
- Critical thinking.
- Verbal and written communication skills.
- Ability to reason and argue persuasively.
- Commitment to integrity and ethical conduct.

4.6.2 Discipline Specific Competencies
- Multimedia reporting and writing skills.
- Media literacy.
- Multimedia production skills.
- Media critique and analysis.
- Research skills.
- Commitment to integrity and ethical conduct.

Think in other terms

4.7 **Exit Level Outcomes**

Graduates of the programme should be able to:
- Report and write news and features for print, broadcast and online media.
- Utilise communication and publicity skills to pursue careers in the communication and public relations fields.
- Produce and understand a wide variety of media products, including films/documentaries, blogs/websites, magazines/newspapers, etc.
- Utilise their knowledge of the media industry and its techniques to analyse and critique its operations.
- Conduct research that identifies problems and suggests solutions that benefit the media industry and society.

5.0 MINIMUM BODY OF KNOWLEDGE IN JOURNALISM AND MEDIA STUDIES

- Skills to write and report news for print, broadcast and online media.
- Communication and publicity skills to pursue careers in the communication and public relations fields.
- Knowledge to produce and understand a wide variety of media products including films/documentaries, blogs/websites, magazines/newspapers etc.
- Knowledge of the media industry and techniques to analyse and critique its operations.
- Media literacy skills to enable students to engage with the society.
- Research skills to identify problems and suggest solutions for the benefit of society.

6.0 SCHEME OF EXAMINATION AND ASSESSMENT

6.1 Faculty Regulations for examinations shall apply.

6.1.1 However, in the following modules, module work shall account for 50% of overall assessment, while formal examination shall account for the other 50%:

IJM 1114	Foundation Skills in Journalism
IJM 1121	Introduction to Radio Production
IJM 1222	Introduction to Television Production
IJM 1223	News Writing
IJM 2122	Reporting and Writing
IJM 2123	Design and Layout
IJM 2124	Scriptwriting for Television and Radio
IJM 2214	Fundamentals of Film and Video Production
IJM 2220	Feature Writing

6.1.2 The following modules shall be examined entirely through continuous assessment. That is, continuous assessment shall account for 100 percent of the overall mark:

IJM 4220	Advanced Feature Writing
IJM 4221	Print Project
IJM 4222	Advanced Film and Documentary Production Project

Think in other terms

IJM 4223	Advanced Radio Production
IJM 4215	New Media: Practical project
IJM 4224	Advanced Photojournalism
IJM 4225	Sports Reporting II

6.2 Examination for modules in which continuous assessment accounts for 50 percent or 100 percent of the overall mark must meet the following basic requirements:

6.2.1 In modules where students are assessed on news stories, features or other types of articles, students must submit a minimum of five assignments, each of which must be revised at least once before being re-submitted for grading.

6.2.2 In broadcasting production modules, students must submit a minimum of four scripts and must also be assessed on production and post-production work.

6.2.3 If students opt to produce a class magazine or newspaper for IJM 4221 (Print Project), they shall be assessed on individual pages produced for the publication.

6.2.4 A student who fails a module that is examined 100 percent through continuous assessment shall not be able to supplement. That is, the student must repeat the module in the next Academic Year.

6.2.5 The following Grading Scheme shall be applied for all modules in the Programme:

75% and above	1	(First Division)
65% - 74%	2.1	(Upper Second Division)
60% - 64%	2.2	(Lower Second Division)
50% - 59%	Pass	
Below 50%	Fail	

6.2.6 The following are the contributions of each Part to the overall assessment:

Part I	10%
Part II	20%
Part III	20%
Part IV	50%

Think in other terms

PROGRAMME SUMMARY

Part I (135 Credits)

Module Code	Module Description	Credits
Semester I	(All Core Modules)	72
IJM 1113	Media in Zimbabwe	10
IJM 1114	Foundation Skills for Journalists	11
IJM 1115	Language and Practical Skills for Journalists	10
IJM 1120	Information Technology for Journalists I	11
IJM 1121	Radio Production I	11
IJM 1122	Introduction to Communication Theories	10
CTL 1101	Conflict Transformation and Leadership	9
Semester II	(All Core Modules)	63
IJM 1211	Media Law	10
IJM 1212	Media Ethics	10
IJM 1220	Media and Society	10
IJM 1221	Information Technology for Journalists II	11
IJM 1222	Introduction to Television Production	11
IJM 1223	News Writing	11

Part II (136 Credits)

Semester I   **67 Credits**

Core Modules

Module Code	Module Description	Credits
IJM 2112	Gender, Class, Race and the Media	11
IJM 2116	Communication for Development	10
IJM 2120	Media Economics and Management	11
IJM 2121	Global Media Institutions	11
IJM 2122	Reporting and Writing	12

Practical Electives

Module Code	Module Description	Credits
IJM 2123	Design and Layout	12
IJM 2124	Scriptwriting for Television and Radio	12

Semester II

Think in other terms

IJM 2211	Media, Human Rights and Democracy	11
IJM 2212	Applied Media Research Methods	11
IJM 2213	Public Relations I	12
IJM 2215	Media Texts and Reception	11
IJM 2216	Online Journalism	12

Practical Electives

IJM 2214	Fundamentals of Film and Video Production	12
IJM 2220	Feature Writing I	12

Part III

IJM 3001	Industrial Attachment	129

Part IV (132-134 Credits)

Semester I

IJM 4111	Media in Africa	10
IJM 4112	Critical Media Theory	10
IJM 4113	Health Communication	11
IJM 4120	Investigative Journalism	12
CBU 4109	Entrepreneurship	12

Beat and Theory Electives (Choose One)

IJM 4121	Economic Reporting I	12
IJM 4122	Eco and Science Journalism I	12
IJM 4123	Public Relations II	12
IJM 4124	Sports Reporting I	12
IJM 4125	Photojournalism I	12
IJM 4126	Entertainment Reporting I	12
IJM 4127	Health Reporting I	13
CBU 2102	Marketing Communications	10

Semester II

IJM 4010	Final Year Project	11
IJM 4211	Popular Culture: Theories and Perspectives	10
IJM 4214	Politics and the Media	10

Practical Elective Modules (Choose Two)

IJM 4220	Feature Writing II	12
IJM 4221	Print Project	12

Think in other terms

| IJM 4222 | Film and Documentary Project | 12 |
| IJM 4223 | Radio Production II | 12 |

Beat and Theory Elective Modules (Choose One)

IJM 4215	New Media: Practical Project	12
IJM 4224	Photojournalism II	12
IJM 4217	Advertising and the Media	10
IJM 4225	Sports Reporting II	12
IJM 4226	Economic Reporting II	12
IJM 4227	Eco and Science Journalism II	12
IJM 4228	Health Reporting II	12
IJM 4229	Entertainment Reporting II	12
IJM 4230	Public Relations III	12
CBU 1210	Foreign Languages	10

TOTAL CREDITS FOR THE PROGRAMME

Part I	135
Part II	136
Part III	129
Part IV	134

Total minimum credits: 534

Think in other terms

MODULE SYNOPSES

Semester I

IJM 1113 Media in Zimbabwe   **10 Credits**
Students shall trace the development of print media, broadcasting and film in Rhodesia. The module shall also show how politics and other factors affected the operation of the media during the colonial period. Students shall also focus on the structure of the media in independent Zimbabwe, and how ownership and control affect the media today.

IJM 1114 Foundation Skills in Journalism   **11 Credits**
The module introduces students to the basics of news writing. It focuses on the definition of news, the five Ws and H, the inverted pyramid, the different types of basic hard news lead, news values and newsroom job descriptions. Students shall also be introduced to newsgathering, as well as the different types of sources and how they can be cultivated. The module examines methods of researching news stories, as well as journalism theory, including the principles of journalism and the role of the news media. This is a practical module, therefore, students shall be expected to gather and write stories as part of their module work. They are also expected to keep abreast of current affairs and shall be tested on their news awareness.

IJM 1115 Language and Practical Skills for Journalists   **10 Credits**
The aim of the module is to help students make a smooth transition from high school to university, as well as introduce them to effective communication skills in journalism. It helps students develop essay writing skills. The module pays attention to language and grammar for essay writing, as well as news language and style. The module also focuses on teaching proper referencing and using the Internet for academic research. Students shall also be introduced to shorthand.

IJM 1220 Information Technology for Journalists I   **11 Credits**
Students shall be introduced to information technology concepts and principles that are critical to the practice of journalism. They shall look at the historical and evolutionary processes that led to the development of personal computers and consider how these have impacted on their profession. They shall be introduced to computer application programs and shown how journalists can utilise these during the gathering, storage and dissemination of news in a multimedia environment. Distributed computing shall also be covered, with a focus on its impact on the journalism field. Students shall study the evolution of the world-wide web, focusing on online journalism applications.

Think in other terms

IJM 1121 Radio Production I   **11 Credits**
In this module, students examine various models of radio broadcasting and radio programming in Zimbabwe and in other countries. This module also equips students with skills to use radio production technology, with particular focus on microphone usage, as well as recording and editing of radio programmes. It also equips them with knowledge about radio programme genres/formats such as radio news, radio dramas, music shows, talk shows, book reviews and radio sport among others. Students are also taught interviewing techniques and they are expected to produce dummy radio programmes as part of module work. The module also examines critical aspects of gender in radio production, including gender sensitivity in programming and programme content.

IJM 1122 Introduction to Communication Theories   **10 Credits**
The module introduces students to the basics of communication and mass communication concepts and issues. It considers questions about the nature of communication, its underpinnings and its various forms and levels in society. Students shall be introduced to models and theories of mass communication, as well as to gender, race and class issues. By the end of the module, they should be able to critically appreciate the nature and role of communication in society and be able to see mass communication as inextricably linked to other forms of human communication.

Semester II
IJM 1211 Media Law   **10 Credits**
The module begins by examining definitions of media law and examines the importance of media laws and media regulation in general. It also explores the various Zimbabwean laws governing media practice, taking note of their historical development and how they affect media freedom. Concepts such as freedom of expression and freedom of the media shall be examined in relation to the various laws governing the media in the country.

IJM 1212 Media Ethics   **10 Credits**
The module entails defining media ethics and identifying the differences between media ethics and media law. It examines the importance of media ethics and the various theories that are key in understanding ethics and morality. Various ethical principles such as objectivity, fairness, balance, and accuracy are explored. These issues shall also be examined in relation to issues of gender, race and ethnicity. In addition, the module focuses on codes of conduct, media councils and self-regulation, paying attention to their strengths and limitations. The module also deals with issues regarding ownership, editorial policy and their relationship to ethics. Students shall be required to undertake case studies on the ethical and professional conduct of the media, as well as on the ethical challenges faced by the media in Zimbabwe.

Think in other terms

IJM 1220 Media and Society   **10 Credits**

The module provides a detailed and critical overview of the normative theories of the media, such as social responsibility, libertarian, authoritarian, development and democratic participant theories. In addition, the functionalist, Marxist and watchdog roles of the media shall be examined. Students shall also explore the relationship between media and culture, media technologies and society and the rise of the information society. In its broad analysis of the relationship between the media and society, the module shall examine power inequalities manifested through gender, race, class and ethnic relations, among others.

IJM 1221 Information Technology for Journalists II   **11 Credits**

The aim of this module is to equip students with theoretical knowledge and practical skills to enable them to work in a multimedia environment. Students shall be introduced to computer graphics and they shall be required to create, edit, manipulate and present graphics using appropriate presentation techniques. Website design principles are introduced, with students expected to design and maintain their own websites. The major applications covered include MS FrontPage, Macromedia Dreamweaver, Adobe Photoshop and HTML. In addition, students shall study the historical evolution of the Internet, email and the World Wide Web.

IJM 1222 Introduction to Television Production   **11 Credits**

In this module, students examine various models of television broadcasting and television programming in Zimbabwe and in other countries. They also study the various elements of television production, such as sound, lighting, camera use, set design, scenery, titling and graphics, as well as the use of sound and visual effects. Students are equipped with knowledge about the characteristics of different television programme genres/formats, such as news, dramas, music shows, talk shows, and others. Students are also taught interviewing techniques and they are expected to produce dummy news bulletins, and talk shows as part of module work. The gender of television production is also examined, with particular focus on balance and equity in technical, and production roles, as well as gender sensitivity in programming and programme content.

IJM 1223 News Writing   **11 Credits**

The module aims to develop the news writing and gathering skills gained in Foundation Skills for Journalists. That is, it develops skills gained in newsgathering and hard news writing that uses the inverted pyramid format. It also introduces students to the hour-glass, focus, narrative and chronological styles of news writing. Students shall also be introduced to newsgathering and language use that is sensitive to gender, racial and ethnic groups. Students are also expected to keep abreast of current affairs and shall be tested on their news awareness.

Think in other terms

Part II (136 Credits)

Semester I

IJM 2112 Gender, Class, Race and the Media   **11 Credits**
This module critically examines the media's coverage and representation of gender, race, class and ethnic relations in society. Students shall study how the media can be used to advance the interests of specific minority groups in society by monitoring the media's coverage of minority groups in Southern Africa and by analysing case studies.

IJM 2116 Communication for Development   **10 Credits**
This module explores the relationship between development and communication, new information technologies and the media, focusing on how the media and ICTs can be harnessed to address social, political, economic and technological challenges that stand in the way of community development. It explores the concept of development, participatory models of development and the crafting of strategic communication. There is a practical approach to crafting strategies, with students expected to craft, design, implement and evaluate a communication plan in the context of a given problem. A number of theories on development shall be examined, and their validity and usefulness evaluated. The module shall also examine the roles played by governments, non-governmental organisations and other institutions in community development.

IJM 2120 Media Economics and Management   **11 Credits**
The module examines theoretical and practical perspectives on the management of media institutions. It aims to help students appreciate key factors (including gender, race and class) in the production, marketing and distribution of media products and also in the management of media institutions. The module focuses on how these factors affect the production, marketing and distribution of media products, as well as the management of media institutions. At the end of the module, students should have a local, regional and international perspective on the performance of media institutions and the factors affecting them.

IJM 2121 Global Media Institutions   **11 Credits**
This module explores the political economy of global media institutions, examining how these giant cultural industries are historically interlinked with corporate institutions and how this affects the practice of journalism. Students shall examine and critique the implications of concentration of ownership and of the rise of new media. In addition, the module focuses on globalisation in the context of cultural imperialism, exploring the coverage and representation of Third World countries and the implications this has had on the African media landscape.

Think in other terms

IJM 2122 Reporting and Writing   **12 Credits**
This module focuses on advanced news, building on what students have learnt in Foundation Skills in Journalism and News Writing. It shall also introduce editing for news. There is focus on advanced reporting, including advanced interviewing techniques, reporting on speeches, meetings, press conferences, as well as court and parliamentary proceedings, among others. The module also introduces investigative news gathering techniques. Students shall also be introduced to alternative leads, including 'buried' or 'delayed' leads; multi-paragraph leads; suspenseful leads and descriptive leads, among others. They shall also focus on writing effective endings to their news stories. Students are also expected to keep abreast of current affairs and shall be tested on their news awareness.

IJM 2123 Design and Layout   **12 Credits**
The module is chiefly practical, teaching students how to design and layout newspapers and magazines using the latest design software, such as Adobe In Design CS. Students shall also be exposed to advanced editing and sub-editing skills for both magazines and newspapers so that they can be better copy editors and sub-editors.

IJM 2124 Script Writing For Radio and Television   **12 Credits**
This is a practical module aimed at developing skills that shall enable students to become versatile television and radio writers. Students are introduced to the linear writing process used in television and radio writing. Emphasis is placed on the relationships and responsibilities of the writer in a collaborative production process, various approaches to television and radio writing, television and radio script terminology, script development processes, and scripts formats for various television and radio genres and roles. The module also focuses on the art of drawing up programme concepts. Students are required to approach radio and television stations with their concepts. Those who successfully do so shall be encouraged to concentrate on perfecting their broadcast writing skills. This module also covers gender, race, ethnic and class sensitive scripting to ensure that scripts do not symbolically annihilate and negatively cover women and minority groups in society.

Semester II
IJM 2211 Media, Human Rights and Democracy   **11 Credits**
This module explores issues of human rights, democracy and the media within the Zimbabwean, African and global context. It explores human rights and democracy practices in the country as defined by United Nations conventions, as well as regional and other sub-regional treaties and protocols. The module shall examine the issue of human rights and democracy at individual and international levels. It also explores the importance of the media in protecting these rights.

Think in other terms

IJM 2212 Applied Media Research Methods   **11 Credits**
Students learn the historical background to media and communication research. They shall learn how to identify research problems, come up with a research design, differentiate quantitative from qualitative research and how to use statistics to analyse data. They shall study various research methods and sampling techniques used in media research. Apart from general research methods, students shall also learn media specific research methods such as textual analysis, among others.

IJM 2213 Public Relations I   **12 Credits**
The module introduces students to public relations theory and practice. The primary objective is to enable students to understand the philosophy, detail and mechanics of public relations in order to understand how public relations functions in organisations and in society. The module perspective is that PR is a communication management function through which organisations adapt to, alter, or maintain relationships with others. Students shall learn public relations principles and theory by discussing and analysing current events and by also examining how gender, race and class issues affect the practice of public relations.

IJM 2215 Media Texts and Reception   **11 Credits**
The module traces the history of reception and audience studies and explores debates about passive audiences and powerful texts. Using well-known studies such as David Morley's nationwide studies, students shall analyse the role of social contexts, ideology, culture and history in people's interpretation of media texts and the meaning they derive from them. The module also examines issues related to commodification, ethnography and technology and how they affect the reception of media texts.

IJM 2216 Online Journalism   **12 Credits**
In this module, students shall learn to use software for online journalism and shall also be equipped with skills to write and report for new media. They shall also learn to create and maintain weblogs and to use photos, video, audio and data on the Internet when presenting multimedia stories. The module also examines the impact of new media on journalism practices.

Practical Electives

IJM 2214 Fundamentals of Film and Television Production   **12 Credits**
The module directs students' attention to practical aspects of film and video production to help them develop the skills required of a versatile film producer. It builds on the writing and scriptwriting foundation laid in the first semester. Emphasis is placed on film/video production terminology, practical aspects of camera work, and acting/performing for film/video. Students learn the basics of shooting, directing, editing, budgeting and marketing in film production. To apply theory to practice, students are mainly expected to produce 30 minute films and/or documentaries. The module examines the responsibilities of and the challenges facing an

Think in other terms

independent film writer and producer in an independent production process. These responsibilities include script development, budgeting, producing, editing and marketing the end product (documentary and film trailer production). Films and documentaries shall focus on gender and political topics, among others.

IJM 2220 Feature Writing I   **12 Credits**

The module introduces students to writing feature stories. Students shall learn how to select a topic for a feature story and how to distinguish between the different types of features. They shall learn how to write summary, quotation, anecdote, question, action/narrative and descriptive feature leads, among others. The module also examines the different formats that can be used to write the body of a feature story, as well as effective endings for features. It also introduces editing for feature articles. Students are also expected to keep abreast of current affairs and shall be tested on their news awareness. Extra credit shall be given for any published work.

Part III
Semester I & II   **(129 Credits)**
IJM 3001 Industrial Attachment
Students go on industrial attachment.

Part IV   **(132 -134 Credits)**

Semester I

IJM 4010 Final Year Project   **11 CREDITS**

Students are expected to submit project proposals in the First Semester and attend prescribed research seminars, which are intended to help them carry out their dissertation projects that are completed and submitted for assessment at the end of the Second Semester. The choice of topics will be subject to the availability of supervisors. All chapters are expected to pass through a supervisor before a final project is compiled. Any dissertation whose chapters are not seen and approved by a supervisor will not be accepted for assessment. Students are expected to follow the Departmental guide on dissertation writing.

IJM 4111 Media in Africa   **10 Credits**

The module explores the media in Africa, concentrating on selected regions. It shall provide a historical overview of the media, analysing the key issues that define and distinguish the media of one region from another. The regions studied in depth are southern, eastern and western Africa. The media environment of at least two countries in each region shall be explored. Students shall also examine how the various forms of media have performed during the colonial

and post-colonial periods. The module shall also explore emerging media ownership patterns, the factors behind them and their implications for the development of the media in Africa.

IJM 4112 Critical Media Theory   **10 Credits**
The module briefly introduces classical Marxism before examining the ideas of critical theorists influenced by Karl Marx. Students shall take an in-depth look at the media theories of the Frankfurt School, political economy theory, Anthonio Gramsci and Louis Althussser. They shall also examine the work of theorists working within cultural studies and postmodernism. In addition, the module outlines the history of feminist theory before examining feminist perspectives on the media.

IJM 4113 Health Communication   **11 Credits**
This module explores various health communication strategies and the role of the media in communicating health issues. It offers a theoretical base for the understanding and promotion of health behaviour. The module outlines models of health behaviour promotion, culminating in the design of a communication strategy. The module also examines how access to health information and services can be affected by gender roles, the different needs and interests of women and men, as well as relations between men and women. Students are expected to monitor the Zimbabwean media's coverage of various health issues, as well as assess how new information and communication technologies have contributed to health communication.

IJM 4120 Investigative Journalism   **12 Credits**
The module introduces students to the world of investigative reporting, focusing on investigative reporting skills/techniques ranging from hypothesis formulation, planning, researching, interviewing and writing. Students shall also examine the ethics of investigative reporting. They are also expected to keep abreast of current affairs and shall be tested on their news awareness.

Beat and Theory Electives

IJM 4121 Economic Reporting I   **12 Credits**
The module introduces techniques for researching and writing about the economy and business. Students shall be equipped with the knowledge and skills required to cover economics, financial markets and companies. They shall be introduced to microeconomics and macroeconomics, microeconomic policy and business journalism ethics. They shall also be equipped with the skills to write about financial markets and company accounts. They shall be expected to produce business and financial news stories.

IJM 4122 Eco and Science Journalism I   **12 Credits**
The purpose of this module is to teach students how to research, report and write about science and the environment. Topics covered shall range from the history of science and environmental

journalism to local, national and global laws and policies on the environment. The module also covers ethical issues in science and environmental reporting, the interpretation of scientific jargon and the use of statistics. Students shall write in-depth articles about scientific and environmental issues with the goal of publishing them.

IJM 4123 Public Relations II   **12 Credits**

The module builds on the knowledge that students have gained from Introduction to Public Relations, as well as on their experiences in industry. Through seminars and group discussions, students shall explore public relations concepts in relation to their experiences in industry. Through case studies of local and international companies, students shall explore the practice of PR and how it affects the performance of companies in both profit and non-profit making industries. As part of continuous assessment, students shall be expected to design and implement a PR programme in partnership with an organisation of their choice.

IJM 4124 Sports Reporting I   **12 Credits**

The module introduces students to sports reporting as a specialised form of journalism and considers both philosophical and practical issues about the field. It also interrogates the relationship between the sports industry and the media and how it affects the practice of professional sports journalism, with reference to both local and international cases studies. Gender, race and class issues and how they affect sports reporting shall be considered to enable students to understand their impact on the mediation of sport in general. In practice, students shall be expected to attend and report on sporting events.

IJM 4125 Photojournalism I   **12 Credits**

The primary goal of this module is to equip students with skills beyond the technical aspects of photography. Students shall learn the theory and practice of manual and auto focus cameras and the principles of composition. They shall be trained to process digital images using modern software packages. They shall also be expected to critique the use of pictures in the print media in Zimbabwe. At the end of the module, students should be able to think critically about content and composition.

IJM 4126 Entertainment Reporting I   **12 Credits**

The module explores different types of entertainment reporting for print and online media. These include film and television programme reviews, book reviews, music album or song reviews, celebrity news and gossip, fashion, modelling and entertainment features. The module also introduces students to the entertainment industry so that they can effectively report entertainment issues.

IJM 4127 Health Reporting I   **13 Credits**

This module introduces students to the practice of health reporting. It considers the history of health reporting and the factors that have led to it being a significant part of the media industry.

Think in other terms

Students shall be introduced to the language of health reporting, sources and markets for health stories, health reporting ethics and contemporary issues dominating health reporting. At the end of the module, students should be able to identify and develop health stories for both print and electronic media.

Semester II

IJM 4010 Final Year Project   11 Credits
Students are expected to submit project proposals in the First Semester and attend prescribed research seminars, which are intended to help them carry out their dissertation projects that are completed and submitted for assessment at the end of the Second Semester. The choice of topics will be subject to the availability of supervisors. All chapters are expected to pass through a supervisor before a final project is compiled. Any dissertation whose chapters are not seen and approved by a supervisor will not be accepted for assessment. Students are expected to follow the Departmental guide on dissertation writing.

IJM 4211 Popular Culture: Theories and Perspectives   10 Credits
The module explores the various definitions of popular culture and its relationship to the media. Students shall also examine several theoretical perspectives on popular culture, including the Frankfurt School, political economy theory, neo-Gramscian hegemonic theory, cultural studies, feminism and postmodernism. The module also focuses on popular music, soap operas, film, advertising, fashion and reality television as forms of popular culture.

IJM 4212 Politics And The Media   10 Credits
The module aims to provide a deeper understanding of the role of the media in modern democracies by examining normative and critical perspectives on political media. Students shall study the construction of political news and examine the forces that shape news stories. They shall also examine the use of photography and political cartoons in the news media. In addition, the module focuses on the media's political effects and the impact of new media on political news. Students are expected to monitor local, regional and international political news and shall be required to critically analyse news stories. The module also pays attention to political news management, the marketisation of political news, election coverage and war/crisis reporting.

Practical Electives

IJM 4220 Feature Writing II   12 Credits
The module builds on the skills obtained in Feature Writing and also introduces students to column writing. It focuses on researching, writing and editing several types of feature stories. Students shall be equipped with skills to research, write and edit news features, news analyses,

profiles and narrative features, among others. The module shall highlight the differences between informational, expressive, descriptive, persuasive and narrative writing that uses fictional techniques to tell nonfiction stories. It also takes an in-depth look at persuasive and expressive feature writing. It shall introduce students to leader/editorial writing, writing opinion columns, reviews as well as political and lifestyle columns. Areas of focus shall include adopting the right tone to gain readers' confidence, developing a credible argument, choosing the appropriate language, as well as using dramatic emphasis for lively and engaging pieces.   Extra credit shall be given for any published work.

IJM 4221 Print Project   12 Credits
The module is the culmination of all practical print journalism modules. Students are expected to show their understanding of these practical modules through producing either a newspaper or a magazine. They are expected to show understating of writing stories, design and layout.

IJM 4222 Film and Documentary Production Project   12 Credits
This module draws on knowledge gained by students in year one and two modules on television production. Students are expected to develop a film script that focuses on gender, HIV/AIDS, culture and power problems in society. The script should indicate the problem, the struggle, the climax and lastly the resolution of the problem. Narrative theories are also be used as a point of reference in crafting and shaping the theme of the film in the script. Student are then required to use production aesthetics, shot sizes, scenery, costumes, light, sound, and so forth, to convert the script into a film that can change attitudes, stimulate tolerance, and unite audiences to adopt the theme. The module tests students' competencies in initiating and completing pre –production, production, and post production stages in film production. It empowers students with the skills to become independent film producers who can come up with best-selling films. The module also focuses on the production of trailers for marketing produced films.

IJM 4223 Radio Production II   12 Credits
This module focuses on radio news, magazine and current affairs programmes. It focuses on the use of conventions of news bulletin, magazine, phone-in and radio discussion and radio current affairs formats to produce these programmes. Students shall be assigned to produce various radio programmes.
Beat and Theory Electives

IJM 4215 New Media: Practical Project   12 Credits
Students shall establish their own new media projects and manage them during the module of the semester. They shall design websites for specific communities or organisations and regularly upload information during the module of the semester. They are expected to produce projects with visual appeal and with content that is easy to use and access.

IJM 4224 Photojournalism II   **12 Credits**

Photojournalism students shall receive practical training in photographing, editing and presenting news and feature stories in which the essential information is photographic. The program prepares photojournalists who are fully aware of the power of photography, are well grounded in the legal and ethical traditions of the profession and are practically prepared to make a significant contribution to contemporary journalism. Technical skills development in Photoshop and the advanced use of professional digital cameras is combined with an academic understanding of the historical debates and critical theories of photojournalistic practice.

IJM 4217 Advertising and the Media   **10 Credits**

The module introduces students to advertising and how it relates to the media industry. This shall entail tracing the history of advertising, understanding the relationship between advertising and culture, as well as its influences on commercial media. Students shall explore the development and operations of advertising agencies as a key component of advertising. They shall also evaluate the Zimbabwean advertising industry. The module also explores ethical issues in advertising. Students shall also focus on practical aspects such as media planning, the creative process in advertising and the actual production of advertisements.

IJM 4225 Sports Reporting II   **12 Credits**

The module is tailored for students who have experience in sports reporting and who want to further develop their knowledge and skill as sports journalists. It shall build on knowledge and skill gained in the introductory module, with emphasis on specialised reporting and feature writing. Conceptually, students shall explore the history, nature and market for specialised sports reporting. In practice, students shall be expected to choose a sports discipline to specialise in, and, as part of continuous assessment, develop a portfolio of critical, in-depth and analytical feature articles on that discipline. Extra credit shall be given for any published work.

IJM 4226 Economic Reporting II   **12 Credits**

The module builds on Introduction to Economic Report and equips students with other skills required to effectively cover the economy and business. Students shall continue to examine microeconomics and macroeconomics, financial markets, economic policy and company accounts. They shall also be introduced to covering business finance, debt markets and poverty. They shall be expected to produce business news stories, features and analyses. Extra credit shall be given for any published work.

IJM 4227 Eco and Science Journalism II   **12 Credits**

This module examines important issues that journalists need to know in order to cover science and the environment. Students shall pay special attention to the story of the century: the climate change that shall affect every aspect of our society. The module shall examine the current debates on global warming and the journalists who report on it. They shall also examine notable scientific discoveries, inventions, adaptations and other developments, looking at both their positive and negative effects. Students shall learn how to recognise and find good stories, how to

approach environmental and scientific issues, how to deal with scientists, as well as how to research, report and write from the field. They shall learn to use a variety of tools, including qualitative research, in environmental and science news gathering. The module shall deal with current, controversial topics and students shall strive to have their individual work published or broadcast. Extra credit shall be given for any published work.

IJM 4228 Health Reporting II   12 Credits

Advanced health reporting builds on the knowledge and skills gained in Introduction to Health reporting. At this stage, students are introduced to specialised health reporting, paying attention to why and how it developed. Case studies of the coverage of particular health issues shall be examined as part of continuous assessment so as to critically evaluate the role and importance of health reporting in society. Students shall also be expected to write health features on areas of their choice. Extra credit shall be given for any published work.

IJM 4229 Entertainment Reporting II   12 Credits

This module builds up on the introductory module but pays particular attention to entertainment reporting in the broadcast media. The module focuses on different kinds of programmes on television and radio that are fact-based but are also meant to be artistic and entertaining. This module allows students to focus on these types of programmes, learning to create unique, interesting personal stories, and specific styles of writing and interviewing for radio and television entertainment. Students shall choose an entertainment/feature program, do an extensive deconstruction of it and create their own original half hour entertainment/feature program that includes a 'backgrounder', an interview and a profile.

IJM 4230 Public Relations III   12 Credits

The module builds on the knowledge and skills gained in Advanced Public Relations I, and provides students with an opportunity to demonstrate their mastery of those skills. The primary aim of the module is to prepare students to work in the public relations industry. The module shall focus on crisis, corporate and online communication. It shall also examine events management and international public relations. Working in groups, students shall tackle two public relations campaign projects.

MASTERS DEGREE PROGRAMME

1.0 PREAMBLE

The Master of Science in Journalism and Media Studies programme is aimed at students who are keen to have an advanced understanding of contemporary journalism practices, the role of the media in society and the philosophy that informs journalism practices, particularly in developing contexts. Through the critical examination of the media as institutions, which act and are acted upon by various social forces, the module enables students to have an understanding of media institutions and journalism practices as informed by economic, political, cultural and ideological foundations. Emphasis shall also be placed on the understanding of journalism's potential contributions to sustainable development, conflict transformation and generally the well-being of society.

2.0 REGULATIONS

The regulations for the Master of Science degree, hereinafter referred to as the Master of Science in Journalism and Media Studies, complement, and are subordinate to, University General Regulations for Masters degree by module work and Faculty of Communication and Information Science Regulations.

3.0 ENTRY REQUIREMENTS
3.1 Communication Studies, Public Relations and Advertising.
3.2 Candidates with at least a Second Class Honours degree in the above areas shall be required to have at least three years post-qualification practical experience in a recognized media house.
3.3 Candidates with any good first degree and a postgraduate diploma in Journalism and/or Media Studies or related field may be admitted into the Masters programme.

4.0 PROGRAMME PROFILE

Degree type	Master of Science
Credit Load	291-306
SADC-QF Level	9
Accrediting authority	Zimbabwe Council for Higher Education (ZIMCHE)
Date of Accreditation	

5.0 STRUCTURE OF PROGRAMME AND SELECTION OF MODULES

On a full-time basis, the programme shall be studied over a period of 18 months, of which a minimum of six months shall be for the dissertation. On a Block release basis, the MSc programme shall be studied over a period of 24 months. A full-time MSc student may, for good reason and subject to approval by Senate on the recommendation of the

Faculty Board, transfer to the part-time programme or vice-versa, provided the student meets the requirements of the part of the programme he/she is transferring to.

6.0   Purpose of the Programme

The aim of the Master of Science in Journalism and Media Studies is to impart an advanced understanding of contemporary journalism practice, the role of the media in society as well as the philosophies that inform journalism practice.

7.0   Programme Characteristics
7.1   Areas of Study
The programme focuses on several key areas, including:
- Media theories, film theory, and journalism debates and trends.
- Advanced news and feature reporting and writing.
- Advanced television and online journalism, as well as advanced documentary and magazine production.
- Advanced investigative journalism and editing practices.

7.2 Specialist Focus
- Print, broadcast and online journalism
- Media studies.
- Science and environmental journalism.
- Media management.

7.3   Orientation
The programme gives equal weight to theory and practice.

7.4   Career Opportunities and Further Education
Graduates can work in several fields, including newspapers, magazines, television, radio, online publications, public relations, advertising, government, non-governmental organisations, and in academia. Graduates of the programme can also proceed to doctoral studies in journalism and media studies, public relations, advertising, and developmental studies, among others.

7.5   Programme Delivery
Teaching and learning methods include lectures, tutorials, seminars, laboratory practical, group work, research projects, and independent study. Students are assessed through essays, tests, oral presentations, practical work (news and feature stories, documentaries, radio programmes, etc), published news and feature stories, and dissertations, among other means. Students taking practical modules are expected to produce industry-standard work.

Think in other terms

7.6 Programme Competencies

7.6.1 Generic Competencies

- Ability to analyse and synthesise information.
- Methodological problem solving.
- Critical thinking.
- Verbal and written communication skills.
- Ability to reason and argue persuasively.
- Commitment to integrity and ethical conduct.

7.6.2 Discipline Specific Competencies

- Multimedia reporting and writing skills.
- Media literacy.
- Multimedia production skills.
- Media critique and analysis.
- Research skills.
- Commitment to integrity and ethical conduct.

8.0 EXIT LEVEL OUTCOMES

Graduates of the programme should be able to:

- Report and write news and features for print, broadcast and online media.
- Produce television programmes.
- Utilise communication and publicity skills to pursue careers in the communication and public relations fields.
- Produce and understand a wide variety of media products, including films/documentaries, blogs/websites, magazines/newspapers, etc.
- Utilise their knowledge of the media industry and its techniques to analyse and critique its operations.
- Conduct research that identifies problems and suggests solutions that benefit the media industry and society.

9.0 DETERMINATION OF RESULTS OF MODULES

9.1 Scheme of Examination and Assessment

9.1.1 Examination

A formal three-hour examination shall be conducted in all modules at the end of each semester, except for the dissertation and IJM 6104 and IJM 6105, which shall require the submission of a final practical project and a final paper respectively.

9.1.2 Module work shall account for 40% of overall assessment, while the formal examination shall account for 60% of the overall assessment.

Think in other terms

9.2 **Carrying Over**
    9.2.1 Candidates may be allowed to proceed carrying only two (2) modules to the next Stage or Part.
    9.2.2 No candidate may carry over a particular Module for more than two (2) years.
    9.2.3 No candidate will be allowed to proceed to Stage 3 (Dissertation) without clearing all Modules in Stages 1 and 2.

9.3 **Repeating Modules**
No candidate shall be allowed to repeat a module or stage for more than once.

Credit calculations on the Masters programme

Note that our MSc has electives hence the final credits per student depend on the choice of electives.

10.0 DISSERTATION
10.1   A dissertation shall carry the overall weight of 30% of the entire programme.
10.2   The dissertation should have approximately 20 000 words.
10.3   After the dissertation has been submitted, a student shall be required to defend it before the Departmental Board of Examiners. Oral defence of the dissertation shall constitute 25% of the total dissertation mark.
10.4   A student must submit four copies of the dissertation, bound according to departmental specifications.

11.0 AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE
In order to be awarded the Master of Science degree in Journalism and Media studies, a student shall be required to pass all modules taken in the programme.

11.1 Grading Scheme
The following classification shall be used for the programme:

Marks	Description	Grade
80% and above	Distinction	(D)
70% - 79%	Merit	(M)
60% - 69%	Credit	(C)
50% – 59%	Pass	(P)
49% and below	Fail	(F)

PROGRAMME SUMMARY

Year One   **(160-169 Credits)**

Semester I

Core Modules

Module Code	Module Description	Credits
IJM 5101	Media and Society: Theories and Perspectives	24
IJM 5102	Contemporary issues in Journalism	30

Electives (Choose One)

IJM 5103	Science, Health and the Environment Journalism	30
IJM 5104	Advanced Investigative Journalism	30
IJM 5105	Electronic Publishing	26

Semester II

Core Modules

IJM 5201	Research Methodology in Journalism and Media Studies	25
IJM 5202	Journalism, Development and Democracy	30

Electives (Choose One)

IJM 5203	Advanced News Writing and Editing	30
IJM 5204	Advanced Television Journalism	30
IJM 5205	Film Theory and Practices	30
IJM 5206	Conflict Transformation, Management and Journalism	25

Year Two   **(160-169 Credits)**

Semester I

Core Modules

IJM 6100	Dissertation	26
IJM 6101	Strategic Media Management	24
IJM 6102	Media Texts and Audiences	30

Electives (Choose One)

IJM 6103	Advertising and Corporate Communications	24
IJM 6104	Journalism Production Project	30
IJM 6105	Special Topics in Journalism	30

Semester II

IJM 6200	Dissertation	27

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	**200**
YEAR II	**200**
Total minimum credits:	**400**

MODULE SYNOPSES

Year I

Semester I
IJM 5101 Media and Society: Theories and Perspectives   **24 Credits**
The module examines the philosophical foundations of journalism practice and the sociological nature of media institutions. As such, issues related to the professionalisation of journalism, the sociology of news, objectivity and fairness shall be examined in detail. The module shall also apply the instrumental and advanced critical perspectives to the understanding of the role of the media in society.

IJM 5102   Contemporary Issues In Journalism   **30 Credits**
The module shall explore global trends in journalism emanating from how different news media organizations are structured and the resultant implications on practice and professionalism. Issues related to the role of journalism in a world characterized by many changes shall be looked at in relation to the impact of global trends on journalism and also on whether journalism influences these trends. The module shall also look into developments in new information and communication technologies and how they have given birth to concepts such as blogging, 'citizen journalism', advocacy journalism and many other issues related to the role of journalism in society.

Electives
IJM 5103: Science, Health and the Environment Journalism   **30 Credits**
The module is aimed at equipping students with knowledge that is needed to become outstanding science, environment and health journalists. In the first instance, students learn the importance of the three areas to achieving sustainable development and also examine key topics in the philosophies of the practice of science, toxicology, environmental law, risk assessment, epidemiology, science and environmental databases. Students shall learn to research and write incisive stories from scientific journals, papers and conferences. Prominent guest speakers in the above areas shall also be invited to make presentations and interact with students. Special attention shall also be given to topical issues of relevance to Zimbabwe.

IJM 5104:   Advanced Investigative Journalism   **30 Credits**
This module is aimed at equipping students with the skills required for them to become effective investigative journalists. Key aspects of the module include sourcing of story ideas, research, interviewing and building sources for effective investigative journalism. Students also undertake investigative journalism case studies and also trace the history, challenges and the potential of investigative journalism practice in Zimbabwe.

Think in other terms

IJM 5105   Electronic Publishing   26 Credits
The module critically examines the history and practice of journalism in new media, with special reference to Southern Africa. Aspects to be covered shall include study of the Web as a communication medium, online research and referencing, user centered–designs, lear navigation, general information architecture, graphics and the various online storytelling techniques. The module shall also explore the reception of online content and examine the implications of this to the practice of online journalism in Zimbabwe.

Semester II

Core Modules
IJM 5201 Research Methodology in Journalism and Media Studies   25 Credits
The module aims at equipping students with both the theoretical and practical knowledge of conducting research in journalism and media studies. Students explore the history of research in journalism and media studies, the philosophy informing major research approaches, various key data gathering and analysis techniques commonly used in the field. Emphasis shall also be given to research ethics, report writing and the general state of journalism and media studies research in Africa.

IJM 5202   Journalism, Development and Democracy   30 Credits
This module provides students with an understanding of the role of journalism in development and democracy. Students problematise the concepts of development and democracy and also critique the various journalism understandings, such as the public sphere, watchdog and advocacy understandings, as well as the implications of these understandings to development and democracy. Special focus shall be given to the practice of journalism in Africa and its implications to development and democracy on the continent.

Electives
IJM 5203   Advanced News Writing and Editing   30 Credits
This module explores the international trends in news writing and editing, with special attention given to advanced narrative storytelling techniques and recent editing practices. This module shall be mainly practical and students shall also be expected to undertake practical critiques and reviews of news writing and editing practices locally.

IJM 5204   Advanced Television Journalism   30 Credits
This module equips students with skills to produce non-fiction television content and to report on air, on location and in the studio. Other issues to be covered include mechanical and aesthetic editing of news clips, knowledge of various news writing formats, newsroom organisation and other key aspects. Students shall be expected to produce news clips and demonstrate news judgment by organizing news stories into 20-minute newscasts.

Think in other terms

IJM 5205   Film Theory and Practices   30 Credits

In this module, students study the history and contemporary film production practices in Africa. Film production practices in successful African countries like Nigeria shall also be studied in greater depth. Students shall also learn the practical aspects related to film production and, as part of module work, students shall be expected to produce a 20-30 minute short film. Experienced film producers in the country shall also be invited to give seminars on film production.

IJM 5206   Conflict Transformation, Management and Journalism   25 Credits

The module explores the role of journalism in conflict transformation and management, with specific focus on the African continent.   Using the theoretical knowledge gained in other modules, students examine the role that can be played by the media to prevent, manage and resolve conflicts. Case studies of the media's coverage of conflicts shall be undertaken.

Year II

Semester II

IJM 6100   Dissertation   26 Credits

Students are expected to initially attend prescribed research seminars and then identify a research topic of their choice, submit a research proposal, review relevant literature and identify the theoretical framework. The choice of topics shall be subject to the availability of supervisors.

IJM 6101   Strategic Media Management   24 Credits

The module is aimed at equipping students with the skills of developing long term strategies of improving business performance through improved advertising, circulation and general resources utilization. This subject introduces students to concepts and practical issues concerned with strategic management. Topics to be examined include strategy formulation and planning, business environment analysis, strategy implementation, strategy and competitive advantage, dynamics of strategy, among others.

IJM 6102   Media Texts and Audiences   30 Credits

In this module students shall study the history of audience studies and explore how different theoretical perspectives on active and inactive media audiences and the nature of texts impact on our understanding of everyday media audiences. Students further explore the practical challenges related to textual analysis beyond the common representation and stereotyping dimensions. Specific attention shall also be given to the study of 'rural' audience analysis, persuasion, public opinion and the public use of different media and media content.

Think in other terms

Electives

IJM 6103   Advertising and Corporate Communications   24 Credits

The advertising aspect of the module examines the managerial, economic, legal and cultural implications of the advertising industry, as well as practical aspects such as advertising planning, creative strategies and media planning. In corporate communications, students examine issues related to internal communications, media relations as well as reputation and image management. The module shall provide students with an insight into the contemporary advertising and corporate communications practices worldwide.

IJM 6104   Journalism Production Project   30 Credits

This is a production-based module that shall allow students to produce a sustained and sizable piece of work to demonstrate their theoretical understanding and practical print, television and/or film production skills. Production proposals must be accepted by the department in advance and shall be allocated to individual supervisors.

IJM 6105   Special Topics in Journalism   30 Credits

In this module, students may select individual topics in journalism and, with the assistance of their lecturers, delve into them in detail and submit detailed critical papers of at least 25 double spaced pages. Students must show both exhaustive depth and a high level of analysis in covering contemporary understanding in their chosen areas.

Semester II

6200   Dissertation   27 Credits

During this semester, students shall continue working on their dissertations by conducting field research, analyzing findings and writing up their research project reports.

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE

Lecturer and Acting Chairperson
T. Matingwina, PhD LIS (University of Cape Town) MSc LIS (NUST), BSc. (Hons) LIS, (NUST)

Secretary
V. Kuzipa, ND Secretarial Studies (Byo Poly)

Technician
(Vacant)

ACADEMIC STAFF

Professor
(Vacant)

Associate Professor
(Vacant)

Senior Lecturers
(Vacant)

Lecturers
T. Machimbidza, PhD Information Studies (University of KwaZulu-Natal), South Africa, BSc. (Hons) LIS, (NUST)

N. Pasipamire, PhD LIS (University of KwaZulu-Natal), MPhil LIS (NUST), BSc. (Hons) LIS, (NUST)

E. Maisiri, MSc LIS, (NUST), PGDHE (NUST), PGDLIS (UB), BSc (Hons). Soc (UZ)

N. Guvava MSc LIS (NUST), BSc. (Hons) LIS, (NUST)

D. B. Mupambwa, MSc LIS (NUST), BSc. (Hons) LIS, (NUST), PGDHE (NUST)

A. R. Nyaku, MSc LIS (NUST), BSc.Comp Science & Maths (UZ)

P. Ngwenya –Tizora, MA Applied Linguistics (UZ), BA UZ, PGDLIS (NUST)

Dr T. Mugwisi, PhD LIS, MA LIS, (University of Zululand), South Africa, BLS, (Loughborough University) UK(Temporary Full-Time Lecturer)

Think in other terms

E. Mupaikwa, MSc LIS (NUST), BSc. (Hons) Computer Science (NUST), HND Computer Science (Byo Poly)

S. S.M. Tizora, MA English (UZ), Dip in Teaching English as a Foreign Language (UZ), BA, (UZ)

E. Mackina, MSc LIS (NUST), BSc. (Hons) LIS, (NUST)

Staff Development Fellows
(Vacant)

Tutorial Assistants
P. Sibanda, BSc. (Hons) Library and Information Science (NUST)

P. Matshozi, BSc. (Hons) Library and Information Science (NUST)

M. Chereni, BSc. (Hons) Library and Information Science (NUST)

T. A.B. Man'ozho, BSc. (Hons) Library and Information Science (NUST)

Research Fellow
S. Ngwenya, MPhil in STS, (Stellenbosch South Africa), MSc LIS (NUST), BA (Hons) History and Development Studies, (MSU)

Professional Instructor
Takawira T. D, BSc. (Hons) LIS,(NUST)

Demonstrator
(Vacant)

BACHELOR OF SCIENCE HONOURS DEGREE IN LIBRARY AND INFORMATION SCIENCE

1.0 PREAMBLE

To develop competent students in the field of librarianship and information science to enable them to be able to operate in highly technological libraries and information centre specializing in the storage and provision of information in a wide range of media as well as manage such institutions.

2.0 REGULATIONS

2.1 These regulations should be read in conjunction with the general university regulations for undergraduate studies, and the regulations of the Faculty of Communication and Information Science.

2.2 The Degree will be awarded to candidates who have successfully completed the programme and passed the examinations in accordance with the regulations set out below.

3.0 ENTRY REQUIREMENTS

3.1   Applicants must have the following qualifications (or their equivalent):

3.1.1 Five 'O' Level passes including English Language (Mathematics with at least a C grade is   an added advantage).

3.1.2 Applicants with any two 'A' Level subject passes can be admitted into the BSc in Library and Information Science.

3.1.3 Applicants with at least a National Diploma or its equivalent may apply but will be required to start at Part I level.

3.1.4 Applicants with a Higher National Diploma or its equivalent will be exempted Part I and credits for Part I modules will be credited to them.

4.0 PROGRAMME PROFILE

Degree type	Bachelor of Science Honours
Credit Load	535
SADC-QF Level	8
Accrediting authority	Zimbabwe Council for Higher Education (ZIMCHE)
Date of Accreditation	

4.1   Structure of Programme

4.1.1   The degree programme may be studied on a full-time basis over four academic years.

4.1.2   One year of the programme (at least 30 weeks) is earmarked for industrial attachment. A student placed under an organisation for attachment will be required to submit himself/herself to rules and regulations as apply to the employees of that organisation. Should it become necessary for the student under attachment to move to another organisation, permission must be granted by the University.

4.1.3   In semester I of Part Four, students will take six core modules. In the second semester of Part Four, students will take five (5) core modules including a dissertation which is done for the whole academic year   and one (1) elective module amongst electives which will be offered that particular year.

4.2   **Electives**
Availability of electives will depend on there being adequate staff and resources to deliver modules, as well as enough students to form a viable class. Therefore, some electives might not be offered during some semesters.

4.3   **Purpose of the Programme**
The aim of the Bachelor of Science Honours Degree in Library and Information Science is to produce graduates who can work in an information industry which is dynamic in nature and is faced with constant technological developments and ever changing information needs. The degree equips students with relevant skills that enable them to work and transform libraries and information centres to client expectations.

4.4   **Programme Characteristics**
4.4.1   **Areas of Study**
The programme focuses on several key areas including:
- Information storage, retrieval and dissemination
- Knowledge organisation
- Technological access to information
- Knowledge management
- Management of all types of libraries and information centres.

4.4.2   **Orientation**
The programme gives equal weight to theory and practice.

4.5   **Career Opportunities and Further Education**
Graduates may work in different types of libraries and information centres such as public libraries, academic and school libraries, special libraries and other information centres. Graduates can work at middle management or top management levels in various capacities which include: reference librarians, information officers, subject specialists, classifiers, cataloguers, information specialists, bibliographers, indexers and in academia. Graduates of the programme may also proceed to Masters' programmes in Library and

Think in other terms

Information Science, Knowledge Management, or Records Management programmes among others

4.6   **Programme Delivery**

Teaching and learning methods include lectures, tutorials, seminars, laboratory practicals, group work, industrial visits, industrial attachment, research projects, and independent study. Students are assessed through essays, tests, oral presentations, practical work, industrial attachment assessment, industrial attachment reports and dissertations among other methods.

4.7   **Programme Competencies**
4.7.1 **Generic Competencies**

● Ability to analyse and synthesise information.
● Organise and systematise information.
● Develop and use suitable storage, retrieval and dissemination systems
● Manage knowledge in a most effective way.
● Develop and use suitable technological tools for knowledge processing.

4.8   Exit Level Outcomes

Graduates of the programme should be able to:

● Create and use most suitable methods of organising information.
● Manage and develop relevant library and information centre collections which satisfies user needs.
● Develop and use suitable technological tools in information storage, retrieval and dissemination.
● Use appropriate management techniques in different types of libraries and information centres
● Conduct research that identifies problems and suggests solutions the benefit the information industry and the general society.

5.0   MINIMUM BODY OF KNOWLEDGE IN LIBRARY AND INFORMATION SCIENCE

● Knowledge of Information technology in information communication
● Organisation of knowledge classification, cataloguing, indexing abstracting
● Information retrieval and dissemination
● Management and development of library collections
● Information and media literacies essential to 21st century global economy

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Think in other terms

- Information ethics
- Communication, marketing and publicity skills
- Digital Librarianship
- Knowledge management
- Comparative librarianship
- Instructional methods for Information literacy
- Research methods
- Production and publishing of information media.

6.0   SCHEME OF EXAMINATION AND ASSESSMENT

6.1   In determining the overall degree programme aggregate, the following weightings will be used:

Part I   10%   minimum 139 credits
Part II   20%   minimum 132 credits
Part III 20%   minimum 130 credits
Part IV 50%   minimum 134 credits

6.2   Candidates for this programme must satisfy the examiners in all the prescribed modules and in all requirements of the programme.

6.3   For the degree to be awarded, the minimum number of 555 credits must be satisfied.

7.0   Examinations

7.1   Faculty regulations for examinations will apply.

Think in other terms

PROGRAMME SUMMARY

Part I   **(139 Credits)**

Semester I (All Core Modules)

Module Code	Module Description	Credits
ILI 1103	Introduction to Information Technology	10
ILI 1104	Collection Development Management	10
ILI 1107	Theory and Practise of Classification	14
ILI 1108	Communication Theory and Practice	10
ILI 1109	Information and Knowledge Society	10
ILI 1110	Instructional Methods for Information Literacy	10
CTL 1101	Conflict Transformation and Leadership	10

Semester II (All Core Modules)

ILI 1202	Information Sources and Services	10
ILI 1208	Application of Information Technology Tools in Information Centres	12
ILI 1209	Theory and Practice of Cataloguing	14
ILI 1210	Information Ethics	10
ILI 1211	Information Systems Management	10
IILI 1212	Information and Development	10

Part II **(132 Credits)**

Semester I (All Core Modules)

ILI 2106	Indexing and Abstracting	12
ILI 2108	Production and Publishing of Information Media	10
ILI 2109	Database Design and Management in Information Centres	12
ILI 2110	Information Storage and Retrieval	12
ILI 2111	Metadata Description and Access	12
ILI 2112	Research Methods and Statistics I	10

Semester II (All Core Modules)

ILI 2207	Web Design and Content Management	10
ILI 2208	Management of Information Centres	12
ILI 2209	Research Methods and Statistics II	10

Think in other terms

ILI 2210	Digital Libraries	10
ILI 2211	Library Management Systems	12
ILI 2212	Informatics	10

Part III
ILI 3000 Industrial Attachment **130**

Part IV **134**
Semester I (All Core Modules)
ILI 4005	Dissertation	26
ILI 4102	Marketing of Information Products and Services	10
ILI 4106	Comparative Librarianship	12
ILI 4108	Human Resources Management in Information Services	10
IRA 4104	Infoprenuership	10
ILI 4109	Knowledge Management Strategies	12

Semester II (All Core Modules)
ILI 4205	Children's Libraries	10
ILI 4210	Project Management	10
ILI 4211	Copyright and legal Issues	12
ILI 4212	Disaster Risk and Communication	12

Electives (Choose One)
ILI 4201	Academic Libraries	10
ILI 4202	Public Libraries	10
ILI 4207	School Library Media Centres	10
ILI 4209	Special Libraries	10
ILI 4213	Medical Librarianship	10
ILI 4214	Law Librarianship	10
ILI 4215	GIS and Map Librarianship	10

BSc Programme Credits
Part I	139
Part II	132
Part III	130
Part IV	134
TOTAL MINIMUM CREDITS	**535**

Think in other terms

MODULE SYNOPSES

PART I   **(139 CREDITS)**

Semester I
ILI 1103 Introduction to Information Technology   **10 Credits**
This module introduces information technology and the use of commercially available computing hardware, software and communications. It includes accessing geographically distributed Internet Information, electronic communication, word processing and document design, data modelling with spreadsheets, database design and maintenance for information storage, retrieval and presentation.

ILI 1104 Collection Development and Management   **10 Credits**
This module covers the establishment of policies and criteria for the selection, evaluation, acquisition, processing and circulation of information media. It provides familiarity with basic bibliographic tools, including reviewing media.

ILI 1107 Theory and Practice of Classification   **14 Credits**
The module looks at theories and practices which underpin classification of resources in a library or information centre. Distinction between classificatory structures such as the deductive and the inductive approaches will be analysed. It tackles features and use of different types of classification systems. Practical exposure to classification using popular established classification schemes will be given. Ability to put classification into context and to create suitable classificatory systems to particular environments such as manual and electronic environments will be dealt with.

ILI 1108 Communication Theory and Practice   **10 Credits**
This module covers basic communication theories through to practical skills employed in interpersonal communication within a working environment. Group dynamics and aspects of non-verbal communication models are also examined.

ILI 1109 Information and Knowledge Society   **10 Credits**
The module is introductory in nature. It highlights the importance of information and communication to the individual, family, socialising agencies and social organisations with a variety of purposes, nation states, regional groupings and the global society. The institutionalisation and professionalization of information provision through libraries, archives and media organisations are given prominence. Students are sensitised on the impact of information and communication technologies on information and knowledge handling and society. The study of this module should enable students to appreciate the value of information and knowledge in a wide and varied range of human circumstances and endeavours. This

Think in other terms

appreciation should embrace not only the intrinsic value but also the economic value which views information and knowledge as resources that benefit individuals, organisations and society.

ILI 1110 Instructional Methods for Information Literacy   10 Credits

The module aims to provide students with the basic knowledge and skills necessary to provide instructional services in user education programmes. It fosters an understanding and appreciation of the nature and function of learning theory, instructional design and delivery methods and how informational needs relate to instruction. The module will enable students to articulate the various theories that underpin practice in information literacy instruction as well as identify information literacy instruction models suitable to the learning needs of clients in various information environments.

CTL 1101 Conflict Transformation and Leadership   10 Credits

(*Offered from the Department of Business Management*)

The module will examine concepts of conflict and peace, theories of conflict, and classical social structural theories of conflict. Modern structural theories of conflict, resource, cultural, religious and ethnic and identity based conflicts will be reviewed. Gender and conflict and conflict resolution processes will be discussed and critiqued.

SEMESTER II

ILI 1202 Information Sources and Services   10 Credits

This module examines theories and practices in information services provision with particular emphasis on reference work and interpersonal skills and information sources required for answering users queries. It includes factors to consider in setting up user education programmes.

ILI 1208 Application of Information Technology Tools in Information Centres 12 Credits

The module focuses on building skills on a variety of networked computer applications for a varied range of information centre types. Emphasis is placed on Internet tools as useful information technology tools applied in information centres. The applications are studied within the framework of how they enable users to structure, store, process, access and present information. The topics will vary from semester to semester, but will typically include networking and Internet application, web coding such as HTML and XML, designing and building websites and working with CGL.

ILI 1209 Theory and Practice of Cataloguing   14 Credits

The module deals with the theory and practice of cataloguing in a library or information centre context. It enables the student to understand the concept of cataloguing and its application to libraries and information centres as a basis for information retrieval. Basic principles and standards as provided by the International Standard Bibliographic Description (ISBD) and the

Think in other terms

Anglo-American Cataloguing Rules II will be presented and applied through practical sessions. Subject cataloguing will also be dealt with and exposure to the use of standard Lists of Subject Headings will be given.

ILI 1210 Information Ethics   10 Credits
The module provides grounding on the ethical implications of accessing and disseminating information through various means. Areas of study include moral questions relating to the life cycle of information as it pertains to its generation, gathering, organisation, storage, retrieval and use. The module broadly examines issues related to information privacy, security and access, intellectual freedom, quality and integrity of information as well as intellectual property rights. It will help students to make professional decisions when confronted with legal and ethical dilemmas in the workplace.

ILI 1211 Information Systems Management   10 Credits
This module explores information system building blocks, the impact and benefits of information systems to organisations particularly libraries and information centres. It covers transaction processing systems, knowledge work systems, management information systems, decision support systems and executive information systems. It also covers different system development approaches and security controls and documentation standards necessary during information systems development and operation.

ILI 1212 Information and Development   10 Credits
The module aims to provide a theoretical, empirical and methodological understanding of the role that information plays in development processes. The areas covered include key concepts, approaches, theories and practices associated with development; evolution of issues current in development; and the role and function of information organisations and agencies involved in development. The student will be provided with an insight into the communication methods used in development. Particular information types and communication media are addressed in the context of development processes.

PART II (132 CREDITS)

SEMESTER I
ILI 2106 Indexing and Abstracting   12 Credits
The module is a survey of the impact of information and use in the health science disciplines and professions. The organisation of sources, current techniques and tools for its control, including online databases are analysed.

ILI 2108 Production and Publishing of Information Media   10 Credits
The module enables students to identify the physical composition of information media and to understand the different stages in the creation, production and distribution of book and non-book

Think in other terms

materials, to identify producers and suppliers and to be aware of the functions and use of different types of information media. The module further explores the capturing of text and its handling through reprography, desktop and other computer-aided printing and publishing systems. The study and evaluation of Internet information sources and evaluation is also included.

ILI 2109 Database Design and Management in Information Centres   **12 Credits**
The module provides a solid introduction to the terminology, concepts and practice of information storage and retrieval systems design. Special emphasis will be placed on user needs assessment, data integrity, data models and record structure and data manipulation. Other topics include current awareness of the relational database model, hierarchical model, network model, object-oriented model, query languages, data normalisation techniques, client-server systems, database warehousing and data mining. Practice in developing a small database shall be done.

ILI 2110 Information Storage and Retrieval   **12 Credits**
The module examines principles of information storage and retrieval and how the principles apply to information systems and services. It covers components of information storage and retrieval systems, information representation, storage and retrieval models and techniques (including human information processing), retrieval evaluation and evaluation of information retrieval systems.

ILI 2111 Metadata Description and Access   **12 Credits**
The module covers issues on the application of standards and rules to the construction of tools for information retrieval, primary web resources and catalogues in library and information environments; an overview of concepts of knowledge organisation and metadata applications (Dublin Core, Encoded Archival Description [EAD], Anglo-American Cataloguing Rules and Machine readable Cataloguing [AACR2 and MARC21]; functional requirements for Bibliographic Records [FRBR], RDF and XML]) as well as special problems in the organisation of resources: archival and library materials, in various forms including Internet resources. It also includes metadata formats, descriptive detail for different forms of material, choice and form of entry for names and uniform titles, provision of authority control for names and titles.

ILI 2112 Research Methods and Statistics I   **10 Credits**
This module provides an introduction to qualitative research methods and designs for academic and professional investigation of information practices. Students will practically learn how to identify problem to study, develop research objectives and research questions and conduct literature review for a study. The module will also expose students to various qualitative strategies of inquiry such as case study, ethnography and phenomenology which are used in understanding the social world.

Semester II
ILI 2207 Web Design and Content Management   12 Credits
This module provides a basic understanding of the methods and techniques of developing simple to complex websites. It seeks to equip students with skills to build creative, interactive and dynamic well designed websites. It covers web page layout techniques, simple, html, cascading style sheets, java scripting and emerging web technologies like blogs, listserv and events. Main module content includes a continuation of Web designing from ILI 1208, including HTMLs CSS, Java scripting, Active Server Pages (ASP), the concept, context and content of a web site.

ILI 2208 Management of Information Centres   10 Credits
The module introduces management theories and their application in the information services sector. The relationship between information centres and their parent organisations will be stressed. Aspects on service quality including the underlying theories like SERVQUAL, LibQUAL and others will be studied. Special attention will be given to clientele types and their needs in planning, organising, budgeting, staffing and marketing of services. Students will be encouraged to focus on current trends.

ILI 2209 Research Methods and Statistics II   10 Credits
This module is a continuation of ILI 2112 Research Methods and Statistics I. In this module, broad methodological approaches and tools in quantitative research are explored. It provides an understanding of basic statistics including terminology and common statistical methods employed in quantitative research. Focus will be on quantitative data collection, data presentation and data analysis techniques. Students are also exposed to the use of SPSS in analysing data files.

ILI 2210 Digital Libraries   12 Credits
The digital library is a blend of old and new information management techniques. It brings new formats, technologies and techniques to the global dissemination of information, drawn on knowledge and experience in areas such as organisation of information, digital preservation, information retrieval, interface design and networking. This module will provide an overview of principles and practices in digital libraries. The module will address theoretical, technological, social and practical issues regarding building, organising and providing access to digital libraries. Topics covered include all aspects of project management including collection development and assessment, formatting standards and practices, metadata and mark-up standards, technical infrastructure and end user experience.

ILI 2211 Library Management Systems   10 Credits
This module introduces students to a variety of software for managing routine library operations such as circulation, cataloguing, serials control and acquisitions among other library functions. It aims to provide a practical orientation to library management systems such as, but not limited to, Innovative Millennium and Koha. By the end of the module, students will be expected to carry

Think in other terms

out administrative, end-user support and end-user responsibilities. In addition to this students will be equipped with analytical skills on evaluating library management systems to enable them to make appropriate decision on acquiring library management system.

ILI 2212: Informatics   10 Credits

The module will introduce students to fundamental topics in Informatics while developing a basic understanding of Information Theory. It will cover foundational Informatics concepts such as Information, Knowledge, Modelling and Uncertainty. The module introduces all the conceptual building blocks necessary to understand the basics of Information Theory. Those building blocks are introduced hand in hand with the practical dimension of Informatics, which focuses on solving real problems with information technology. There is presentation of informatics tools in the field of information sciences and discussion of their implications for the practice in the field of information sciences.

PART III

Semesters I and II

ILI 3000 Industrial Attachment   130 Credits

The third year is an internship period in which students undertake an industrial placement for a minimum of eight months. At the place of attachment, students generally have a supervisor who assigns them specific tasks and evaluates their work. The internship is a compulsory part of the degree programme. It is formally assessed. Assessments include the writing of a reflective log and an evaluative report by students and a performance evaluation report by the industrial supervisor. The internship is expected to give students an insight into the world of work and to allow the students to build on the theory they would have learnt at university as well as explore their career options. At times, employers use internships as a trial period for prospective employees, thus students get an opportunity for an offer of a full-time job. After the internship, students would gain practical skills that help strengthen their curriculum vitae, increasing their chances of being employed.

PART IV (134 Credits)

SEMESTER I
ILI 4005 Project Seminars

This module introduces methods of formulating a research project proposal, information gathering, project design and literature reviewing. It prepares students for an in-depth research project to be completed during the second semester in Part IV.

Think in other terms

ILI 4102 Marketing Of Information Products and Services   **10 Credits**

Application of marketing theory to libraries and other information settings is examined. It includes consumer behaviour, market research, segmentation, targeting and positioning, public relations, product design and sales promotion.

ILI   4106   Comparative Librarianship   **12 Credits**

A comparative study of selected archives and library systems within the Southern African region and other cultural regions will be done. The study will focus on legislation, budget, staffing, accommodation, training, areas of specialization, future plans and any particular problems.

ILI 4108 Human Resources Management In Information Services   **10 Credits**

Students are introduced to the fundamentals aspects of human resources management in various information centres. The module covers different systems for obtaining, mobilising and managing an organisation's human assets. Emphasis will be placed on skills and knowledge in recruitment, selection, training, development and retention of staff necessary for the efficient and effective management of an organisation. Other detailed aspects include organisation structure, motivational theories and time management policies and practices.

IRA 4104 Infoprenuership   **10 Credits**

(*Module is offered by the Department of Records and Archives Management*)

The module aims to develop students' understanding of the challenges of selling information goods. The module will also focus on developing students' skills on setting up an information business and designing product lines for information goods that are competitive, setting prices for different customer groups and how to manage one's intellectual property as well as deal with ethical and legal issues of running an information business. Students will learn how to protect themselves from "lock-in" and how to take advantage of it when possible, procure software for an information business. Lastly, the students will be introduced to the information business planning, marketing and management processes.

ILI 4111 Knowledge Management Strategies   **12 Credits**

The module introduces students to the concept of knowledge management, its tools and techniques and to the concept of a learning organisation. It then surveys various knowledge management strategies, highlighting the major differences between the various strategies by emphasizing different aspects of knowledge management that include focusing on the knowledge, the business processes/areas, or on the end results.

Think in other terms

SEMESTER II
Five (5) Core Modules

ILI 4005 Dissertation
PREREQUISITE ILI 4005 Research Seminars   **26 Credits**
Students are required to undertake a research project that culminates in the production of a project report, under the guidance of a supervisor.

ILI 4205 Children's Libraries   **10 Credits**
The module is an introduction to the development of children's literature. It discusses specific genre, the reading interests and needs of children and young people. It looks at the role of the home, the school and public information organisations. It also includes the art of storytelling, special displays for children and information technology appropriate for this level of readership. By the end of the module, students would have been exposed to a wide range of literature for children such that they would develop an in-depth knowledge of literature appropriate for today's children.

ILI 4210 Project Management   **10 Credits**
The module introduces students to the theory and practice of project management. Project life cycle aspects like identification, purpose, planning, implementation, managing, utilising resources in the environment as well as feasibility assessment of a project will be stressed. After completing this module, students would understand the dynamics of project management theory and practice and would gain knowledge on project management methodology.

ILI 4211 Copyright and Legal Issues   **12 Credits**
This module covers the basics of copyright law, including determinations of what is copyrightable, formalities for obtaining protection, and copyright registration practices and procedures and intellectual property rights. The importance of legislation in creating an enabling environment for information professionals is examined by assessing information related legislation. Major contemporary issues within the provision of information services, such as censorship and the need for a national information policy are covered. At the end of the module, students would gain an understanding of copyright laws for different types of information media.

ILI 4212 Disaster Risk and Communication   **12 Credits**
The module looks at disaster risk communication as that communication type that seeks to inform different communities about the risks that they are exposed to, the source of their vulnerability and acts as a platform for identifying possible solutions. The module covers an examination of risk communication media and methodologies; gives an overview of the communication theory and its scope; addresses the various interactions that may be required between emergency management officials and a full spectrum of relevant stakeholders, including internal management, emergency services, the press as well as the impacted public; procedures for planning, conducting and measuring success for preparedness campaigns and the role of ICTs

Think in other terms

and the most common types of technologies used in disaster communication. Students will gain an appreciation of disaster risk communication issues and would be able to develop risk communication strategies and public preparedness campaigns.

ELECTIVES
Choose One (1) Elective Module

ILI 4201 Academic Libraries   **10 Credits**
The overall goal of this module is to enable students to contribute to the economic, social and cultural progress of the community by preparing the students for positions of responsibility and leadership in academic libraries. Attention is given to problems of organisation and management of university, college and community college libraries; their resources, functions and services. The module also gives students an opportunity to individually investigate major issues and topics related to academic library management. On completion of the module, students would be able to describe missions and values of academic libraries, the environmental changes affecting those missions and how those changes affect the current and future management of academic libraries.

ILI 4202 Public Libraries   **10 Credits**
The module outlines the emergence of public libraries and the development of public libraries in developed and developing countries, with special reference to Zimbabwe. The role of public libraries in the development of civilised societies is emphasised. The role played by professionals in public libraries is also highlighted. The various functions of public libraries in their communities will be assessed. Students would become cognisant of the mandate and the various services offered by public libraries upon successfully completing the module.

ILI 4207 School Library Media Centres   **10 Credits**
The module examines the role of School Library Media Centres beginning with their development and placement in the school system. It explores the role of the school library media programme in promoting information literacy and other educational objectives. Emphasis is placed on the exploration of available resources and the creative use of these resources in problem solving within the school library media centres. The role of the library media specialist as collaborator, partner, teacher and resource within the school community is addressed. Students who undertake the module would gain knowledge of school library programme management including policy and procedures, collection development, finance, facilities and personnel.

ILI 4209 Special Libraries   **10 Credits**
The module evaluates the role that parastatal, corporate, non-governmental and government departmental libraries, among others, play in supporting their parent organisations. Focus is given to subject domain specific information seeking behaviour, challenges and opportunities of special libraries and the value of networking for special librarians. At the end of the module, students would understand the scope and function of special libraries as well as the information

needs of specialised categories of users; and would also understand the range of skills sets that are necessary for information personnel in a special information centre.

ILI 4213 Medical Librarianship   **10 Credits**

The module aims to introduce students to basic medical information resources, services and medical librarianship. It includes a study of the management of primary, secondary and tertiary resources of a medical library as well as the specialised research methods used in medical research. Other topics include the history of medical libraries, their organisation and administration and the role of medical librarians in medical schools and hospitals. The students would gain an appreciation of the specialised medical literature and an understanding of roles of the different stakeholders in medical education which affects the administration of medical libraries.

ILI 4214 Law Librarianship   **10 Credits**

The module is an introduction to basic legal information resources and law librarianship. It includes a study of the management of primary, secondary and tertiary resources of a law library as well as the specialised research methods used in legal research. Other topics include the history of law libraries, their organisation and administration and the role of law librarians in law schools and law firms. After the study, students would gain knowledge on the nature of literature in law libraries and how to run a law library.

ILI 4215 GIS and Map Librarianship   **10 Credits**

The module is an introduction to the management and preservation of geographic information created using a wide range of geospatial tools. Topics will include management of geographic and cartographic resources, that is, collection development, records appraisal, collection maintenance, reference work including bibliographic instruction. At the end of the module, students would understand map interpretation using physical map resources, map creation applying GIS and would gain skills necessary to run a specialised GIS and map library.

Think in other terms

POST-GRADUATE DIPLOMA IN LIBRARY AND INFORMATION SCIENCE

1.0 PREAMBLE

The Post Graduate Diploma in Library and Information Science (PDLIS) is a basic qualification designed to impart information management skills to any graduate pursuing a professional career in Library and Information Science. It is a part-time programme. Successful PDLIS graduates may proceed to the Masters LIS programme.

2.0 REGULATIONS

2.1 These regulations should be read in conjunction with the General Regulations for Post-Graduate Studies and the Faculty of Communication and Information Science regulations.

2.2 The degree shall be awarded to students who have successfully completed the programme and passed the examinations in accordance with the regulations set out below.

3.0 ENTRY REQUIREMENTS

Normally applicants should hold a first degree in any discipline from a recognised university. A teaching diploma or relevant post qualification work experience would be an added advantage.

4.0 PROGRAMME DURATION AND CONTENT

4.1 Normally the programme shall be completed in not less than 15 months on a part-time block release basis.

4.2 Stages I and II will consist of 5 modules each and Stage III will consist of 4 modules, 3 of which are compulsory and 1 will be an elective.

4.3 Electives offered in any academic year will be determined by the availability of lecturers and demand.

5.0 STRUCTURE OF THE PROGRAMME

5.1 The programme shall consist of 3 stages and each stage is equivalent to a semester.

5.2 The programme shall normally commence at the beginning of each calendar year.

6.0 MODE OF INSTRUCTION

6.1 Each module will be formally presented through lectures, seminars and workshops.

Think in other terms

6.2   Students will be requested to submit a maximum of 3 written assignments for each module.

6.3   Interaction between students and module lecturers may be extended to outside the prescribed contact hours on an individual or small group basis through a mentor system.

7.0 ASSESSMENT

7.1   A formal 3 hour written examination shall be conducted in all taught modules.

7.2   Examinations will be subject to external assessment.

7.3   Students shall submit a written research paper.

7.4   The pass mark is 50%. Candidates may be allowed to proceed carrying only two (2) modules to the next Stage or Part.

7.5   No candidate may carry over a particular Module for more than two (2) years.

7.6   No candidate will be allowed to proceed to Stage 3 (Dissertation) without clearing all Modules in Stages 1 and 2.

8.0 PROGRAMME PROFILE

Degree type	Post-Graduate Diploma
Credit Load	144
SADC-QF Level	8/9
Accrediting authority	Zimbabwe Council for Higher Education (ZIMCHE)
Date of Accreditation	

8.1 Structure of the Programme

8.1.1   The programme shall consist of 3 Stages and each Stage is equivalent to a semester.

8.1.2   The programme shall normally commence at the beginning of each calendar year.

8.1.3   Normally the programme shall be completed in not less than 15 months on a part-time block release basis.

8.1.4   Stages I and II will consist of 5 modules each and Stage III will consist of 4 modules, 3 of which are compulsory and 1 elective.

8.1.5   Electives offered in any academic year will be determined by the availability of lecturers and demand.

8.2 Purpose of the Programme

8.2.1   To provide opportunity to graduates from various disciplines involved in information-related work to acquire information management skills.

8.2.2   To produce professionals that display simultaneously mastery of both indigenous and global knowledge systems.

Think in other terms

8.3 **Programme Characteristics**

8.3.1 **Areas of Study**

The programme focuses on several key areas including:

- Management of school library media centres
- Processing and organisation of knowledge
- Developing and managing school library collections
- Recognition of indigenous knowledge systems in school library media centres
- Development and use of modern technologies in school library media centres
- Integration of school library media centres with the school curriculum

8.3.2 **Orientation**

The programme gives equal weight to theory and practice.

8.4 **Career Opportunities and Further Education**

Graduates will work in school libraries as school librarians or teacher-librarians and other types of libraries or information centres where opportunity arises. They will be able to work as managers or middle managers or at decision-making levels. Graduates of the programme qualify to proceed to Masters Programmes in library and information science, records and archives management, teacher training institutions, among others.

8.5 **Programme Delivery**

Teaching and learning methods include lectures, tutorials, seminars, laboratory practicals, group work, industrial visits, industrial attachment, research projects, and independent study. Students are assessed through essays, tests, oral presentations, practical work, and an in-depth research paper among other methods.

8.6 **Programme Competencies**

- Ability to analyse and synthesise information.
- Methodological problem solving.
- Critical thinking.
- Verbal and written skills
- Ability to reason and argue persuasively.
- Commitment to integrity and ethical conduct.

8.6.2 **Discipline Specific Competencies**

- Managing school library media centres
- Developing and managing collections of various formats

Think in other terms

● Supporting the school curriculum with relevant library materials
● Integrating the school library media centre with the school curriculum

9.0   MINIMUM BODY OF KNOWLEDGE

- Application of information technology skills in information communication ranging from using   technology tools to web technology tools
- Organisation of knowledge classification, cataloguing, indexing abstracting.
- Management and development of library collections.
- Information and media literacies essential to 21st century global economy bound by information ethics
- Information database creation, maintenance and management as well as information systems management
- Content management through web design and use of contemporary ICT tools such as blogs, wikis, cloud   computing, online learning
- Communication and publicity skills to pursue careers in the communication and public relations fields.
- Digital Librarianship
- Practical skills in user orientation and education, knowledge management
- Information literacy skills to enable students to engage with the society.
- Research skills to identify problems and suggest solutions for the benefit of society.
- Information retrieval and dissemination.

10.0   SCHEME OF EXAMINATION AND ASSESSMENT
10.1   Faculty regulations for examinations shall apply.

10.2   Candidates must pass all modules in one Stage before proceeding to the next.

10.3   **Research paper**
10.3.1   Each candidate is required to submit a Mini Dissertation of approximately 5 000 words on a topic of his/her choice, which is approved by the Department.
10.3.2   The paper shall be submitted not later than 2 months before date of publication of results. The student must submit two loose bound copies for marking and two hard bound copies for presenting one each to his/her supervisor and to the Library.
10.3.3   The format of the research paper shall be as provided for in the General Regulations for Post-Graduate Studies.

Think in other terms

11.0 GRADING

11.1 The Grading scheme is as follows:

Marks	Description	Grade
80 – 100%	Distinction	(D)
70 – 79%	Merit	(M)
60 – 69%	Credit	(C)
50 – 59%	Pass	(P)
0 - 49 %	Fail	(F)

11.2 **Grading scheme and weighting of the degree**

      11.2.1 Examinations will constitute sixty percent (60%) of the marks whilst forty percent (40%) of the marks will come from the continuous assessment.

      11.2.2 Taught modules will contribute seventy percent (70%) of the overall mark whilst thirty percent (30%) of the marks will come from the research paper.

12.0 AWARD OF THE PDLIS

    12.1 The PDLIS shall be awarded in accordance with the General Regulations on Marking Scheme and Degree Classification.

    12.2 In order to be awarded the diploma, a candidate must have passed all taught modules and must have satisfactorily completed the research paper.

Think in other terms

PROGRAMME SUMMARY

Stage I

Module Code	Module Description	Credits
PDL 5301	Communication skills	10
PDL 5302	Information behaviour	10
PDL 5303	Organisation of knowledge	10
PDL 5304	Collection development and management	10
PDL 5305	Information and society	10

Stage II

PDL 5306	Research methods in information science	10
PDL 5307	Application of information technology tools in information centres	10
PDL 5308	Reference services and retrieval systems	10
PDL 5309	Web applications and design	12
PDL 5310	Indigenous knowledge systems	10

Stage III
Core modules

PDL 5311	Management of information centres	12
PDL 5312	Project management	10
PDL 5300	In-depth research paper (minimum 5 000 words)	10

Electives (Choose one)

PDL 5313	Integration of libraries in education	10
PDL 5314	Records and archives administration	10
PDL 5315	Information and knowledge management	10
PDL 5316	Information and rural development	10
PDL 5317	Publishing management: advanced theory and practice	10

Think in other terms

MODULE SYNOPSES

Stage I
PDL 5301   Communication Skills   10 Credits
The module seeks to introduce students to communication theories through to practical skills employed in interpersonal communication within a working environment. Group dynamics and aspects of non-verbal communication models are also examined. It consists of 10 units all modelled for delivery through lectures, class discussion, practical exercises and written work.

PDL 5302   Information Behaviour   10 Credits
The module focuses on the theory and practice of information seeking and retrieval. It surveys different classes of information resources to establish characteristics of the resources and the information seeking behaviour employed by the users of the resources. Focus will also be on contemporary issues and trends in the production, publication and the dissemination of the resources. Bibliographical sources and other guides to the different classes of the resources are emphasised. Local examples will be stressed upon.

PDL 5303   Organisation of Knowledge   10 Credits
Focus on this module shall be on subject analysis and control, indexing theory as well as the structure, compilation and application of indexing languages including thesauri, subject lists and classification schemes. The module also covers theories and practices of the organisation of knowledge and information in monographic, electronic, realia and serial formats. Central issues include principles and methods of descriptive cataloguing (AACR2), catalogue maintenance and MARC coding.

PDL 5304   Collection Development and Management   10 Credits
The module covers purposes, policies and criteria for the selection, evaluation, acquisition and circulation of information resources including special materials, online and web-based resources. Issues on interlibrary lending and resource sharing, use of basic bibliographic tools as well as reviewing media will be covered.

PDL 5305   Information and Society   10 Credits
The module highlights the importance of information and communication to the individual, family, socialising agencies and social organisations for a variety of purposes within nation-states, regional groupings and the global society. The institutionalisation and professionalisation of information provision through various kinds of institutions like libraries, archives and media organisations is given prominence. Students are sensitised to the impact of information and communication technologies (ICTS) on information handling and in society.

Think in other terms

Stage II

PDL 5306   Research Methods in Information Science   10 Credits

Focus is on developing an understanding of the nature of scientific research. Formulation of the research problem, research questions, hypotheses, research design, sampling, data collection and analysis and writing of research reports are covered. Techniques on reviewing literature will also be imparted to students. Both quantitative and qualitative methods for research in information science are included.

PDL 5307 Application of Information Technology Tools in Information Centres   10 Credits

The module introduces students to information technology tools and the use of commercially available computing hardware and software. Emphasis is placed on the educational and administrative value of information technology. Topics covered include accessing geographically distributed Internet information, electronic communication, word processing and document design, data modelling with spreadsheets, database design and maintenance for information storage, retrieval and presentation.

PDL 5308   Reference Services and Retrieval Systems   10 Credits

Students study the functions and types of reference and information services. Reference tools, both print and electronic are examined with emphasis on the evaluation of the various types of materials (e.g. bibliographies, indexes, dictionaries and encyclopaedias). The module also involves the design of information literacy programmes, study of question-answering techniques in a reference interview and use of feedback. An advanced study of major online information retrieval systems is included.

PDL 5309   Web Applications and Design   12 Credits

The module has a practical focus. Emerging Internet-based applications and technologies like Web 2.0 are making it imperative to move beyond traditional GUI applications to deliver interactive applications that provide the best of the web and the best of the desktop experience. The module will therefore seek to acquaint students with best practices in designing websites. The thrust is to get the student to appreciate the use of web-based applications in a library environment.

PDL 5310   Indigenous Knowledge Systems   10 Credits

The module explores the features and the significance of indigenous knowledge systems from cultural, historical, spiritual and development perspectives; and its relationship with imported knowledge systems. It is expected to develop an appreciation of issues involved in the perpetual debate concerning the constituents of knowledge as well as the various approaches of validating knowledge such as positivism, testimony, tacit understanding, experience, and faith, for example. More specifically, students would appreciate the features, status, value, weaknesses and challenges of organising indigenous knowledge systems in modern society. Consideration will be

Think in other terms

given to the question of how library and information services can embrace all forms of knowledge systems.

Stage III

PDL 5311   Management of Information Centres   12 Credits

The module covers the purposes, philosophy, policy, principles and practices associated with a variety of libraries: public, school, academic, special, digital and their hybrids. The relationship between information centres and their parent organisations will be stressed. Aspects on service quality including the underlying theories like SERVQUAL, LibQUAL and others will be studied. Special attention will be given to clientele types and their needs in planning, organising, budgeting, staffing and marketing of services. Students will be encouraged to focus on current trends.

PDL 5312   Project Management   10 Credits

The purpose of the module is to enable students to design and implement information related projects in various work settings. The project life cycle aspects like identification, purpose, planning, implementation, managing, utilising resources in the environment as well as feasibility assessment of a project will be stressed. Emphasis will be on relevance to local people and needs.

PDL 5300   Mini Dissertation   10 Credits

Students will engage in self directed study, under the supervision of a member of staff, on a topic of their choice in information science. The investigation may involve original research or the compilation of a bibliography, the synthesis and evaluation of literature. Concepts and methodologies from other disciplines may be applied where appropriate.

Electives

PDL 5313   The Integration Of Libraries In Education   10 Credits

The focus of this module is to show the role of libraries in supporting education from the cradle to the grave. Special stress will be given to those libraries that support formal education at all levels. The contribution of libraries to life-long learning will also be covered.

PDL 5314   Records and Archives Administration   10 Credits

The module focuses on the importance of current documents and archival materials, their management and storage. Included is the nature of current documents and archival materials, the principles of their creation, acquisition, arrangement and bibliographic control. The module also looks at the role of document management and archival service for researchers.

PDL 5315   Information and Knowledge Management   10 Credits

This module provides an overview of the scope and complexities of information and knowledge management relating to organisational records and information, irrespective of format. It is intended to impart an understanding of the theory and practices that underpin information and knowledge management and to introduce students to the concepts and

applications of information and knowledge management techniques. It also explores the various areas related to organisational information management which include archival management, electronic record management, information preservation, and information resources management.

PDL 5316   Information and Rural Development   10 Credits
Based on the unique and somewhat complicated nature of rural communities, the module emphasises the importance of information as an empowering tool in such communities. Issues covered include the importance of information and information centres in literacy development, poverty alleviation and national development, at large. The interests and roles of stakeholders in rural development, including non-governmental organisations, local leadership, central and local government as well as aspects on community profiling for setting-up information infrastructure like information and communication technologies will also be included.

PDL 5317 Publishing Management: Theory and Practice   10 Credits
This module sets out the basics of efficient, economical and prudent management of time and money in publishing. It is intended to equip students with techniques that contribute to success, whether they are doing school books, readers, trade books and journals or magazines. The module critiques open tenders and contracts as well as the private sector open competitive markets. The role of astute tactics of managing and motivating teams, use of resources and time to market issues are considered using evidence and the experiences of various stakeholders. The principles espoused will be based on textbook publishing, but attention will be given to other types of publishing. The role of managers to ask the right questions regarding application of resources and use of information in programme planning and project development will be stressed.

Think in other terms

MASTERS OF SCIENCE IN LIBRARY AND INFORMATION SCIENCE

1.0   PREAMBLE
The Master of Science Degree in Library and Information Science programme is aimed at applicants who have passed their first degrees in Library and Information Science or other related disciplines who want   to pursue further studies at Masters level. Students in this programme will go through a rigorous learning process which enables them to develop critical thinking on managerial and technological developments in the information field. Knowledge of current trends and their applicability to given environments and situations will be emphasised in this programme. Innovative thinking and problem-solving techniques will be encouraged.

2.0   REGULATIONS
These regulations should be read in conjunction with the general university regulations for Masters studies, and the regulations of the Faculty of Communication and Information Science. The Degree will be awarded to candidates who have successfully completed the programme and passed the examinations in accordance with the regulations set out below.

3.0   ENTRY REQUIREMENTS
3.1   Candidates must have the following qualifications (or their equivalent):
3.1.1 At least a Lower Second Class Honours Degree in Library and Information Science or in any other Information Science field, for instance, Information and Communication Technology, Archives, Records Management, Information Systems Management, Publishing, Archaeology, Cultural Heritage and Musicology Studies.
3.1.2 At least a Lower Second Class Degree in any other subject field plus a postgraduate qualification in library and information studies
3.1.3   Applicants who have obtained a Pass Degree in any information science field and at least five (5) years relevant experience in information related sciences may be considered for admission and on special entry basis.

4.0   REGISTRATION
Registration of students shall be at the beginning of the academic year.

4.1 Examinations
4.1.1   Formal examinations shall take place at the end of each semester.

Think in other terms

4.1.2 Examinations will be subject to external assessment.

4.1.3 The students shall make an oral presentation of their proposed research at the end of Semester I of the year, submit a written dissertation and attend a viva voce at the end of Semester II.

4.1.4 In order to proceed to the writing of the dissertation the student must have passed all taught modules.

4.1.5 The pass mark is 50%.

4.1.6 A student who fails any of the taught modules and is allowed to repeat the module may be exempted by Senate, on the recommendation of the Departmental Panel of Examiners, from those modules which he/she has passed.

4.1.7 Candidates must pass all examinations before proceeding to the next academic year.

4.1.8 No student shall be allowed to repeat a module more than once. Candidates may be allowed to proceed carrying only two (2) modules to the next Stage or Part.

4.1.9 No candidate may carry over a particular Module for more than two (2) years.

4.1.10 No candidate will be allowed to proceed to Stage 4 (Dissertation) without clearing all Modules in Stages 1, 2 and 3.

5.0 PROGRAMME PROFILE

Degree type	Master of Science
Credit Load	121
SADC-QF Level	9
Accrediting authority	Zimbabwe Council for Higher Education (ZIMCHE)
Date of Accreditation	

5.1 Structure of Programme

The programme, consisting of eight (8) taught modules and examinations plus a dissertation, shall last a minimum of 15 months and a maximum of 24 months on a full-time basis. On a part-time basis, the programme will be studied over a minimum period of 24 months and a maximum period of 36 months. There may be bridging modules between registration and commencement of the academic year.

5.1.1 **Full-time programme:** In Semester I six (6) core modules will be taught and examined. In Semester II students will take one core module and one elective module and research seminars which are compulsory though not examinable. After examination of the modules, they will concentrate on the writing of the dissertation.

5.1.2 **Part-time programme:** On a part-time basis the delivery of taught modules will

Think in other terms

be by block release. A total of six (6) core modules will be offered during Semesters I and II of the first year. In Semester I of the second year, students must do one core module and select one (1) elective from a complement of six (6) and research `seminars which are compulsory though not examinable.

5.1.3   In Semester II of the second year candidates will concentrate on the writing of the dissertation. The research project leading to the dissertation may commence any time after Semester II of the first year. But the writing of the dissertation will be after examination of the taught modules.

5.2   Purpose of the Programme

The aim of the Master in Library and Information Science programme is to impart an advanced understanding of contemporary theory and practice in the field of library and information science, the role of information in society as well as the philosophies that inform practice in library and information science.

5.3   Programme Characteristics

5.3.1   Areas of Study
- Contemporary issues in the library and information science discipline.
- Modern technology and its application to provision of access to information.
- Formulation and implementation of information policies.
- Digital curatorship
- Research techniques suitable for the information discipline.
- Management of libraries and information centres
- Theories and practices of knowledge management.
- Database development, utilisation, and management.

5.3.2   Specialist Focus
- Role of indigenous knowledge systems in a knowledge society
- Knowledge in agricultural, health, and developmental studies.
- Advanced records and archives management.
- Project management.

5.3.3   Orientation
The programme gives equal weight to theory and practice.

5.4   Career Opportunities and Further Education

Graduates of this programme may work in a variety of libraries and information centres as middle or top level managers and information specialists and in academia. Graduates may proceed to doctoral studies in library and information science fields, among others.

Think in other terms

5.5   **Programme Delivery**

Teaching and learning methods include, lectures, tutorials, seminars, laboratory practical work, group work, e-learning, research projects, and independent study. Students are assessed through essays, tests, oral presentations, practical work and dissertations among other means. Students taking practical modules are expected to produce industry-standard work.

5.6   **Programme Competencies**

5.6.1   **Generic Competencies**

- Ability to analyse and synthesise information.
- Methodological problem solving.
- Critical thinking.
- Verbal and written communication skills
- Ability to reason and argue constructively.
- Commitment to integrity and ethical conduct.

5.6.2   **Discipline Specific Competencies**

- Database creation, development and utilisation
- Management Information Systems creation, development and utilisation
- Application of Knowledge management skills
- Development of state-of-the-art libraries and information centres
- Digital curation
- Information policy planning and implementation

5.7   **Exit Level Outcomes**

- Apply contemporary issues in the library and information science discipline.
- Develop modern technology applications to provision of access to information.
- Formulate and implement information policies needed in given environments.
- Apply digital curatorship where needed.
- Use suitable research techniques suitable for the information discipline.
- Manage of libraries and information centres
- Apply theories and practices of knowledge management.
- Develop, maintain, and use databases where necessary.

6.0   MINIMUM BODY OF KNOWLEDGE IN LIBRARY AND INFORMATION SCIENCE

- Adaptation skills and competencies in new technologies in fields of telecommunications, electronic commerce and publishing, digitization, cloud computing.

Think in other terms

- Creation, maintenance and management of digital institutional repositories, online databases.
- Management of library and information centres in ICT environments
- Problem solving, critical thinking, time management, literature synthesis and data analysis through academic research
- Knowledge management in principle and practice
- Management Information Systems and strategic thinking application in information services
- Knowledge in contemporary information policy issues in and outside Zimbabwe as well as policy crafting and assessment skills
- Information based solutions to Indigenous Knowledge Systems
- Specialised expertise in agricultural, health and geographic information systems
- Patent legislation and intellectual property rights
- Project management skills
- Instructional methods for information literacy
- Data management and digital curatorship
- Bibliometrics, altmetrics and webometrics.

7.0   SCHEME OF EXAMINATION AND ASSESSMENT

7.1   Faculty regulations for examinations shall apply.
7.2   A formal 3 hour written examination shall be conducted in all taught modules.
7.3   Examinations will be subject to external assessment.
7.4   Students shall submit a written research paper.
7.5   The pass mark is 50%.
7.6   If a candidate fails a research paper, he/she may re-submit it within three months after publication of Results, or repeat as provided for in the General Regulations.
7.7   Students shall not be allowed to repeat a module more than once.
7.8   Candidates may not carry more than two modules to the next Stage.

PROGRAMME SUMMARY

Module Code	Module Description	Credits
Part I		**(36 credits)**
ILI 5101	Advanced Information Technology Applications	12
ILI 5102	Research Methods and Data Analysis Techniques	12
ILI 5112	Knowledge Management	12
Part II		**(36 credits)**
ILI 5201	Information and Communication Theory	12
ILI 5202	Management Information Systems	12
ILI 5203	Strategic Management and Leadership in the Information Services	12
Part III		**(24 credits)**
Core Modules		
ILI 5000	Research Seminars	
ILI 5301	Information Policy Studies	12

Elective Modules (3)
These electives will be offered provided a minimum of five students sign up for the module and are also subject to the availability of resources and teaching staff.

Module Code	Module Description	Credits
ILI 5302	Indigenous Knowledge Systems	12
ILI 5303	Specialised Information Systems in Agriculture, Health, Development Studies	12
ILI 5304	Sociology of Information	12
ILI 5305	Intellectual Property Rights	12
ILI 5306	Project Management	12
ILI 5307	Instructional Methods for Information Literacy	12
ILI 5308	Data Management and Digital Curatorship	12
ILI 5309	Informetrics	12
IRA 6101	Advanced Records Management	12

Module Code	Module Description	Credits
Part IV		**(25 credits)**
ILI 5000	Dissertation	25

Think in other terms

MODULE SYNOPSES

YEAR I

PART I   **(36 credits)**

ILI 5101 Advanced Information Technology Applications   12 Credits
This module seeks to provide senior library managers with skills and competencies that enable them to adopt new technologies and adapt to new technological trends in the use of ICTs in libraries and information resource centres. These technologies include telecommunications, cloud computing, electronic publishing, text digitization and ecommerce. The module thus seeks to enable professionals in information centres to appreciate the changing role of librarianship in an ICT environment and to gain the ability to manage the creation and management of digital repositories, institutional repositories and online databases as well as Web OPACs, Portals. Upon completing the module successfully, students would be able to manage library operations in an ICT environment.

ILI 5102 Research Methods and Data Analysis Techniques   12 Credits
Prerequisite for ILI 5000
This module provides fundamental knowledge and skills necessary for conducting quality research in library and information science. It includes in great depth the different methods used in research, covering the whole breath of conducting a research project, proposal creation, data collection, data processing and data presentation techniques. Upon successful completion of the module, students would be able to formulate research questions, design and carry out research studies and critically evaluate and analyse findings and conclusions from other research studies.

ILI 5112 Knowledge Management   12 Credits
The module introduces the concept of knowledge management, definitions and perspectives of knowledge management, outlines the history of knowledge management, knowledge management elements, knowledge management cycle, knowledge management models, knowledge management tools and how knowledge management can be implemented in organisations. The importance of knowledge management for individuals, communities of practice and organisations is described together with the emerging knowledge management strategies, roles and responsibilities needed to ensure successful implementation. At the end of the module, students would have gained an understanding the concept of knowledge management and the different views on the concept, describe different methods and techniques for managing knowledge, describe different types of knowledge support systems and will also understand the need for effective knowledge and information management in the knowledge society.

Think in other terms

YEAR I

PART II (36 credits)

ILI 5201 Information and Communication Theory   **12 Credits**
This module examines theoretical and practical aspects of communication and information. It includes a contextualised study of knowledge and information, the media of information storage and transmission, control and exchange of information in society and the social organisation of knowledge. Upon completion of the module, students would gain an appreciation of the concepts of information and knowledge, the various communication theories, particularly those that the student is likely to encounter later in their graduate programme and the dynamics of information and knowledge management in society.

ILI 5202 Management Information Systems   **12 Credits**
The module is a study of concepts and techniques for applying computer technology to functional areas of a work environment in an information centre. Emphasis is placed on the advantages, limitations, general characteristics and potential contributions of computerised information systems to sound decision making. At the end of the module, the students would be able to generate and use data from various computer systems in decision making through report generation features.

ILI 5203 Strategic Management and Leadership in the Information Services 12 Credits
This module is an introduction to the field of strategic management. It looks at the art and science of strategic planning and implementation of the plans, the key concepts and theories in the field and how they can be applied to institutions in the information services sector. The module also highlights the role of leadership in effective strategy implementation. Illustrations with case studies about real scenarios in various types of information services institutions shall be used during classes. At the end of the module, students would gain an appreciation of the importance of building competitive advantage, an understanding of leadership strategies and their impact on organisational direction and the relationship between strategic management and leadership. Students would also be able to set performance targets of teams to meet strategic objectives and to apply influencing and persuading skills in the workplace.

YEAR II

PART III   **(24 credits)**

Core Modules
ILI 5000 Research Seminars
Prerequisite ILI 5102 Research Methods and Data Analysis Techniques   12 Credits
Seminars are offered to students in preparation for undertaking a dissertation. The purpose of the seminars is to enable students to select a research topic and thereafter write a research proposal. The essence of the seminars is to enable students to design their own research curricula which are finally refined with the help of dissertation supervisors.

ILI 5301 Information Policy Studies   12 Credits
The module in an examination of aspects of policy through a critical analysis and comparison of key policy initiatives and policy documents in the field of Library and Information Services in Zimbabwe, in the region and internationally. It also examines and analyses policies occurring in coextensive areas such as mass media and the publishing industry. At the end of the module, students would be able to demonstrate familiarity with current information policy issues in Zimbabwe, assess recent information policy initiatives in other countries, propose policy approaches in response to an information issue such as freedom of information, information access and distribution, copyright, or privacy and also design their own sector-specific policies.

One (1) Elective Module to be Chosen

ILI 5302 Indigenous Knowledge Systems   12 Credits
The module explores the significance of indigenous knowledge systems from historical and developmental perspectives, placing the systems in the context of modern knowledge systems. It concludes by demonstrating how library and information services can embrace all forms of knowledge systems. Students will gain an appreciation of the importance of indigenous knowledge in modern society and its application from different perspectives. It is anticipated that students would advance knowledge on the subject area by undertaking research on the subject matter in their dissertations.

ILI 5303 Specialised Information Systems in Agriculture, Health,   12 Credits
Development Studies, Etc
The module focuses on the design, development and management of specialised information systems in agriculture, health and environmental issues in the context of contemporary trends.

Think in other terms

Topics include expert systems for specialised information systems, diagnostic problem solving for information systems in the agriculture, health and environmental sectors. Students would gain both theoretical and practical exposure in the use of a selection of specialised information systems in agriculture, health and the environment upon successfully completing the module.

IRA 6101 Advanced Records Management   **12 Credits**
(*Module offered from the Department of Records and Archives Management*)
The module discusses the various theories and approaches used in records and archives management. A critique of the major approaches including the records life-cycle, records continuum, integrated recordkeeping models is done with special reference to selected case studies. Contemporary recordkeeping approaches and application of records management policies and programmes in situational contexts is also examined. Students would gain an ability to appraise records.

ILI 5304 Sociology of Information   **12 Credits**
The module is an in-depth study of the relationship between particular users and user communities and the delivery of information services in specific contexts. It focuses on society and societal information needs in both retrospective and current contexts, and how these needs, particularly current ones, can be strategically met. It also looks at social change and how this impacts on information requirements and delivery to various segments of society. Students would gain an appreciation of the information needs, use and seeking behaviours in different social institutions at the end of the module.

ILI 5305 Intellectual Property Rights   **12 Credits**
This module focuses on the protection of proprietary rights in inventions, writings, creative expression, software, trade secrets, trade designations, and other intangible intellectual products, copyright, trademarks and unfair competition law. Consideration will be given to the challenges posed for traditional intellectual property paradigms by new technologies and the shift to a knowledge-based economy. The module covers some of the salient controversies in intellectual property law, including patent protection for software and business methods, the challenges to copyright law posed by file sharing technology, the role and difficulties of protecting trademarks on the Internet, and the application of common law doctrines to the Internet. Emphasis is given to Zimbabwean patent laws. Upon completing the module, students would gain an understanding of intellectual property rights issues.

ILI 5306 Project Management   **12 Credits**
The purpose of the module is to enable students to design and implement information related projects in various work settings. The project life cycle aspects like identification, purpose, planning, implementation, managing, utilising resources in the environment as well as feasibility assessment of a project will be stressed. Emphasis will be on relevance to local people and needs,

and the role of leadership skills in capitalising on 'soft skills' for successful project management. On completion of the module, students would know what project management involves, how to efficiently organise project work towards a goal, understand what work motivation, leadership and teamwork entail as well as learn how to communicate, influence and act in a crisis.

ILI 5307 Instructional Methods for Information Literacy 12 Credits

The module aims to develop in students, proficiencies to plan, coordinate and implement information literacy programmes in a variety of information institutions. The students would gain an understanding of learning theories, information seeking behaviour models and instructional design and delivery methods. Proficiencies include: administrative skills, assessment and evaluation skills, communication skills, curriculum knowledge, and presentation skills, among others.

ILI 5308 Data Management and Digital Curatorship 12 Credits

The module prepares students and practicing information professionals with the competencies (i.e., knowledge, skills, and abilities) for the emerging digital curation and data management environment. It also prepares students to qualify for and excel in the evolving opportunities in digital curation and data management. Students will learn both fundamental concepts and practical skills needed to perform essential job functions that are relevant to digital curation and data management. Students would gain practical experiences with technologies and applications in a virtual laboratory setting to develop the necessary technical competencies needed to facilitate continued access to digital information resources.

ILI 5309 Informetrics 12 Credits

The module covers the study of quantitative aspects of information, including the production, dissemination and use of all forms of information. Areas of focus include bibliometrics, altmetrics, scientometrics and webometrics. At the end of the module, students would gain fundamental theoretical and practical knowledge and skills in informetrics.

YEAR II

PART IV (25 Credits)

ILI 5000 Dissertation 25 Credits

Working under the guidance of a supervisor, students will be required to undertake an independent investigation on a topic of their choice that is subject to approval. The exercise will enhance the students' proficiency in undertaking research in order to solve organisational/institutional and societal problems. The dissertation must be at least 20 000 words. Marking and moderation of the dissertation must be done by a moderator and an external examiner, respectively.

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DEPARTMENT OF PUBLISHING STUDIES

Lecturer and Chairperson
S. Jele, PhD (UNISA) (in progress); MSc L.I.S. (NUST); PGDHE, NUST; BSc (Hon) in L.I.S. (NUST)

Secretary
Hlongwane, M.B, BA (Gen) in English and Communication (ZOU), ND Secretarial Studies (Byo Poly)

Technician
M. Ruzive, MSc Information Systems, (NUST); BSc (Hons) Computer Science, (NUST) HND Computer Studies, (Byo Poly)

ACADEMIC STAFF
Professor
(Vacant)

Associate Professor
(Vacant)

Senior Lecturers
(Vacant)

Lecturers
N. L. Dlodlo, D.D. (AIHT), M.P.A. (UZ), BSc. (Hons) (Brunel), P.T.H.

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S. Nkomo, PhD (UNISA) (in progress)*;*MSc, L.I.S. (NUST); PGDHE, NUST; BSc (Hons) in L.I.S.(NUST)

S. Mpofu, PhD (UNISA) (in progress); MSc, L.I.S. (NUST); PGDHE, NUST, BSc (Hons) in Pub..(NUST)

E. C. Chiware (Chingono), MSc Information Science (Publishing), (Moi University, Kenya), PGDHE, (NUST), BSc (Hons) in Pub. (NUST)

A. Ndlovu, PhD (UNISA) (in progress)*;* MSc Information Science (Publishing), (Moi University, Kenya), PGDHE, (NUST), BSc (Hons) in Pub.(NUST)

Staff Development Fellows
(Vacant)

Tutorial Assistants
N. Dube, BSc (Hons) in Pub (NUST)

Research Fellows
(Vacant)

Professional Instructor
K. K. O. Shiri, B.Ed. (UZ), NC Computer Studies, (Hre. Poly), Cert. Ed. (UCE)

Demonstrator
(Vacant)

BACHELOR OF SCIENCE HONOURS DEGREE IN PUBLISHING MEDIA AND TECHNOLOGY STUDIES

1.0   PREAMBLE

This programme proposal is rebranding from the Bachelor of Science Honours Degree in Publishing to the Bachelor of Science Honours Degree in Publishing Media and Technology Studies. It is a programme aimed at producing graduates with knowledge and professional skills required in a variety of publishing media sectors which include book, magazine, newspaper, film and music. The primary objective of the programme is to equip students with skills that shall make them function effectively in a range of situations from the editorial, design, production, marketing, promotion as well as distribution of published information products and/or services. Students undertaking this degree programme shall occupy company management functions from middle to senior levels and also become media practitioners as they shall be able to write and design various publishing media products.

2.0   REGULATIONS

2.1   These regulations should be read in conjunction with the general university regulations for undergraduate studies and the regulations of the Faculty of Communication and Information Science.

2.2   The Degree shall be awarded to students who have successfully completed the programme and passed the examinations in accordance with the regulations set out below.

3.0   ENTRY REQUIREMENTS

3.1 **Normal Entry**

For entry into the Bachelor of Science Honours Degree in Publishing Media and Technology Studies, applicants must have passed at least two (2) subjects at Advanced Level and 5 subjects at Ordinary Level including English Language. Mathematics with at least a C Grade is an added advantage.

3.2 **Special Entry**

Applicants may apply for Special Entry if they have successfully completed a National Diploma in Education or Information or Communication or an equivalent qualification in the subject or skills related to Publishing.

3.3 **Mature Entry**

Applicants who are at least 25 years of age and who are not eligible for entry under the normal or special regulations may apply for mature entry, provided that they have passed at

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least 5 O' Level subjects including English language and Mathematics and have completed their full time school or college education at least five years before the start of the academic year in which admission is sought.

4.0   PROGRAMME PROFILE

Degree type	Bachelor of Science Honours
Credit Load	534
SADC-QF Level	8
Accrediting authority	Zimbabwe Council for Higher Education (ZIMCHE)
Date of Accreditation	

4.1   **Structure of Programme**

    4.1 On a full-time basis, the programme shall be studied over four (4) years with the third year being spent on work attachment in industry for training experience.

    4.2 A minimum period of thirty (30) weeks shall be required for industrial attachment. A candidate placed under an organisation shall be required to submit himself/herself to Rules and Regulations as may apply to employees of that organisation. Should it become necessary for a student to change the organisation, permission must be granted by the University.

    4.3 In the fourth year candidates must undertake a research project. Candidates must satisfy the examiners in all the prescribed modules and in all requirements for the programme.

    4.4 A candidate must attain a total of 534 credits to qualify for the award of the degree.

4.2   **Purpose of the Programme**

    The programme aims at producing graduates who can work effectively within publishing houses of various media including books, magazines, newspapers, journals and corporate publications. The core skills shall make them able to work in a range of units from the editorial, design, production, marketing, promotion as well as distribution of published information products and/or services, and all company management functions from middle to senior levels.

4.3   **Programme Characteristics**

    4.3.1 **Areas of Study**

      The programme focuses on several key areas, including:

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- Acquisitions and commissioning of publishing projects,
- Digital applications of publishing media,
- Fundamentals of production: editing, proofreading, design,
- Marketing and distribution of information products/ services
- Copyright and other Intellectual Property Rights
- Communication skills, leadership and management
- Creative writing, report writing, copywriting
- Types of Publishing: Journal, Educational, Magazine, Corporate, Trade, Music, Newspaper and Film Publishing.

4.3.2 **Orientation**
The programme gives equal weight to theory and practice.

4.4 **Career Opportunities and Further Education**

Graduates in the Programme may work in the publishing industry, creative   industry, copyright industry, media institutions and academia as:
- Publisher/ Publishing manager
- Editorial manager
- Editor (books, journals, magazines or newspapers)
- Creative designer/ Graphic designer
- Artwork controller
- Proofreader
- Digital marketer/ web developer/ Information marketing officer
- Content manager/ developer
- Copywriter
- Production manager
- Social media publisher
- Online publisher
- Music publisher
- Film publisher
    Graduates of the programme can also proceed to Master's programmes in publishing or any related field.

4.5 **Programme Delivery**
Teaching and learning methods include lectures, tutorials, seminars, laboratory practicals, group work, industrial visits, industrial attachment, research projects, and independent

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study. Students are assessed through essays, tests, oral presentations, practical among others. Students taking practical modules are expected to produce industry-standard work.

4.6   **Programme Competencies**

    4.6.1 **Generic Competencies**

- Ability to analyse and synthesise information.
- Methodological problem solving.
- Critical thinking.
- Verbal and written communication skills.
- Ability to reason and argue persuasively.
- Commitment to integrity and ethical conduct.

    4.6.2 **Discipline Specific Competencies**

- Ability to edit, design, typeset, and proofread content for publication.

- Ability to adopt new publishing technologies in the production and delivery of publications.

- Ability to solve a wide range of problems in the book sector by identifying their fundamental aspects and using both theoretical and practical methods.

  - Research skills.
  - Commitment to integrity and ethical conduct.

4.7   **Exit Level Outcomes**

    Graduates of the programme should be able to:

- Identify, analyse and solve problems in the publishing media industry creatively and innovatively.

- Apply knowledge of publishing, management, production and marketing to solve the publishing industry problems.

- Produce creative and artistic designs.

- Demonstrate competences in developing proposals and conducting research.

- Display capabilities to use appropriate publishing software.

- Exhibit ability to communicate effectively, both orally and in writing, with readers and the community at large.

- Express critical awareness of the sustainability and impact of Publishing on the social and educational settings.

- Demonstrate ability to work effectively as an individual, in teams and in multidisciplinary environments.

- Show aptitude to engage in independent learning through well-developed learning skills.

- Reveal ability to act professionally and ethically and to exercise judgment and take responsibility of actions taken.

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- Demonstrate knowledge and understanding of the principles of publishing management and economic decision making.
- Produce and understand a wide variety of publishing products, including books, films, blogs/websites, magazines/newspapers, journals etc.
- Utilise their knowledge of the publishing industry and its techniques to analyse and critique its operations.
- Conduct research that identifies problems and suggests solutions that benefit the publishing industry and society.

5.0 MINIMUM BODY OF KNOWLEDGE IN PUBLISHING MEDIAAND TECHNLOGY STUDIES

- Skills in content acquisition and commissioning for publishing projects.

- Ability to write, read, edit written texts and make appropriate decisions about aspects of language such as grammar, punctuation and tone, style and logic so that the intended message is clearly transmitted.

- Skill of combining text and graphics and communicating messages effectively.

- Ability to review literary works and critique them with a view to understanding the history and cultures of publishing.

- Knowledge of and ability to interpret the copyright law and other Intellectual Property laws and their application.

- Communication skills to enable students to engage with all players in the creative industry.

6.0 SCHEME OF EXAMINATION AND ASSESSMENT
6.1 Faculty regulations for examinations shall apply.
6.1.1 Unless specified otherwise in the module synopses, all taught theory modules shall be assessed through continuous assessment in the form of assignments, tests, quizzes, short projects or oral and other presentations, and a formal 3-hour written examination. The weighting of written examinations and continuous assessment shall be 70% and 30%, respectively. The final year project shall be carried out over two semesters and shall be weighted as two modules.
6.1.2 The following Grading Scheme shall be applied for all modules in the Programme:

75% and above	1	(First Division)
65% - 74%	2.1	(Upper Second Division)
60% - 64%	2.2	(Lower Second Division)
50% - 59%	Pass	
Below 50%	Fail	

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6.1.3   The following are the contributions of each Part to the overall assessment:

Part I	10%
Part II	20%
Part III	20%
Part IV	50%

PROGRAMME SUMMARY

Part I   **134 Credits**

Module Code	**Module Description**	**Credits**

Semester I (All Core Modules)

IPU 1111	Introduction to Publishing	10
IPU 1120	Publishing in Africa	10
IPU 1121	Fundamentals of Publishing Technologies	10
IPU 1122	Elementary Writing Skills for Editors	12
IPU 1123	Design for Print Media	12
CTL 1101	Conflict Transformation and Leadership	10

Semester II (All Core Modules)

IPU 1204	Copy Editing: Theory and Practice	12
IPU 1220	Marketing of Publications	12
IPU 1221	Copywriting	10
IPU 1222	Creative Writing I: Fiction	12
IPU 1223	Electronic Publishing	12
IPU 1224	Content Commissioning and Acquisition	12

PART II   **134 Credits**

Semester I (Core Modules)

IPU 2120	Electronic Editing: Theory and Practice	12
IPU 2121	Digital Marketing	12
IPU 2122	Creative Writing II: Non-Fiction	12
IPU 2123	Online Publishing: Graphics for the Web	10
CBU 2103	Human Resources Management	10

Electives (Choose One)

IPU 2124	Fundamentals of Educational Publishing	10
IPU 2125	Magazine and Newspaper Publishing	10
IPU 2126	Music Publishing	10

Semester II (Core Modules)

IPU 2220	Copyright and Publishing Agreements	12
IPU 2221	Research Methods in Publishing	12

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IPU 2222	Logistics and Distribution of Information Products	12
IPU 2223	Web and Animation	12
IPU 2224	Social Media Publishing	10

Electives (Choose One)

IPU 2225	Educational Book Evaluation, Approval and Selection Criteria	10
IPU 2226	Costing and Pricing Publications	10
IPU 2227	Film Publishing	10

PART III

| IPU 3000 | Industrial Attachment | **130 Credits** |

PART IV   136 Credits

Semester I (Core Modules)

IPU 4000	Research Project	12
IPU 4120	Publishing Management, Organisation and Strategy	12
IPU 4121	Sustainable Media Development	10
IPU 4122	Creative Writing III: Magazines and Newspapers	12
IPU 4123	Self-Publishing and Freelancing	10

Electives (Choose One)

IPU 4124	Scholarly Publishing	10
IPU 4125	Corporate Publishing	10
IPU 4126	Publishing for Children	10

Semester II (Core Modules)

IPU 4000	Research Project	12
IPU 4220	New Media Publishing Project	12
IPU 4221	Policy Frameworks in Publishing	12
IPU 4222	Legal and Ethical Issues in Digital Publishing	12
IPU 4223	Digital Skills for Editors	12

Electives (Choose One)

IPU 4224	The Future of Publishing: Global Developments and Trends	10
IPU 4225	Principles of Education for Publishers	10
IPU 4226	Translations and Adaptations	10

* Electives will be offered provided a minimum of five students sign up for the module and are also subject to the availability of resources and teaching staff.

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TOTAL CREDITS FOR THE PROGRAMME

Part I	134
Part II	134
Part III	130
Part IV	136

Total minimum credits: **534**

MODULE SYNOPSES

PART I **134 CREDITS**

Semester I (All Core Modules)

IPU 1111   Introduction to Publishing   10 Credits

The module covers the overall introduction to the basic principles of publishing for trade, education, magazine, journal, professional and children. It is an overview of how publications are discovered, contracted, developed, financed, edited, designed, produced, marketed and sold in a changing marketplace. It gives students a general perspective and understanding of the publishing processes and industries. Students will explore the structure and functions of the publishing enterprise, as well as the unique attributes of the segments of the book, magazine and newspaper publishing industries: editorial principles and practices, marketing and publicity, production, sales and distribution. The impact of technology on these segments of the industry, current trends and issues will also be covered.

IPU 1120   Publishing in Africa   10 Credits

The module takes students through a tour of Africa's current developments, strengths and weaknesses in book funding and resource mobilization for sustainable development in the publishing sector. Entry barriers and funding limitations are evaluated against post monopolistic policies in the publishing sector. The roles of various sector members in content development and distribution in Africa South of the Sahara are also discussed. The role of policies in various countries as well as the attempts to trading in books and other publications within the continent are examined to identify similarities and differences.

IPU 1121 Fundamentals of Publishing Technologies   12 Credits

This module introduces students to basic information technological skills and desktop publishing skills with focus on how to use Microsoft Office, as well as design software like Adobe, In Design, Photoshop, Illustrator etc. to create visual communications. It enables students to harness the power of these packages to develop different types of publications from simple greeting cards to newsletters. At the end of the module students will have good knowledge and skills of various information technological tools, features and their applications in a publishing setup. Students will learn how to package their documents for print to get the most from the final design.

IPU 1122 Elementary Writing Skills for Editors   12 Credits

This module is aimed at helping students strengthen their writing skills. It focuses on language, including variations in grammar, usage and punctuation and linguistic approaches to writing style, module development and readability. It examines features of different text types, both spoken and written. It discusses communicative approaches to writing and helps students develop their knowledge of English for both business and study. It also aims at familiarising

students with the myriad forms of communication; both online and offline so that they become critical receivers and effective producers of content for any media.

IPU 1123 Design for Print Media: Theory and Practice   12 Credits
This module equips students with the principles of design and their application for print media. It gives a brief historical perspective of book, magazine and newspaper design and discusses the fundamental principles on which designs are founded. It introduces students to the design process, and its relationship to the editorial, production, and marketing functions. The components of design and printing: typography, composition, page layout, illustrations, photo-editing, colour process & theory, prepress (both traditional and electronic) paper basics, printing processes, binding operations, will be covered, including the use of templates, grid systems, and current layout programs. This module allows for further analysis of the design aspects covering costs and cost effectiveness of uses of design, colour and paper choices. The new technology online linkages, print on demand, computer to plate technologies and investment costs in hardware and programs for maximum effectiveness are also examined.

CTL 1101   Conflict Transformation and Leadership   10 Credits
(Offered by the Department of Business Management)
The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

Semester II (All Core Modules)

IPU 1204   Copy Editing: Theory and Practice   12 Credits
The module lays a theoretical and practical introduction to copyediting and proofreading. It covers the aspects of copy editing such as; the types and styles of copy editing, the roles and responsibilities of editors as well as skills of editors. The legal and ethical aspects of copy editing and text mark-up are also discussed. The module also examines the different requirements for copy editing on hardcopy and on screen and the tools and resources used by editors.

IPU 1220   Marketing of Publications   12 Credits
The module provides a market oriented conceptual framework of marketing and captures market dynamism by discussing current trends in marketing. It analyses marketing methods specifically related to books, periodicals, newspapers, magazines, newsletters and other products. It aims to provide an effective working knowledge of the business and marketing principles and practices of the publishing industry across different marketplaces and sectors, and how they apply in different types of publishing organisations in both domestic and global markets. It includes offline and online marketing campaigns and strategies. The module also shows students how to identify and understand a target audience and the most effective ways to reach it.

Think in other terms

IPU 1221 Copywriting　　　　　　　　　　　　　　　　**10 Credits**

This module aims at equipping students with the fundamental copywriting skills. It will enable students to write effective copy for web pages, blogs, social media, brochures, advertisements among others. It is a practical module which gives students a chance to tackle the real-world copywriting tasks. Students will also learn how to craft a copy that engages readers and persuades them to act, adapt to writing for different formats and markets. The module will also cover the importance of following a brief and the copywriter's legal and moral obligations.

IPU 1222 Creative Writing I: Fiction　　　　　　　　　**12 Credits**

The module focuses on the basic vocabulary, techniques and transitions in fiction and includes discussion of published fiction works. The module's goal is to give students practice and criticism in the writing, analysis, and composition of fiction writing. It also aims to broaden students' literary scope and help them to read with a critical eye and expose them to constructive criticism and discussion. Students also practice writing, reading and reviewing a variety of short fictional works by a variety of authors (from classic to contemporary). A treatment of comparative literature contrasting African Literature and World Literature mainly in the English Language will be covered. The module is portfolio driven, therefore, at the semester students should have written, read and reviewed a variety of fictional works.

IPU 1223 Electronic Publishing　　　　　　　　　　　**12 Credits**

This module gives students applied and theoretical knowledge of professional electronic publishing which is a key digital technology that has transformed society in many ways. It sets the foundation for the development of skills necessary to create well designed publications using the latest desktop publishing technology. It also equips students with basic layout, design principles, visual communication, using colour effectively, creative typography and image editing. Students will also learn to work with the latest versions of application programs such as In Design, Corel draw, Illustrator, Photoshop etc. Successful completion of this module is a prerequisite for IPU 2123 Online Publishing: Graphics for the Web.

IPU 1224 Content Commissioning And Acquisition　　　**10 Credits**

This module provides a basic introduction to commissioning and acquisition of content for different publications. It equips students with the necessary knowledge and skills to acquire or commission content from suitable authors according to a publisher's requirement and curate it by ensuring that the content meets the publisher's standards. The module also discusses how students can identify books or media products to publish and how they can commission work by finding authors or responding to proposals. It also covers the evaluation and assessment of non-solicited content.

PART II (134 Credits)

Semester I (Core Modules)

IPU 2120 Electronic Editing: Theory and Practice   12 Credits
This is a practical module with minimal theory that looks at the professional responsibility of the editorial team to authors, artists, readers and the profit drivers; the role of the market research and information management and application to editorial decisions. The module reviews the reader as well as the core aspects of design and presentation of knowledge electronically. Readability measures, word count are also examined. Practical electronic editing is the order of the day.

IPU 2121 Digital Marketing   12 Credits
This module is designed to meet the expanding needs for marketers who are skilled in utilisation of a unique blend of technology, social media channels and business. It enables students to develop skills to assess and evaluate an organization's digital strategy, the ability to map the customer journey to key consumer touch points and to maximize the effectiveness of an organization's digital footprint. It also aids students with the knowledge to develop, execute, monitor, and maintain digital advertising campaigns in order to attract, activate, and retain customers. This has made digital marketing channels and social media the most widespread, interactive and essential of all modern marketing tools. Digital Marketing is now the most important part of the marketing mix. It has grown rapidly in the past few years as more and more businesses are realizing the importance of a good online presence.

IPU 2122   Creative Writing II: Non-Fiction   12 Credits
The module focuses on the basic vocabulary, techniques and traditions of non- fiction and includes the discussion of published works. This module aims to develop students' awareness of the possibilities of non-fiction writing. Original non-fiction work is written and presented for criticism and discussion. Students will gain an understanding of the historical origins and precursors of contemporary writings in this mode and gain experience in exploring and expanding the accepted limits of different genres as practicing writers. Students will also write, read, interpret, and review a variety of non-fiction works by a variety of authors (classic to contemporary). The module is portfolio driven, therefore, at the end of the semester students should have written, read and reviewed a variety of non-fictional works.

IPU 2123   Online Publishing: Graphics for the Web   12 Credits
This module provides a hands-on experience to the skills needed to plan, design and render visual layouts for interactive content particularly on the web. Students are encouraged to apply the skills and knowledge they gained on Electronic Publishing (IPU 1223) to their own professional development. Students will focus on issues relating to writing and integrating texts, graphics and sound (multimedia) to create websites, social media and online publications. Students will also gain a practical experience in multimedia, online, and mobile publishing.

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CBU 2103   Human Resources Management   10 Credits
Offered from the Department of Business Management)
A review of Human Resources Management; operative functions of human resources management; practical aspects of human resources management; current trends in human resources management in Zimbabwe.

ELECTIVES (Choose One)

IPU 2124   Fundamentals of Educational Publishing   10 Credits
This module focuses on the basic requirements of educational publishing. It also examines the role of a publisher in curriculum and syllabus development process as well as aspirations for change. The module also reviews the origins and rationale for educational materials evaluation, and selection. The module also aims to help students understand the role of the textbook in teaching and the role played by the publisher in production and publishing of educational materials.

IPU 2125 Magazine and Newspaper Publishing   10 Credits
This module explores the major aspects of magazine and newspaper publishing; from editing, layout and design to new models of distribution and revenue generation. It deals with the transformation of the editorial copy and photography into a professional work of art. Students will use software packages to edit and prepare magazines and newspapers including incorporating graphics such as pictures, photos and other illustrations. Focus goes beyond print into the digital environment.

IPU 2126 Music Publishing   10 Credits
The module covers the structures of music publishing and how they are changing with particular reference to the process of record release and contracts, music licensing, performance rights, catalogue development and acquisition, sub publishing, internet revenues, new technologies relating to songs and other activities conducted by music publishers. Students will be introduced to key players and institutions (music publishers and record label companies) to gain insights into the music production trends.

Semester II (Core Modules)

IPU 2220 Copyright and Publishing Agreements   12 Credits
The module introduces students to the laws relating to copyright and related rights. It examines the international systems for the protection of copyright, it identifies works which are eligible for copyright protection and it discusses how copyright is infringed. The module also discusses the rationale and objectives of establishing Collective Management Organisations (CMOs) and provides an independent examination of Reproduction Rights Organisations (RROs). The module is designed for those who wish to appreciate the role of collective management in

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enforcing copyright to promote creativity and growth of culture. The goal is for students to develop an understanding of copyright law to resolve problems.

IPU 2221   Research Methods in Publishing   12 Credits
The module theoretically introduces students to research methodologies used in social sciences and especially those used in the field of publishing. It provides an understanding of research approaches, methods and skills to students and importantly, an ability to deploy them in their studies. It also aids students to conduct research as part of their studies. Students will also learn how to write a research proposal, methods of designing, collecting, analyzing, and interpreting data using examples from a variety of special areas in publishing.

IPU 2222 Logistics and Distribution of Information Products   12 Credits
This module covers the place element of the marketing mix in the context of marketing publications. It aims to introduce current theories and practices in logistics and distribution to students. Distribution and logistics is a critical business function that every publisher has to pay attention to. By learning the relevant theoretical frameworks, students will understand the motivations and behaviours of channel members. Students will also learn how to make informed decisions in logistics and distribution. More important, this module is not a standalone marketing module. It integrates concepts and ideas from other marketing modules so that students can fully comprehend the linkage of distribution with other core marketing activities.

IPU 2223   Web and Animation   10 Credits
The module covers the design and creation of motion graphics. It equips student with knowledge and tools used to create animations on the web such as CSS, HTML and Java Script. It is a practical module that will assist students to improve their design and illustration skills. Students will also learn how to incorporate various multimedia into a document or web page.

IPU 2224 Social Media Publishing   10 Credits
This module gives students practical and theoretical knowledge on preparing content for publishing in social media. It equips students with the new or emerging forms of online content creation. Students will examine professional and consumer trends in digital content creation and social media publishing, following both the technological and theoretical advances that have disrupted the print medium. Students will also learn how to develop, execute, manage and publish compelling social media content through social media publishing strategies like Hootsuite, HubSpot, TweetDeck and others.

ELECTIVES (Choose One)

IPU 2225 Educational Book Evaluation, Approval and Selection Criteria   10 Credits
The module reviews the origins and rationale for educational materials evaluation, approval and the need for selection criteria in open/liberalized book industry markets/countries. Models of successful book development experiences in Sub-Sahara countries are reviewed and discussed

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with a view to appreciating the process of book development. The values of transparency and openness in a participatory process are critiqued by the module. The module also prepares students for professional adjudication over disputes between evaluators and publishing companies in systems that are less transparent and use Tenders to offer publishing projects and award modules for printing and distribution.

IPU 2226 Costing and Pricing of Publications   **10 Credits**
The module prepares the student for professional and astute pricing of products and services within a competitive environment. It discusses the elements of costs that should inform pricing decisions and delves into each element to clarify stage by stage accumulation of costs up to identification of unit costs, discounts, quantities, royalties, overheads, completion and subsidies for price setting. Emphasis is applied to key competencies of networking within and outside the company to determine the right price before spending starts. The module also prepares students for professional negotiations with suppliers- printers and origination houses as well as authors and illustrators. The logical and systematic consultative process with marketing staff and customers in the effort to determine opportunities and threats to profitable pricing is emphasized.

IPU 2227 Film Publishing   **10 Credits**
This module is intended to develop student`s film production skills. It addresses both theory and real-life applications while introducing students to professional camerawork, lighting sound for location recording as well as editing and post-production skills. The module also documents and analyses the major developments in the evolution of cinema in a socio-historical context. It explores the key theoretical tools used to understand film and demonstrates how to apply these in film production and publishing. Students will be introduced to key players and institutions (film industries) to gain insights into the film production trends in Zimbabwe.

PART III

IPU 3000 Industrial Attachment   **130 Credits**
The third year is an internship period in which students undertake an industrial placement for a minimum of eight months. At the place of attachment, students generally have a supervisor who assigns them specific tasks and evaluates their work. The internship is a compulsory part of the degree programme. It is formally assessed. Assessments include the writing of a reflective log and an evaluative report by students and a performance evaluation report by the industrial supervisor.
The internship is expected to give students an insight into the world of work and to allow the students to build on the theory they would have learnt at university as well as explore their career options. At times, employers use internships as a trial period for prospective employees, thus students get an opportunity for an offer of a full-time job. After the internship, students would gain practical skills that help strengthen their curriculum vitae, increasing their chances of being employed.

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Semester I (Core Modules)

IPU 4000 Research **12 Credits**
The module covers the essential issues in writing a research project. It deals with issues of developing a research proposal, including literature review, research methodology, data presentation and analysis, conclusion, citation and the final document layout and presentation. Students are encouraged to apply the knowledge and skills they gained in IPU 2221 Research Methods in Publishing for their own professional development. By the end of this module students should have developed a complete research proposal in preparation for IPU 4000 in their second semester.

IPU 4120 Publishing Management, Organisation and Strategy **12 Credits**
This module focuses on the concepts and methods for strategically and effectively managing a publishing organisation. Publishing has its own distinct terminology which carries through to business strategies and organisational structure. It also reviews strategic plans and budgets for a publishing firm. Special attention is given to the managerial ethics, and the importance of publishing in a multinational environment.

IPU 4121 Sustainable Media Development **10 Credits**
The module will be focused on both print and digital media in various areas such as educational, general, trade, scholarly and magazine publishing. It will examine and evaluate funding; market; development, production and distribution issues in selected countries. It examines media development models and the role of various players and stakeholders in media development and funding in order to achieve the ideal sustainability in each genre.

IPU 4122 Creative Writing III: Magazines and Newspapers **12 Credits**
The module extends the creative writing theory and practice to magazines and newspapers. Students will read, critique and review various magazines and newspaper articles. It also examines the creation of a magazine and a newspaper from concept to realisation. In these volatile economic times, the magazine and newspaper industry face unprecedented challenges. The module will also discuss the magazine and newspaper industry as businesses that work in concert to attract readers and advertisers. The module will broaden students' literary scope and help them to read with a critical eye and expose them to constructive criticism and discussion. The module is portfolio driven, therefore, at the end of the semester students should have written, read and reviewed a variety of magazine and newspaper articles.

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IPU 4123 Self -Publishing and Freelancing   **10 Credits**

This is an entrepreneurial module which seeks to equip students with creative and innovative managerial practices of becoming successful self-publishers. The module reviews the publishing process and explains the process from creation of an idea to successful launch of a new venture. Students also review and evaluate the business models of the world's best self-publishers. The module also explores how to identify and develop solutions to the most common leadership and personal challenges faced by self-publishers when starting new ventures or launching new products. It also promotes a deeper understanding of what is required to be a self-publisher and highlights the skills and tools necessary to become a self-publisher and explores alternatives to common pitfalls.

ELECTIVES (Choose One)

IPU 4124 Scholarly Publishing   **10 Credits**

This module consolidates knowledge and techniques that are specific to production and publishing of academic monographs, journals and research output. It introduces students to the field of scholarly publishing, the processes of peer review and editorial of typescripts. It also explores the journal production chain, the business models in scholarly publishing as well as the changing landscape of scholarly publishing.

IPU 4125 Corporate Publishing   **10 Credits**

This module provides basic knowledge on corporate publishing. The module material covers publishing requirements and computer applications for publishing company materials. It focuses on several publishing formats, periodicals (newsletters, magazines etc), company reports and promotional materials. The module is portfolio driven, therefore, at the end of the semester students should have designed various corporate publications.

IPU 4126 Publishing For Children   **10 Credits**

This module provides an overview of children's literature and how it differs from mainstream adult trade publishing. It covers the history of children's books and examines the ways in which videos, magazines, picture books, novelty books, translations, both hardcover and paperback are evaluated, acquired and produced. Every essential element of the children's book publishing industry is assessed from acquisition, design and production to marketing strategies and distribution methods in both print and digital media. It also covers selected texts from the 19th to the 21st century. The module is portfolio driven, therefore, at the end of the semester students should have written, read and reviewed a variety of children's literature.

Semester II (Core Modules)

IPU 4000 Research   **12 Credits**
The module covers the essential issues in writing a research project. It deals with issues of developing a research proposal, including literature review, research methodology, data presentation and analysis, conclusion, citation and the final document layout and presentation. Students are encouraged to apply the knowledge and skills they gained in IPU 2215 Introduction to Research Methods for their own professional development and they build up on the proposal produced in IPU 4000 in first semester.

IPU 4220 New Media Publishing Project   **12 Credits**
This is a practical module in which students exploit their creativity and technological skills acquired during the module of their studies. Students will design websites to demonstrate their web design skills and the ability to edit multi-media from the internet. Students will use their practical skills in web design, social media publishing, magazine publishing and web animation to produce digital content. The module will assist students to develop the expertise needed in the editorial and production of digital content. By the end of the semester students will submit a project they would have produced which will contribute towards their final Part 4 assessment.

IPU 4221 Policy Frameworks in Publishing   **12 Credits**
The goal of this module is to provide students with the expertise needed to locate, interpret, evaluate, create and adapt policies relating to publishing issues. In particular, students will be able to recognize how different national and regional policies affect the publishing industry and their significance for the growth of the industry. The policy environment is discussed scrutinising how various policies even outside the book industry, affect and implicate policies in the publishing industry.

IPU 4222 Legal and Ethical Issues In Digital Publishing   **12 Credits**
The module will introduce students to the major legal and ethical issues that affect the publishing industry in the digital environment. Thus, students will be able to identify and review these issues as well as propose how to solve problems that can arise from them. Beyond copyright, students have to appreciate other legal issues such as open access licences, Digital Rights Management, Creative Commons and so forth. Students will also examine cases of questionable ethics (and criminal offenses) in the publishing industry dealing with fraud, plagiarism, and copyright infringement using both general and specific examples.

IPU 4223 Digital Skills for Editors   **12 Credits**
This module will enable students to create, edit and publish content on the web and other digital platforms. Students should have familiarity with software like Photoshop or Dreamweaver as well as knowledge of editing videos, photos and text for the web, writing keyword-rich content and coding using HTML. As more and more print publications go online, it is vital to understand the ins and outs of emerging media and technology.

ELECTIVES (Choose One)

IPU 4224 The Future Of Publishing: Global Developments and Trends   10 Credits
This is a research based module which focuses on global developments and trends impacting the future of publishing as an industry. As the world of publishing becomes integrated with other forms of entertainment and information distribution, classic publishing skill sets will find new opportunities; curation, editorial process, management and marketing will be needed for reaching wider audiences.

IPU 4225 Principles of Education for Publishers   10 Credits
The module gives an analysis of key principles of education and their impact on the book development process. It emphasizes the learning theories and the role of the book in learning, learning styles and instructional needs, teaching principles and the book as a teaching tool. Students will be able to incorporate these principles of education in publishing of educational materials.

IPU 4226 Translations and Adaptations   10 Credits
This module aims to engage students in the study of translations and adaptations in diverse forms, genres and styles across music, film, radio, television, books, newspapers, magazine and new media. These translations and adaptations are analysed in the light of theories of text, authorship, genre and cross-cultural exchange. Upon completion of the module students will have an understanding of the creative processes and the working of creative industries in shaping, visualizing and circulating literary narratives and cultural forms. Students will compare and contrast different translations and adaptations will be able to produce their own versions to suit their culture or country.

DEPARTMENT OF RECORDS AND ARCHIVES MANAGEMENT

Lecturer and Chairperson

O. Wutete, PhD in L.I.S, (University of Fort Hare), MSc in L.I.S, (NUST), Diploma in Records Management, (HP), FETE, (Masvingo Tech)**.,** BA (Gen), (UZ)

Secretary

H.H. Dube, HND in Office Management (Byo Poly), BSc (Hons) in Marketing (ZOU), MSc in Marketing (NUST)

Technician

C. T. Mutare, MSc in Information Systems (NUST), BTech (Hon) I.T, (HIT); HND in I.T., (KP)

ACADEMIC STAFF

Professor
(Vacant)

Associate Professor
(Vacant)

Senior Lecturers
(Vacant)

Lecturers

 P. Dewah ,PhD in Knowledge Management, (University of Fort Hare), MSc in LIS, (NUST) ,BA (Gen), UZ

A. Dube, PhD in Records & Archives Mgt, (Moi University), MSc in LIS (NUST)**,** BSc in LIS, (NUST), ND LIS, (BP)

F. Chaterera-Zambuko, DLitt & Phil in Information Science, (UNISA), MPhil Information Science, (UNISA),   MA Museum Studies, (MSU), BA Archaeology, (MSU), PGDTE, (MSU)

N. L.S. Makoni, MSc in LIS, (NUST)**,** Grad CE, (UZ)**,** BA General, (UZ)

M. Masuku, MPhil in RAM, (NUST)**,** PGDHE, (NUST)**,** BSc (Hon) in RAM, (NUST)

H. Ndlovu, MSc LIS, NUST**,** PGDHE, (NUST)**,** BSc (Hon) RAM, (NUST)

D. T. Sigauke, MPhil in Records & Archives Mgt, (NUST), BSc (Hon) in Records & Archives Mgt, (NUST)

R David, MSc in Health Informatics, (University of Leeds), BSc in Records & Archives Mgt, (NUST)

Staff Development Fellows
(Vacant)

Tutorial Assistants
C. Muzamba, BSc (Hons) in Records and Archives Management (NUST)

A.A.M. Ndlovu, BSc (Hons) in Records and Archives Management (NUST)

D. Jakata, BSc (Hons) in Records and Archives Management (NUST)

Research Fellow
A. Chirume , MSc LIS, (NUST); BSc (Hon) in L.I.S.(NUST)

Professional Instructor
(Vacant)

Demonstrator
(Vacant)

BACHELOR OF SCIENCE HONOURS DEGREE IN RECORDS AND ARCHIVES MANAGEMENT

1.0 PREAMBLE

The Bachelor of Science Honours Degree in Records and Archives Management is aimed at students who are keen to pursue a career in the information and records management field. The programme seeks to equip students with the theoretical knowledge and practical skills to work in the information management industry which us continuously transformed by the information and communication technology changes.

2.0 REGULATIONS

These regulations should be read in conjunction with the general university regulations for undergraduate studies, and the regulations of the Faculty of Communication and Information Science. The Degree shall be awarded to students who have successfully completed the programme and passed the examinations in accordance with the regulations set out below.

3.0 ENTRY QUALIFICATIONS

3.1 Normal Entry

3.1.1 Applicants must satisfy conditions for entry to undergraduate degree programmes stipulated in the General Regulations. Applicants must have the following qualifications (or their equivalent):

3.1.2 Five 'O' Level passes including English Language. The 5 subjects should include English. Mathematics with at least a C grade will be an added advantage. Apart from five (5) subjects at Ordinary Level a student must have passed at least two subjects at the Advanced Level.

3.2 Special Entry

3.2.1 In approved cases a student may be exempted from Part I or Part II modules or both on condition the student does not complete the full-time programme in less than three full academic years.

3.2.2 Holders of the Zimbabwe National Diploma from the Polytechnic colleges or the Technical Colleges (or their equivalent) who have passed the Diploma with merit (credits and distinctions) in half of the programme modules may qualify for entry into Part II of the Faculty of Communication and Information Science Undergraduate Honours Degree Programme.

3.2.3 Among Part I students' credit should not be given in excess of the number of modules offered in that part.

Think in other terms

3.3 **Mature Entry**

3.3.1 Persons who are at least 25 years of age on the first day of the academic year in which admission is sought and who are not eligible for entry under the Normal or Special Entry Regulations may apply for Mature Entry provided that:

3.3.2 Applicants must have passed at least five approved 'O' level subjects including English Language. Mathematics is an added advantage. Must have demonstrated potential suitability for university studies by virtue of their attainments and/or relevant work experience.

3.3.3 Normally, applicants should have completed their full-time school or college education at least five years before the start of the academic year in which admission is sought.

3.3.4 Applicants who wish to be considered under the Mature Entry provisions may be required to attend interviews and/or special tests at the University designed to assess their command of the English Language, numeracy and reasoning ability and general suitability for admission to Bachelor's degree studies. Applicants who have previously attended

3.3.5 Mature Entry tests and/or interviews without success will not be considered for admission under this form of entry unless in the intervening period they have acquired additional qualifications and/or experience.

4.0 PROGRAMME PROFILE

Degree type	Bachelor of Science Honours
Credit Load	498
SADC-QF Level	8
Accrediting authority	Zimbabwe Council for Higher Education (ZIMCHE)
Date of Accreditation	

4.1 **Structure of the Programme**

The degree programme may be studied on a full-time basis over four academic years. One year of the programme (at least 30 weeks) is earmarked for industrial attachment. A student placed under an organisation for attachment shall be required to submit himself/herself to rules and regulations as apply to the employees of that organisation. Should it become necessary for the student under attachment to move to another organisation, permission must be granted by the University. A research project will also be undertaken at Part IV as part of the degree requirements.

4.2 **Purpose of the Programme**

The aim is to produce graduates that meet the needs of today's information centres and all industries by providing a thorough understanding of the subject, technical competence, and transferable skills. The programme also aims to prepare records and archives management

students for rapidly changing technological environments with the core knowledge central to multidisciplinary development and personal improvement throughout their professional careers.

4.3 Programme Characteristics

4.3.1 Areas of Study

The programme focuses on several key areas including:

- Records management.
- Archives management.
- Knowledge management.
- Conservation and preservation.
- Documentation.

4.3.2 Specialist Focus

- Records management
- Archives management
- Knowledge management

4.3.3 Orientation

Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.

4.4 Career Opportunities and Further Education

Graduates may work in several fields under various job descriptions. The list includes but is not limited to being employed as archivists, records managers, information managers, document controllers, conservators, preservationists, e-records managers, digital-archivists and knowledge managers.

4.5 Programme Delivery

Teaching and learning methods include lectures, tutorials, practical, seminars, group work, industrial visits, industrial attachment, research project and individual independent study. Students are assessed through written examinations, tests, assignments, oral presentations, seminar presentations, industrial attachment report, third year report, final year research project report and continuous assessments.

4.6 Programme Competences

4.6.1 Generic Competencies

- Ability to draw appropriately from multiple academic disciplines to define and solve problems based on understanding of complex phenomena
- Capability to draw on big data and use analytics for informed decision making and strive to seek new ways of doing things

Think in other terms

- Ability to communicate effectively and to present information orally and in writing and using ICTs to both expert and non-expert audiences
- Capacity for analysis and synthesis using logical arguments and proven facts.
- Professional integrity and awareness of impact of science and technology on society and the environment
- Capability to identify and create new business ventures based on knowledge and new thinking paradigms.

4.6.2 **Discipline specific Competencies**
- Ability to manage and optimize institutional operations with regards to timely information access, management and availability.
- Ability to develop new technologies to aid process improvement with a view to enhance production efficiencies and outputs in any organisation.
- Ability to solve a wide range of problems in information management by identifying their fundamental aspects and using both theoretical and practical methods.
- Ability to use data to analyse process performance and technological issues using appropriate IT packages.

4.7 **Exit Level Outcomes**
Graduates of the programme should be able to:

- Identify, formulate, analyse and solve information management related problems creatively and innovatively.
- Apply knowledge of information technology, user needs, organisational needs and information management requirements to solve institutional problems faced on a daily basis.
- Perform creative, procedural and non-procedural design and synthesis of components, systems, products and processes which affect information management and flow with basic understanding of systems design taught within the programme.
- Demonstrate competence to use appropriate research methods, skills and tools, to conduct research which leads to innovative ideas as well as being problem solving within institutions to allow for effective business process re-engineering.
- Demonstrate competence to communicate effectively, both orally and in writing, with engineering audiences and the community at large.
- Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments.
- Demonstrate competence to engage in independent learning through well-developed learning skills.
- Demonstrate critical awareness of the need to act professionally and ethically and to exercise judgment and take responsibility within own limits of competence.
- Demonstrate knowledge and understanding of information management principles and economic decision making.

Think in other terms

5.0 MINIMUM BODY OF KNOWLEDGE IN RECORDS AND ARCHIVES MANAGEMENT

- Classification, arrangement, description and indexing of documents and records.
- Information technology competency skills
- Capable of adhering to legal and professional requirements to handle and manage records and archives.
- Inforpreneurial skills for creating jobs and wealth
- Research skills for undertaking research to solve information related problems
- Knowledge management skills - capable of leveraging organisational tacit and explicit knowledge
- Appraisal and disposition skills for all records in all formats.
- Conservation and preservation skills for all formats of records and archives.
- Documentation skills

6.0 SCHEME OF EXAMINATION AND ASSESSMENT

Faculty regulations for examinations will apply.

6.1 In determining the overall degree programme aggregate, the following part weightings shall be used:

Part I	10%	minimum 126 credits
Part II	20%	minimum 120 credits
Part III	20%	minimum 130 credits
Part IV	50%	minimum 122 credits

6.2 Final degree results will be classified as follows: First Division, Upper Second Division, Lower Second Division, Pass and Fail. The following Marking Scheme shall be applied for all modules in the Programme:

75% and above 1 (First Division)
65% - 74% 2.1 (Upper Second Division)
60% - 64% 2.2 (Lower Second Division)
50% - 59% Pass
Below 50% Fail

Think in other terms

PROGRAMME SUMMARY

Part I   **126 Credits**

Semester I (All Core Modules)

Module Code	Module Description	Credits
IRA1101	Knowledge Management	10
IRA1102	Archives and Manuscripts Management I	10
IRA1103	Collection Development & Management of Archives	10
IRA1104	Records Management 1	10
ILI1103	Introduction to Information Technology	9
ILI1108	Communication Theory and Practice	8
CTL1101	Conflict Transformation and Leadership	9

Semester II (All Core Modules)

IRA 1201	Archives and Manuscripts Management II	10
IRA1202	Access and Reference Services	10
IRA1203	Principles & Tools for Information Storage, Retrieval and Access	10
IRA1204	Archives, History and Society	10
IRA1205	Records Management II	10
ILI 1208	Applications of Information Technology Tools in Information Centres	10

Part II   **120 Credits**

Semester I (All Core Modules)

IRA 2103	Management of Electronic Records	10
IRA 2104	Management of Registries	10
IRA 2106	Oral History and Indigenous Knowledge Systems	10
IRA 2107	Legal & Professional Issues in RAM	10
IRA2109	Audio Visual Archives Management	10
CBU1108	Principles of Management	10

Semester II (All Core Modules)

IRA2203	Research Methods in Information Science	10
IRA2204	Archival Informatics	10

Think in other terms

IRA2205	Web Content Management	10
IRA2206	Computer Applications in RAM	10
IRA2207	Management of Electronic Records II	10
IRA2211	Archives, Government and Other Information Centres	10

Part III   **130 Credits**

| IRA 3001 | Industrial Attachment | 130 |

Credits

Part IV   **122 Credits**

Semester I (All Core Modules)

IRA4101	Management of Record Centres	10
IRA 4102	Information Economics	10
IRA 4103	Information Management in the Health Services	10
IRA 4104	Infoprenuership	10
IRA 4105	Marketing of Records and Archives	10
	Information Products & Services	

Semester II (All Core Modules)

IRA4005	Research Project	20
IRA 4201	Conservation and Preservation Management	11
IRA4203	Comparative Archives Systems	10
IRA4207	Reprographics	10
IRA4211	Virtual Archives Systems	10
IRA4212	Public Sector Records Management	11

TOTAL CREDITS FOR BSC RAM

Part I	126
Part II	120
Part III	130
Part IV	122

TOTAL CREDITS 498

Think in other terms

MODULE SYNOPSES

PART I   **126 CREDITS**

SEMESTER I

IRA 1101 Knowledge Management   **10 Credits**
The module defines knowledge management; Objectives of knowledge management; Principles of knowledge; Evolution of knowledge Management; Organisation learning: Types, Levels, features; Relationship of IT, IM and KM; knowledge sharing; Organisational Culture, change management and communities of Practice; knowledge Management Frameworks and Processes.

IRA 1102 Archives and Manuscripts Management I   **10 Credits**
The module is an introduction to the theory and practice of managing archival documents. Topics covered include acquisition, arrangement and description of archives and manuscripts. Emphasis is also on the key aspects of provenance and respect for original order. It also includes differences between public and private archives and the legislation applicable to them.

ILI 1103 Introduction to Information Technology   **9 Credits**
The module introduces information technology and the use of commercially available computing hardware, software and communications. It also includes accessing geographically distributed Internet information, electronic communication, word processing and document design, data modelling with spreadsheets, database design and maintenance for information storage, retrieval, and presentation.

IRA 1103 Collection Development and Management In Archives   **10 Credits**
 The module covers the establishment of archiving missions and policies, and the criteria for the acquisition, selection, processing, appraisal and storage of archives. It provides familiarity with records centres and archiving institutions mandates and public services.

IRA 1104 Records Management I   **10 Credits**
The module is an introduction to the management of records in both private and public organisations. Theories, methodologies and technologies applied in managing institutional information and records are introduced. Topics include the records of life cycle, the history and development of records management, records inventory and analysis, classification, retention and scheduling.

Think in other terms

ILI 1105 Communication Skills 8 Credits

The module covers basic communication theories through to practical skills employed in interpersonal communication within a working environment. Group dynamics and aspects of non-verbal communication models are also examined.

Semester II

IRA 1201 Archives and Manuscripts Management 11 10 Credits

The module is about the application of the practice of appraisal of archives and manuscripts. A study of the different values attached to archives and how this affects their retention periods. Preparation of disposal schedules, standing instructions and composition of disposal authorities also examined. Provision of facilities and equipment and the management of archives offices is also included.

IRA 1202 Access and Reference Services 10 Credits

The aim of the module is to introduce students to a wide range of operations that lead to an effective use of the archival service. Based on practical exposure, students should analyse and assist search room operations; identify records needed by researchers, apply search room regulations; plan and organise basic outreach programmes; and design and implement access policies.

IRA 1203 Principles and Tools for Information Storage, Retrieval and Access 10 Credits

The module examines principles of information retrieval and their application to information systems and services. It also emphasizes models of user information seeking behaviour, human information processing and their relationship to retrieval models in information systems.

IRA 1204 Archives, History and Society 10 Credits

The module examines the histology of records and archives management in society. The changing nature of records and recordkeeping systems, particularly those changes influenced by technology are also looked into. It also includes the study of information needs of different categories of archives users and the political, economic, social and cultural environment which conjures the public interest for national archives.

ILI 1204 Application of Information Technology Tools In Libraries and Archives
 10 Credits

The module focuses on building practical skills on a variety of networked computer applications as used in Library and Archive centres today. The applications are studied within the framework of how they enable Library Professionals, Archivists to structure, store, process, access and present information. The topics will vary from semester to semester but will typically include networking and Internet application, web-coding languages such as HTML

Think in other terms

and XML, designing and building web sites for different types of Libraries, and working with CGI.

IRA 1205 Records Management II   10 Credits
The module offers an appraisal of records including the preparation of disposal schedules, standing instructions and disposal authorities. Disposal records including transfers to archives are covered and records management in business and use of information technology in records management are examined.

IRA 1206 Computer Applications in Records and Archives Management   10 Credits
This is an introductory module to records and archives management computer terminology concepts and tools. It includes computer systems in records and archives management and the utilisation of such packages as the Computerised Documentation Systems/ Information Systems for Information Services (CDS/ISIS), eRecords Readiness Tool, Hummingbird Enterprise RM software systems and other contemporary products in the field.

CTL 1101: Conflict Transformation and Leadership   10 Credits
(Offered by the Department of Business Management)
The module will examine concepts of conflict and peace, theories of conflict, and classical social structural theories of conflict. Modern structural theories of conflict, resource, cultural, religious and ethnic and identity based conflicts will be reviewed. Gender and conflict and conflict resolution processes will be discussed and critiqued.

PART II   120 Credits

Semester I

IRA 2103 Management of Electronic Records 1   10 Credits
The module is an introduction to theories, methodologies and technologies used in managing electronic records. Topics include identification, management preservation and ongoing access to various kinds of electronic records proliferating in formats, quantities, media instability and system obsolescence.

IRA 2104 Management of Registries   10 Credits
The module is an in-depth of the study of the importance of registries in records management. Topics include types of registries, the role of registries in the creation, use and maintenance and retirement of files. Focus is on setting up and equipment requirements, security and staffing. Filing systems, index systems and registry manuals, registry designs and other documentation in the registries is also examined.

IRA 2106 Oral History and Indigenous Knowledge Systems   10 Credits

An introductory module to theories, methodologies and practices used in oral history and indigenous knowledge systems. Purpose of module is to enable students to appreciate and utilise tacit knowledge, skills and experiences that have not been tapped from the local people for educational and development purposes. Methods and skills of tapping the knowledge are dealt with, including techniques of infusing that into formally acquired knowledge and skills.

IRA 2107 Legal and Professional Issues In Records and Archives Management 10 Credits

The module examines legislative impacts on Records and Archives Management and on information professionals in the field. Also examines a study of constitutional, administrative and organisational changes in the Records and Archives systems. Major contemporary legal and professional issues in the records and archives management field are also examined.

IRA 2109 Audio – Visual Archives Management   10 Credits

The module covers the nature, uses and format of audio – visual materials; selection, acquisition and storage of audio-visual materials. Also evaluates audio-visual programmes, access and copyright issues.

CBU 2105 Principles of Management   10 Credits

The module is an introduction to management and the organisation. Emphasis is placed on managerial processes and functions and the interface of the manager with supervisors, subordinates and the work environment. History and development of management thought, functions of management, organisational structures, decision-making, communication, centralisation and decentralisation, delegation, leadership and motivation, controlling, budgeting and non-budgetary controls.

Semester II

IRA 2203 Research Methods in Information Science   10 Credits

The module aims to create prerequisites for the formation of knowledge and skills necessary for research work in information science, archives and records management. Data collection in various types of research, survey, observation, interviews and documentary research is also examined together with an analysis and interpretation of data in quantitative and qualitative researchers.

IRA 2204 Archival Informatics   10 Credits

The module studies the representation and description of recorded information objects in an archival environment. The module examines the representation of archival information content, digitising technology and the methods by which records are archived within organisations, networks, cultures and society. Conveys basic knowledge on the application of archival

description and authority standards to archival holdings (ISAD), (G), ISARR (CPF), UNESCO thesaurus etc.

IRA 2205 Web Content Management   10 Credits
Introductory techniques and concepts in the representation organisation, presentation and development of website content with the eXtensible Markup Language (XML) and other related technologies. Aspects of online records standards, policy, management and implementation of online networking strategies surrounding the World Wide Web examined.

IRA 2206 Archives, Government and Other Information Centres   10 Credits
The module is a study of archives and other information centres in the country, their publications, databases, bibliographic organizations and use. It also looks at their methods of acquiring information from various sources, and conditions of access as well as their positions regarding storage.

IRA 2207 Management of Electronic Records 11   10 Credits
The module is an advanced study of the management of electronic records including e-government, e-administration and other electronic records management systems. It also has an application of the practice of the appraisal of electronic records. A study of different values attached to electronic records (ER) in various eras e.g. ICA guide on managing ER. Also examines appropriate electronic recorded management systems for various information centres.

IRA 2211 Archives, Government and Other Information Centres   10 Credits
A study of records and archives created and maintained by public and private organisations. The module studies Zimbabwe's documentary heritage at the National Archives and other information centres such as the National Library and National Museum, their publications, databases, bibliographic organisation and use. The legislative framework and policies, scope for collaboration in facilitating conditions of access, storage and preservation of historical records also is examined.

PART III   **130 CREDITS**

IRA 3000 Industrial Attachment   **130**

PART IV   **122 Credits**
Semester I

Think in other terms

IRA 4005 Research Project   **20 Credits**

The module introduces methods of formulation of a research project proposal, information gathering, project scheme and literature reviewing. It also prepares students for an in-depth research project to be completed during the second semester in Part IV.

IRA 4101 Management of Record Centres   **10 Credits**

The module explores the role of records centres in the storage of inactive records through low cost and efficient utilization of space as well as an analysis of the activities carried out in records centres including storage, retrieval, control, security and systematic legal disposal. It also includes an examination of commercial records centres and their contribution to the management of records of different organizations.

IRA 4102 Information Economics   **10 Credits**

The module gives students an in-depth coverage of the micro and micro economic theories and their application in a records and archives information environment. The measure and analysis of the role information as a resource and its vital value to the economy in an information society is examined. An examination of the issues and strategies surrounding the devotion of resources to the production, distribution and consumption of information in records and archives as a means for development is covered.

IRA 4103 Information Management in the Health Services

                                                                       10 Credits

The critical role of records and information management in health services is examined in this module. Focus is on key records in Health Services, especially patient's case files and use of disposal schedules and standing instructions to determine retention periods. The role of information technology in the management of vast quantities of information in the Health Services is analysed.

IRA 4104 Inforpreneurship   **10 Credits**

The module aims to develop student's understanding of the challenges of selling information goods. The module will also focus on developing student's skills on setting up an information business and designing product lines for information goods that are competitive, setting prices for different customer groups and how to manage one's intellectual property as well as to deal with ethical and legal issues of running an information business. Students will learn how to protect themselves from "lock-in" and how to take advantage of it when possible, procure software for an information business. Lastly, the students will be introduced to the information business planning, marketing and management processes.

Think in other terms

IRA 4105 Marketing of Records and Archives Information Products and Services

10 Credits

This module focuses on the application of marketing theory to archives and records management institutions. The module also examines consumer behaviour, market research, segmentation, targeting and positioning, public relations, product design and sales promotion in the field.

Semester II

IRA 4005 Research Project

The module introduces methods of formulation of a research project, information gathering, project scheme and literature reviewing. It also prepares students for an in-depth research project to be completed during the second semester in Part IV.

IRA 4201 Conservation and Preservation Management   **11 Credits**

The module is an in-depth study of the main threats to the survival of different types of information media. It includes general protection and preventative measures against hazards like fire, flooding and protection units. Strategies to resume operations following disasters, including temporary or alternative facilities are also examined.

IRA 4203 Comparative Archives Systems   **10 Credits**

The module is a comparative study of selected archives systems and institutions within the Southern African region. Hence the module focuses on legislation, staffing, accommodation, training, and areas of specialisation and problems characteristic to the systems.

IRA 4207 Reprographics   **10 Credits**

This module examines principles of printing, photography, microphotography, hardware systems, COM and electronic typesetting. It also looks at the selection and acquisition of reprographic equipment, maintenance, design and control of microfilming services.

IRA 4211 Virtual Archives Systems   **10 Credits**

The module has a study of virtual archival collections as distinct sub-entities of digital information collections and digital archives as well as the role of archivists and the contending issues in their professional capacities to construct virtual collections and enable virtual archival access through the application of encoded archival description and other metadata standards. Issues to harness the potential of virtual archives lie primarily in the ability to describe and store these records and objects, and to search and access them globally across domains and over time are discussed.

Think in other terms

IRA 4212 Public Sector Records Management   **11 Credits**

The module covers the management of public sector records. The functions and activities of public sector institutions, departments and the records they create are discussed. An appreciation of the importance of sound records management systems in the public sector as a measure of ensuring transparency of state enterprises, public accountability, protection of citizen rights and a vision of corporate and responsible government are examined.

Think in other terms

MASTER OF SCIENCE DEGREE IN RECORDS AND ARCHIVES MANAGEMENT

1.0 PREAMBLE

The Master of Science Degree in Records and Archives Management is aimed at students who are keen to pursue a career in management within the information and records management field. The programme seeks to equip students with the theoretical knowledge and practical skills to manage information management industry which is continuously transformed by the information and communication technology changes.

2.0 REGULATIONS

These regulations should be read in conjunction with the general university regulations for postgraduate studies, and the regulations of the Faculty of Communication and Information Science. The Degree shall be awarded to students who have successfully completed the programme and passed the examinations in accordance with the regulations set out below.

3.0 ENTRY REQUIREMENTS

Students must have the following qualifications (or their equivalent):

3.1 Students with a Lower Second 2.2 Class Honours Degree in the above areas will be required to have at least two years' post-qualification experience.

3.2 Hold an Upper Second 2.1 Class Honours Degree in Records and Archives Management; Records Management; Archival Science; Information Studies; History or Heritage Studies from an accredited University or higher education institution.

3.3 Students with any other good first degree in the field other than those listed in section in the first requirement above will be required to have at least two years' post-qualification practical experience in a records and archives establishment for consideration to be admitted into the Master of Science Degree programme.

4.0 PROGRAMME PROFILE

Degree type	Master of Science
Credit Load	272
SADC-QF Level	9
Accrediting authority	Zimbabwe Council for Higher Education (ZIMCHE)
Date of Accreditation	

4.1 **Structure of the Programme**

The two-year block release or part time programme is composed of prescribed core and elective modules as well as a research project culminating in a mini-dissertation of at least 10 000 words. All taught modules will be assessed through module work and examination, unless specified otherwise in the appropriate module synopsis. To be awarded the degree, students must complete a minimum of 272 credits.

4.2 **Purpose of the Programme**

The aim of the programme is to produce graduates that meet the needs of today's information centres and all industries by providing a thorough understanding of the subject, technical competence, and transferable skills. It also aims to prepare records and archives management students for rapidly changing technological environments with the core knowledge central to multidisciplinary development and personal improvement throughout their professional careers.

4.3 **Programme Characteristics**

4.3.1 **Areas of Study**
- Infopreneurial skills for creating jobs and wealth
- Research skills for undertaking research to solve information related problems
- Knowledge management skills - capable of leveraging organisational tacit and explicit knowledge
- Documentation skills
- Project management skills
- Managing records and archives institutions
- Systems development and design within the Records and Archives management field
- Strategic planning skills
- Critical thinking skills

4.3.2 **Specialist Focus**
- Records management
- Archives management
- Knowledge management
- Information technology application in information management.

4.3.3 **Orientation**

Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.

Think in other terms

4.4 Career Opportunities and Further Education

These include: Information Strategy Architect, Information and Records Manager, Corporate Records Manager, Corporate Information Director and Knowledge Managers. There are opportunities for further Studies in Master's and doctoral studies in records and archives management, information science, informatics or in interdisciplinary programmes related to information management.

4.5 Programme Delivery

Teaching and learning methods include lectures, tutorials, practical, seminars, group work, industrial visits, industrial attachment, research project and individual independent study. Students are assessed through written examinations, tests, assignments, oral presentations, seminar presentations, industrial attachment report, third year report, final year research project report and continuous assessments.

4.6 Programme Competences

4.6.1 Generic Competencies

- Ability to draw appropriately from multiple academic disciplines to define and solve problems based on understanding of complex phenomena
- Capability to draw on big data and use analytics for informed decision making and strive to seek new ways of doing things
- Ability to communicate effectively and to present information orally and in writing and using ICTs to both expert and non-expert audiences
- Capacity for analysis and synthesis using logical arguments and proven facts.
- Professional integrity and awareness of impact of science and technology on society and the environment
- Capability to identify and create new business ventures based on knowledge and new thinking paradigms.

4.6.2 Discipline specific

- Ability to manage and optimize institutional operations with regards to timely information access, management and availability.
- Ability to develop new technologies to aid process improvement with a view to enhance production efficiencies and outputs in any organisation.
- Ability to solve a wide range of problems in information management by identifying their fundamental aspects and using both theoretical and practical methods.

Think in other terms

- Ability to use data to analyse process performance and technological issues using appropriate IT packages

4.7 **Exit Level Outcomes**
- Identify, formulate, analyse and solve information management related problems creatively and innovatively.
- Apply knowledge of information technology, user needs, organisational needs and information management requirements to solve institutional problems faced on a daily basis.
- Perform creative, procedural and non-procedural design and synthesis of components, systems, products and processes which affect information management and flow with basic understanding of systems design taught within the programme.
- Demonstrate competence to use appropriate research methods, skills and tools, to conduct research which leads to innovative ideas as well as being problem solving within institutions to allow for effective business process re-engineering.
- Demonstrate competence to communicate effectively, both orally and in writing, with engineering audiences and the community at large.

5.0 DEGREE PROGRAMME ASSESSMENT

5.1 **Overall Assessment for the Degree Programme**
5.1.1 Taught modules will collectively account for an overall weight of 70% in the overall assessment of the Master of Science Degree.
5.1.2 The dissertation will carry an overall weight of 30% in the overall assessment of the Master of Science Degree.

5.2 **Overall Assessment for Taught Modules**
5.2.1 The overall assessment for each taught module is constituted by the completed continuous assessment and a minimum Pass mark obtained from the formal examination registered for by a student enrolled in the Master of Science Degree programme.
5.2.2 For the overall assessment of each taught module, the continuous assessment shall account for 40% while the formal examination will account for 60%.

5.3 **Continuous Assessment**
5.3.1 Continuous assessment in each taught module will require students to compulsorily attend lectures, seminars and enrichment programmes.
5.3.2 Continuous assessment of module work may include essays, tests, fieldwork and practical projects.

Think in other terms

5.3.3 Failure to meet deadlines and carry out assigned work may result in students not writing examinations.

5.4 Examination

5.4.1 A formal three hour examination will be conducted for each taught module at the end of each Stage, except for the dissertation which is studied over two Stages.

5.4.2 Examination of dissertations will require candidates to submit two copies of the final project, bound according to Departmental specifications.

5.4.3 For candidates to be admitted into the formal examination for each module, they must have:
   i) Paid the required fees for student registration in accordance with the University General Regulations.
   ii) Participated in prescribed lectures, seminars and enrichment programmes.
   iii) Completed and submitted all the required module work for continuous assessment of the modules and have been awarded a mark for such work.

5.4.4 The following University grading scheme shall apply for the formal examination of candidates in each module:

Marks	Description	Grade
80 – 100	Distinction	(D)
70 – 79	Merit	(M)
60 – 69	Credit	(C)
50 – 59	Pass	(P)
0 - 49	Fail	(F)

5.4.5 Candidates must pass all the taught module examinations for the Stage before proceeding to the next.

5.4.6 Subject to the University and Faculty regulations, candidates who fail the formal examination for specific module(s) in a Stage will be required to apply to repeat the module(s).

5.5 Carrying Over

5.5.1 Candidates may be allowed to proceed carrying only two (2) modules to the next Stage or Part.

5.5.2 No candidate may carry over a particular Module for more than two (2) years.

5.5.3 No candidate will be allowed to proceed to Stage 3 (Dissertation) without clearing all Modules in Stages 1 and 2.

5.6 Dissertation

5.6.1 The dissertation will carry an overall weight of 30% for the overall assessment of the Master of Science Degree.

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5.6.2 The dissertation should have a maximum of 20 000 words (Chapters 1-7) excluding references and appendices.

5.6.3 Candidates will be required to submit two copies of the dissertation for examination, bound according to Departmental specifications.

5.6.4 Candidates may be required to present an oral defence of their dissertation before a panel of academic assessors.

5.6.5 The following University marking scheme shall apply for the examination of the dissertation:

Marks	Description	Grade
80 – 100	Distinction	(D)
70 – 79	Merit	(M)
60 – 69	Credit	(C)
50 – 59	Pass	(P)
0 - 49	Fail	(F)

Candidates who obtain between 40% and 49% in the examination of their dissertations may, subject to University and Faculty regulations, supplement the examination of the dissertation.

5.6.6 A dissertation that is approved for supplementary examination may be re-submitted upon revision by the candidate after three months.

5.6.7 Dissertations re-submitted for supplementary examination shall be marked as 'Pass' or 'Fail'.

5.6.8 The overall maximum mark awarded in a supplementary examination of the re-submitted dissertation shall be 50%.

6.0 DEGREE CLASSIFICATION

The following classification shall be used for the overall classification of candidates who complete the Master of Science Degree programme:

Distinction	80 - 100%
Merit	70 - 79%
Credit	60 - 69%
Pass	50 – 59%
Fail	Below 50%

7.0 AWARD OF THE MASTER OF SCIENCE DEGREE IN RECORDS AND ARCHIVES MANAGEMENT

In order to be awarded the Master of Science Degree in Records and Archives Management, a candidate will be required to pass all the taught modules taken and the

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dissertation submitted in the programme to the satisfaction of all Departmental Panels of Examiners, Faculty Boards of Examiners, the University Academic Board and the approval of the University Council.

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PROGRAMME SUMMARY

PART I (108 Credits)

Module Code	Module Description	Credits

Semester I (All Core Modules)

IRA 6101	Advanced Records Management	18
IRA 6102	Advanced Archives Management	18
IRA 6103	Information Policy & Governance	18

Semester II (All Core Modules)

IRA 6201	Research Methods in Records and Archives Management	18
IRA 6202	Advanced Information and Communication Technologies in RAM	18

ELECTIVES (Choose One)

IRA6203	Management of Financial Records	18
IRA 6204	Management of Personnel Records	18
IRA 6205	Management of Health Records	18
IRA6206	Management of Legal Records	18
IRA 6207	Management of Local Government Records	18

PART II   164 CREDITS

Semester I (All Core Modules)

IRA 6301	Process Modelling in Information Management	18
IRA 6302	Project Management in Records and Archives Management	18

ELECTIVES (Choose One)

IRA 6303	Indigenous Knowledge Systems	18
IRA 6304	Knowledge Management	18
IRA 6305	Advanced Conservation and Preservation Management	18
IRA 6306	Management of Audio-Visual Records	18

Semester II (All Core Modules)

IRA6000	Dissertation	110

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CREDITS FOR MSC RAM
PART I   108 Credits
PART II   164 Credits
Total Credits for MSC RAM   272 Credits

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MODULE SYNOPSES

PART I   108 CREDITS
Semester I
IRA 6101 Advanced Records Management   18 Credits

The module examines the various theories and approaches used in records and archives management. Critique of the major approaches including the records life-cycle, records continuum, integrated recordkeeping models is discussed with special reference to selected case studies. Contemporary recordkeeping approaches and application of records management policies and programmes in situational contexts is also examined.

IRA 6102 Advanced Information and Communication Technologies in Records and Archives Management   18 Credits

The module explores the range of enabling information and communication technologies including hardware, software and networking for the modern records office to the archival facility. Students will be trained with recommended computer applications used in records and archives management environment, such as Archivists Toolkit, Alfresco, DSpace, XENA, DROID and MS Sharepoint.

IRA 6103 Advanced Archives Management   18 Credits

The module examines the scope of strategic management of archival establishments as repositories serving the research needs of academics and scholars; serving the preservation and restoration of public records and archives; providing for the information needs and competitive advantage of corporate organisations in the private sector and the documentation of society memory and history. Further examination of archival systems, types of archive repositories and the contemporary challenges and opportunities in records and archives institutions in southern Africa and beyond is made.

Semester II
IRA 6201 Research Methods in Records and Archives Management   18 Credits

The module aims at equipping students with both the theoretical and practical knowledge of conducting research in records and archives management. Students explore the philosophies in research approaches, research designs and the various data collection and data analysis techniques used in research studies in the field of records and archives management. Students will also study and apply basic statistics for the summarisation of data, the importance of ethics in research and aspects of dissertation writing at a postgraduate level.

IRA 6202 Advanced Electronic Records Management   18 Credits

The module explores advanced digital archiving approaches and preservation processes for the management of electronic records. Students will appreciate the contemporary challenges associated with electronic records and the measures to address these. Examination of global initiatives for electronic records preservation by InterPARES, review of electronic records

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standards such as Open Archival Information System (OAIS) standard, METS and MoReq is also made. Issues of e-readiness and the e-government is also examined.

ELECTIVES

IRA 6203 Indigenous Knowledge Systems   **18 Credits**

An insightful module that examines theories, methodologies and practices used in the identification, capture, use, access to of indigenous knowledge. Students gain insight into the total archives concept and societal memory issues that appreciate and recognise indigenous knowledge, the skills and life experiences in the local people for educational and development purposes.

IRA 6204 Knowledge Management   **18 Credits**

The module focuses on knowledge creation, capture, retention, transfers, representations and sharing so as to fully leverage the intellectual assets of the organisation. An examination of the tools and techniques for knowledge acquisition, assessment, evaluation, management, organization and dissemination are applied to business situations. Topics include knowledge generation, knowledge coordination and codification, knowledge transfer and reuse, technologies and knowledge management and knowledge management strategies.

IRA 6205 Management of Health Records   **18 Credits**

The module addresses the specific issues involved in managing clinical records within a typical health delivery institution. An outline the management of a variety of other hospital records, including X-rays, specimens, patient registers, administrative and policy files, financial and personnel records, nursing records, pharmacy records and educational records is made. Students engage in a practicum exercise within an identified health institution for hands-on experience with health records.

IRA 6205 Management of Legal Records   **18 Credits**

The module addresses the issues involved in managing legal records created by public and private legal institutions. Particular consideration is given to management of records created by courts of law, the police and security forces and public prosecutors. Issues and particular requirements of a records service within a legal or judicial environment is discussed. Students engage in a practicum exercise within an identified legal institution for hands-on experience with legal records.

IRA 6205 Management of Local Government Records   **18 Credits**

The module addresses the issues involved in managing local government records generated by rural district councils, urban councils and provincial government. Particular attention is given to the types of records generated, impacting legislation such as the Urban Councils Act and importance of these records for public accountability. Students engage in a practicum exercise within an identified local government institution for hands-on experience with their registry office responsible for local government records.

Think in other terms

PART II   **164 CREDITS**
Semester I
IRA 6000 Dissertation   **18 Credits**
In this module students set out to develop research proposals for a final dissertation. The students will craft research topics of their choice and submit a research proposal. The research proposal shall among other sections review relevant literature, identify the theoretical framework and present an outline of the research methodology. The choice of topics will be subject to the availability of supervisors. Students may also be asked to make formal presentations of their research proposals before a panel of academic and invited research experts on records and archives management.

IRA 6301 Information Policy, Security and Risk Management   **18 Credits**
This module explores the information legislation in Zimbabwe, associated statutes and policies that impact on the management of records and archives in both private and public organisations. Students gain an in-depth analysis of the National Archives of Zimbabwe Act, the Electronic Communications Act and Official Secrets Act that particularly impact records management in Zimbabwe. In addition, the module examines the use of policy and other approaches for securing information and information systems in e-government. Students learn how to prepare risk assessments, vital records programmes and disaster preparedness proposals or reports for selected organisations.

IRA 6302 Project Management in Records and Archives Management   **18 Credits**
The module examines the application of project management approaches in the planning and undertaking of long-term records and archives projects. Topics covered include project initiation, risk, estimating and contracts, planning, human factors, project execution, and standard methods. In this module students will learn to prepare project proposals and work plans. Further, they will learn to design and select appropriate project plan schedules and tools to carry out a mini-records and archives management related project.

ELECTIVES
IRA 6303 Advanced Conservation and Preservation Management   **18 Credits**
The module presents and examines modern approaches to the conservation and preservation of various archival material and restoration methods for deteriorated materials. Students will be expected to practically use microphotography, dehumidifying and binding equipment for various preservation and restoration tasks under the guidance of an expert conservator.

IRA 6304 Management of Audio-Visual Records   **18 Credits**
The module explores the innovative technologies applied to the restoration, digitisation, preservation and use of audio-visual media archives. Students will appreciate the history, philosophy and ethics of audio-visual archiving, practices underlying collection development, describe the structures, strategies and skills by which audio-visual management activities are pursued and implement appropriate preservation and storage methods to minimise deterioration

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in the audio-visual environment. Students will engage in a practicum exercise with an audio-visual archivist for hands-on experience with audio-visual records.

IRA 6305 Management of Financial Records   **18 Credits**
The module covers the business functions and processes of financial management, in relation to the financial records generated. Students will appreciate the information systems and records created by financial management and know how to manage financial records in a mixed paper/electronic records environment. Students engage in a practicum exercise within an identified commercial institution for hands-on experience with financial records.

IRA 6306 Management of Personnel Records   **18 Credits**
The module presents an overview of the human resources function and analyses the personal information systems and the records they generate and use in support of personnel management. Students will appreciate the strategic and accountability issues that demand for an effective security of, regulated access to and retention of personnel records. Students engage in a practicum exercise within the human resources department within an identified institution for hands-on experience with personnel records.

Semester II
IRA 6000 Dissertation   **110 Credits**
During this final stage, students will continue working on their dissertations by conducting their research, analysing the findings and writing up their research project reports. The research project is examined at the conclusion of the stage.

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FACULTY OF COMMERCE

Dean
P Nkala, PhD Economics & Social Sciences, BOKU, Vienna, Austria; MSc Econ, UZ, Z'bwe, BSc Hons Econ UZ, Z'bwe, Diploma in Human Resources, IPMZ

Assistant Registrar
K Gazimbi, MBA – PUMBA, NUST, Z'bwe, BSc (Hons) Politics & Administration, UZ, Z'bwe

Administrative Assistant
M Ndlovu, MSc Development Studies, NUST, Z'bwe, BSc (Hons) Records and Archives Management, NUST, Z'bwe

Chief Secretary
S Ndhlovu, BCom (Hons) Management, *NUST, Z'bwe*, Diploma in Management, *NUST, Z'bwe,* Introduction to Marketing, *UNISA, SA*

Senior Secretary
N Matumbu, BA, Media Studies, ZOU, Z'bwe, PGD Media & Society, MSU, Z'bwe, Diploma in Secretarial Studies, Bulawayo Polytechnic, Z'bwe

Chief Technician
E Mnkandla, BCom (Hons) Electronic Engineering, *NUST*, *Z'bwe*, CCNA

Technicians
N P Bhebhe, MSc Information Systems, NUST, Z'bwe, BSc (Hons) Computer Science, NUST, Z'bwe, Dip Education, Hillside Trs College, Z'bwe, IT Essentials, NUST CISCO Academy, Z'bwe

Hedwick Moyo, MSc Information Systems, NUST, Z'bwe, BSc (Hons) Computer Science, NUST Z'bwe

Thembephi Sibanda, Dip Applied Information Technology, City & Guilds, Microcomputer Technology Part I & II, City & Guilds, CCNA

Technical Assistants
K Bapire, BCom (Hons) Business Management & Information Technology, CUT, Z'bwe, National Certificate, Harare Polytechnic, Z'bwe
J Moyo, National Foundation Certificate, *Bulawayo Polytechnic, Z'bwe*, A+ Certification, NUST*, Z'bwe

FACULTY REGULATIONS

1.0   PREAMBLE

The Faculty of Commerce, established in 1991, comprises of 6 departments and currently plays surrogate to the Graduate School of Business and the Institute of Development Studies. It is one of the oldest Faculties of the National University of Science and Technology. The Faculty currently offers 8 four-year Bachelor of Commerce Honours and 12 Masters Programmes across various units.

2.0   LIST OF DEPARTMENTS AND PROGRAMMES

The Faculty of Commerce at NUST is made up of 6 departments, 1 Graduate School of Business and 1 Institute of Development Studies with programmes listed below:

2.1   Department of Accounting
2.1.1   Bachelor of Commerce Honours Degree in Accounting
2.1.2   Master of Science Degree in Accounting and Finance

2.2   Department Banking
2.2.1   Bachelor of Commerce Honours Degree in Banking and Investment Management
2.2.2   Master of Science Degree in Banking and Financial Services

2.3   Department of Business Management
2.3.1   Bachelor of Commerce Honours Degree in Management
2.3.2   Master of Science Degree in Strategic Management

2.4   Department of Finance
2.4.1   Undergraduate
2.4.1.1 Bachelor of Commerce Honours Degree in Finance
2.4.1.2 Bachelor of Commerce Honours Degree in Fiscal Studies

2.4.2   Postgraduate
2.4.2.1 Master of Science Degree in Finance and Investment
2.4.2.2 Master of Science Degree in Fiscal Studies
2.4.2.3 Master of Science Degree in Financial Engineering

2.5   Department of Insurance and Actuarial Science
2.5.1   Undergraduate
2.5.1.1 Bachelor of Commerce Honours Degree in Actuarial Science
2.5.1.2 Bachelor of Commerce Honours Degree in Risk Management and Insurance

Think in other terms

2.5.2 **Postgraduate**
2.5.2.1 Master of Science Degree in Risk Management and Insurance

2.6 **Department of Marketing**
2.6.1 **Undergraduate**
2.6.1.1 Bachelor of Commerce Honours Degree in Marketing
2.6.2 **Postgraduate**
2.6.2.1 Master of Science Degree in Marketing

2.7 **Graduate School of Business**
2.7.1 **Postgraduate**
2.7.1.1 General Master of Business Administration Degree
2.7.1.2 Executive Master of Business Administration
2.7.1.3 Master of Business Administration in Strategic Management

2.8 **Institute of Development Studies**
2.8.1 **Postgraduate**
2.8.1.1 Master of Science Degree in Development Studies
2.8.1.2 Master of Science Degree in Disaster Management

3.0 FACULTY REGULATIONS

These regulations should be read in conjunction with the General Academic Regulations for Undergraduate Degrees of the University (hereinafter referred to as the **General Regulations**).

4.0 ENTRY REQUIREMENTS

4.1 **Normal Entry**

Applicants for normal entry must have a minimum of two 'A' level passes including the relevant subjects stipulated herein under the appropriate programmes.

4.2 **Special Entry**

Holders of the Zimbabwe Higher National Diploma from the Polytechnic colleges or the Technical colleges (or their equivalent) who have passed the Diploma with merit (credits and distinctions) in half of the programme modules may qualify for special entry into Part II of the Faculty of Commerce Undergraduate Honours Degree Programme.

4.3 **Mature Entry**

Applicants who are not eligible for entry under the normal or special entry regulations may apply for mature entry provided that they have passed at least five approved 'O' level subjects including English Language and Mathematics and must have attained relevant work experience on the programmes which they wish to study.

Think in other terms

4.4   Applicants for postgraduate study programmes must have, in addition to the above, the minimum qualifications detailed herein under the appropriate programmes.

5.0 PROGRAMMES AND MODE OF STUDY

5.1 All undergraduate programmes consist of taught modules, Industrial Attachment/Work-based experience (work-based learning) and a final year project.

5.2 Postgraduate programmes by coursework may consist of a component of research whose weighting shall be specified.

5.3 The weighting of modules and programmes shall be based on the notional study hours (NSH) credit system in which all learning activities of a student of average ability, taking place in and outside scheduled contact sessions, are taken into consideration (1 credit = 10 notional hours). A student must attain a prescribed minimum number of credits to qualify for the award of a degree or diploma.

5.4 Programmes shall be delivered in any of the following modes: full-time, block-release, part time or parallel sessions and shall include one or more of face-to-face, online and blended learning approaches.

6.0 ASSESSMENT

6.1 **Undergraduate programmes**

6.1.1   Unless specified otherwise, all taught modules' continuous assessment component shall contribute 30% and the final examinations shall contribute 70% of the overall assessment.

6.1.2   In addition, students are expected to conduct a research leading to a final year project report. The report shall be assessed at 100%.

6.1.3   Assessment of modules with a practical component, unless specified otherwise, shall be weighted as follows: continuous assessment 20%; practical 20% and examination 60%.

6.1.4   The continuous assessment component shall normally consist of at least **two** distinct and appropriately weighted pieces of work submitted by the students including assignments, tests, presentations, reports, projects and portfolios.

6.1.5   The practical component shall normally consist of at least **two** separate and appropriately weighted submissions of laboratory/workshop/studio/fieldwork reports, tests, assignments, products, artefacts and portfolios.

6.1.6   Assessment of the Industrial Attachment shall consist of continuous assessment (assessment reports from university and the candidates' workplace) and the examination component (work-based experience file, log book and an analytical report).

6.1.7   The overall pass mark in each module and in aggregated part or programme marks shall be 50%.

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6.1.8 General Regulations of the University concerning pass and fail, proceeding to the next part, carry over modules, repeat, discontinue and withdraw shall apply.

6.1.9 In determining the part aggregate, all taught modules shall normally carry an equal weighting of between 10 to 15 credits each, while the final year project report shall carry a double weighting of between 20 to 30 credits.

6.1.10 For the determination of the overall degree programme aggregate students shall refer to specific departmental regulations.

6.2 Postgraduate programmes

6.2.1 The pass mark in each module and in aggregated part or programme marks shall be 50%.

6.2.2 For the determination of the overall degree programme aggregate students shall refer to specific departmental regulations which shall apply.

6.2.3 Assessment of postgraduate programmes by research only shall be guided by the General Academic Regulations for Master of Philosophy degrees, Doctor of Philosophy degrees and Higher Doctorate degrees.

7.0 AWARD OF THE DEGREE AND CLASSIFICATION

7.1.1 Students for each degree programme must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.

7.1.2 For the degree to be awarded, the minimum number of credits must be satisfied i.e. 480 credits for the Honours Bachelor Degree and 270 credits for the Masters Degree.

7.1.3 The classification of the degree programmes shall be as in the General Regulations.

7.1.4 Higher degrees by research only shall not be classified.

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DEPARTMENT OF ACCOUNTING

Lecturer and Chairperson
Dr D Madzivanyati, PhD in Business Administration (Aldersgate *College),* MSc Accounting and Finance (*De Montfort University),* BA Accounting and Finance (*De Montfort University)*, Advanced Diploma (CIMA), Certified Public Accountant CPA (Z)

Secretary
Ms P Dondo, BCom (Hons) Human Resources Management, (*LSU Z'bwe),* HND in Office Management (*Byo Poly Z'bwe),* ND in Secretarial (*Byo Poly Z'bwe),* Certificate in HIV/AIDS Care and Counselling *(UNISA SA)*

ACADEMIC STAFF

Senior Lecturer
Mr R Hove, MSc Accounting & Finance (*Stirling University)*, BCompt in Accounting (*UNISA SA)*, IAAA Accounting (*Institute of Administrative Accountants*), HND in Accounting (*UK)*

Lecturers
Mr M Benyu, MSc in Accounting and Finance (*NUST Z'bwe)*, BCom Honours in Accounting (*NUST Z'bwe)*, CA(Z), Postgraduate certificate in Theory of Accounting (CTA)

Mr P C Korera, MSc Finance & Investments (*NUST Z'bwe),* BCom Honours in Accounting (*NUST Z'bwe)*, CGMA (ACMA), Advanced Diploma in Management Accounting (CIMA)

Mr A C Mpofu, MSc Information Systems (*NUST Z'bwe)*, MBA Banking and Finance (*NUST Z'bwe)*, BSc Information Systems (*Rhodes University SA*), Pastel Certified Trainer, Pastel Technician, Pastel Practitioner (*SAGE, SA)*

Mrs F Y Mpofu, MCom Accounting (*MSU Z'bwe)*, MSc Finance & Investments (*NUST Z'bwe)*, BCom Honours in Accounting (*NUST Z'bwe)*, Advanced Diploma (CIMA), HND Accounting (*Byo Poly Z'bwe)*, ND Accounting, (*Byo Poly Z'bwe)*

Mr P N Mushure, CA (Z), MBA Finance (*UZ Z'bwe)*, BSc Accounting Honours (UNISA *SA)*, BBS (Hons) Finance (*UZ Z'bwe)*, Postgraduate Diploma in Financial Management (FQE) (ICAZ & UCT), Postgraduate Certificate in Theory of Accounting (CTA), ACMA, ACIS, AIBZ, (AIIA)

Mr C Ncube, MSc in Information Technology & Knowledge Management (Universita *Degli Studi Di Trento*), BSc in Computer Science (*Universita Degli Studi Di Trento)*, Certificate in Java Mobile Application Development (*University of Bolzano, Italy)*

Mr A Nyalila, BSc Economics (Honours) (*UZ Z'bwe)*, CA (Z)

Mrs F Shumba, MBA Accounting & Finance (USIU *USA)*, BSc Accounting & Finance (*USIU USA)*, Diploma in Accounting (Ahmadu Bello University *Nigeria)*, ICSA (*UK)*, Postgraduate Diploma in Higher Education (*NUST Z'bwe)*

Mr B Sibanda, MCom Accounting (*MSU Z'bwe)*, BCom Accounting (*MSU Z'bwe)*, CPA *Z'bwe*, DT&VE (*Gweru Polytechnic Z'bwe)*, MZAAT, (PEI), Accounting Certificate of Senior Management (AFZ) *Z'bwe*

Mrs S Warima, MSc Finance & Investments (*NUST Z'bwe)*, BTech Accounting (*UZ Z'bwe)*, CIS.

UNDERGRADUATE DEGREE PROGRAMME

SPECIAL REGULATIONS

1.0 PREAMBLE
1.1 The purpose of the programme is to produce technically focused and well-rounded students with a comprehensive knowledge base for identifying, analysing, evaluating and solving problems in core areas of accounting; auditing; taxation and financial management. Students should be able to reflect on their decisions and applications in these fields to assess the effect thereof in the holistic context of accounting as a practice and demonstrate initiative and responsibility, and that shall enable the development of leadership qualities.

2.0 ENTRY REGULATIONS
2.1 To qualify for normal entry into the BCom Honours in Accounting Degree Programme, applicants in addition to satisfying the minimum conditions prescribed under the General Regulations and the Faculty Regulations for English Language and Mathematics, must have obtained at least two passes at 'A' Level; one of the two subjects passed at 'A' level should be Accounting and any other Commercial subject or Mathematics.

2.2 Special entry – Applicants who have successfully completed the Higher National Diploma in Accountancy or have otherwise obtained equivalent qualifications may apply for direct entry into Part II of the degree programme.

2.3 No applicant may complete the degree programme in less than two academic sessions.

2.4 Successful completion of Industrial Attachment component at Part III level is compulsory.

3.0 STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES
3.1 The degree shall be awarded to students who have successfully completed the programme and passed the examinations in accordance with regulations set out above in the Faculty Regulations.

3.2 The Programme consisting of module work shall normally be completed over a maximum period of 4 years both on a full-time, part-time block-release basis or parallel basis.

4.0   ASSESSMENT OF CANDIDATES
4.1 A candidate shall be expected to sit for formal written examination at the end of each semester. For a candidate to be admitted to the examination, they must have satisfactorily completed all assignments for continuous assessments. In addition, they are expected to have attended a minimum of 80% of the lectures in each module.

4.2 The taught component shall be examined by both coursework and a formal written examination. Coursework shall account for 30% of the overall assessment while the formal

written examination shall account for 70% of the overall assessment. For the taught component, the pass mark shall be 50% for all the modules.

5.0   DETERMINATION OF RESULTS OF MODULES
5.1   Students must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.
5.2   For the degree to be awarded, the minimum number of credits of 490 credits must be satisfied.
5.3   The classification of the degree shall be as follows: -

75% -100%	First Division
65%-74%	Upper Second Division
60%-64%	Lower Second Division
50%-59%	Pass
Below 50%	Fail

5.4   For the purposes of degree classification, the parts of the degree programme shall be weighted as follows: -

Part II	30%
Part III	20%
Part IV	50%

6.0 SUPPLEMENTARY EXAMINATIONS
6.1 Supplementary examinations will not be offered.

7.0 REPEATING MODULES
7.1 A student who fails more than 50% of the modules taken in a particular Part may, on the recommendations of the Senate, be granted permission to repeat the failed modules. Nevertheless, a student may be exempted from re-attendance and re-examination in any modules in which he/she previously passed.
7.2 A student who fails the Dissertation Stage with a mark below 50% shall be expected to apply to repeat the module.

8.0 PROCEEDING AND DISCONTINUING
8.1 A student who is not allowed to proceed to the subsequent Stage of the Programme and has failed the same Stage of the Programme twice shall be required to withdraw from the Programme.

9.0 AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE
9.1 Students must satisfy the examiners in all the prescribed modules and in all requirements for the degree.
9.2 For the degree to be awarded, the minimum number of credits must be satisfied i.e. 490 credits for the Honours Bachelor Degree.

Think in other terms

10.0 NOTIFICATION OF RESULTS

10.1 Results are accessible online.

Think in other terms

PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
CAC 1101	Financial Accounting IA	10
CBU 1102	Business Communication	10
CIN 1103	Commercial Law	10
CBA 1104	Principles of Microeconomics	10
CBU 1108	Principles of Management	10
CIN 1106	Quantitative Analysis for Business I	10
CTL 1101	Conflict Transformation and Leadership	10
CAC 1201	Financial Accounting IB	10
CBA 1205	Principles of Macroeconomics	10
CIN 1207	Quantitative Analysis for Business II	10
CMK 1209	Principles of Marketing	10
CAC 1203	Introduction to Information Technology	10
Total Part I		**120**

PART II

CAC 2101	Financial Accounting IIA	10
CAC 2103	Audit Skills	10
CAC 2105	Management and Cost Accounting IA	10
CAC 2104	Information Systems	10
CIN 2106	Company Law I	10
CFI 2101	Corporate Finance I	10
CAC 2201	Financial Accounting IIB	10
CAC 2203	Audit Process	10
CAC 2205	Management and Cost Accounting IB	10
CAC 2204	Introduction to Taxation	10
CIN 2206	Company Law II	10
CFI 2201	Corporate Finance II	10
Total Part II		**120**

PART III

CAC 3001	Industrial Attachment	120

PART IV

Think in other terms

CAC 4101	Financial Reporting	10
CAC 4102	Taxation I	10
CAC 4103	Audit Skills, Theory and Practice	10
CAC 4104	Accounting Information Systems	10
CAC 4105	Management and Cost Accounting II	10
CAC 4201	Advanced Financial Accounting	10
CAC 4202	Taxation II	10
CAC 4203	Advanced Auditing	10
CAC 4204	Financial Management	10
CAC 4205	Strategic Management Accounting	10
CAC 4006	Research Project	20
Total Part IV		**130**

TOTAL CREDITS FOR THE PROGRAMME

Part I	120
Part II	120
Part III	120
Part IV	130

Total minimum credits: **490**

Think in other terms

MODULE SYNOPSES

PART I

CAC 1101 Financial Accounting IA   **10 Credits**

The module is designed for those students with "A" Level Accounting. The module focuses on principles and techniques of Financial Accounting and their application in the preparation of financial statements of sole traders, partnerships, limited companies and non-profit making organisations culminating in analysis and interpretation of financial data.

CAC 1202 Financial Accounting IB   **10 Credits**

The module builds on the foundation laid in Financial Accounting IA. The module aims at developing a thorough understanding of the practical framework of Accounting and an ability to prepare, analyse and interpret financial statements. It covers the following areas of study: Accounting for limited companies, published accounts analysis and interpretation of final accounts, cash flow statements as well as latest developments of International Financial Reporting Standards (IFRS) applications in relationship to the areas covered.

CAC 1203   Introduction To Information Technology   **10 Credits**

The module introduces students to the role of computers in the business world and builds on the uses of different application packages in their field of study. It covers the following: basic fundamental concepts, management's need for information and types of systems, transaction processing as well as an industry specific project.

PART II

CAC 2101 Financial Accounting IIA   **10 Credits**

The module builds on the foundation laid in Financial Accounting IA and B. The module aims at providing students with knowledge of Accounting as related to partnership, accounting for specialised transactions, interpretation of financial statements, published accounts etc.

CAC 2201 Financial Accounting IIB   **10 Credits**

The module is a continuation of Financial Accounting IIA. The module aims at helping students develop a thorough understanding of the practical framework of accounting and imbibe an ability to apply the International Financial Reporting Standards (IFRS), Financial Reporting Standards as adopted by the Institute of Chartered Accountants of Zimbabwe and PAAB.

CAC 2103 Audit Skills   **10 Credits**

The module is meant to provide an understanding of the nature, purpose and scope of Auditing, principles of Auditing and application of ISA. It also addresses the role of the external audit, planning, current issues in Auditing and its regulatory framework.

CAC 2203 Audit Process   **10 Credits**

The module focuses on the performing of the audit process and its application in the context of the regulatory framework and for business control and development.

CAC 2104 Information Systems   **10 Credits**

The module is a continuation of Introduction to Information Technology. It aims at strengthening the understanding, use of computers, fundamental concepts, information system concepts, types of systems, transaction processing etc.

CAC 2204 Introduction to Taxation   **10 Credits**

The module introduces students to the role of tax in an economy and goes on to the applications of the Income Tax and Finance Acts sections relevant to the taxation of an individual in respect of employment income. It also covers taxation of estates, tax administration and allowable deductions as well as the third schedule of the Income Tax Act.

CAC 2105 Management and Cost Accounting IA   **10 Credits**

The module aims at providing an understanding of the principles, concepts and techniques of Management and Cost Accounting and helps students develop an ability to apply this knowledge to practical situations related to cost ascertainment, cost control and planning.

CAC 2205 Management and Cost Accounting IB   **`10 Credits**

The module is a continuation of Management and Cost Accounting IA. It is designed to equip students with a thorough and comprehensive knowledge related to management accounting techniques in planning, control decision making under various conditions and implementation of management policies.

PART III
CAC 3001 Industrial Attachment   **120 Credits**

PART IV
CAC 4101 Financial Reporting   **10 Credits**

The module focuses on Accounting Theory and current issues relating to financial reporting. It concentrates on the role of Accounting Theory, users and objectives of corporate reports,

Think in other terms

Accounting for price level changes, analysis and interpretation of financial statements, cash flow statements and application of International Financial Reporting Standards (IFRS).

CAC 4201 Advanced Financial Accounting   **10 Credits**
The module is a continuation of the Financial Reporting and Financial Accounting II modules. It aims at students having a thorough knowledge of Advanced Accounting principles and practices as they apply to the rapidly changing international business environment. It focuses on group financial statements, accounting for foreign currency transactions, valuation of businesses, re-organisations, mergers and takeovers and deferred taxation and relevant International Financial Reporting Standards (IFRS).

CAC 4102 Taxation I   **10 Credits**
The module introduces individual taxation, culminating in the computation of tax payable by individuals in employment, as well as the tax position of landlords. Aspects of taxation such as PAYE and double taxation agreements are covered. Administration provisions of the Income Tax Act are also dealt with.

CAC 4202 Taxation II   **10 Credits**
The module deals with the taxation of persons other than individuals, including businesses, companies, trusts and deceased estates. Taxes other than income tax are dealt with viz. capital gains tax, indirect taxes, tax planning, tax incentives as well as capital allowances relating to growth points, export processing zones and farmers and miners.

CAC 4103 Audit Skills, Theory and Practice   **10 Credits**
The module builds on the basic principles and techniques acquired in Part II of the Auditing modules. It seeks to consolidate students' grasp of Auditing theory and the latest Auditing techniques and practices as enunciated in the International Standards on Auditing (ISAs).

CAC 4203 Advanced Auditing   **10 Credits**
The module is a continuation of the Part II and CAC 4103 Auditing modules. The module seeks to provide a comprehensive knowledge of the financial reporting provisions of the Companies Act Chapter 24:03 and focuses on Auditing issues and disclosure aspects of Financial Statements and specialised Audits and Investigations. It also covers Computer Auditing

CAC 4104 Accounting Information Systems I   **10 Credits**
The module builds on the information systems acquired in Part II. It seeks to consolidate the developments, installation and management of Information Systems. It emphasises on the understanding of Information Technology and information systems concepts with regard to planning, organising, controlling and decision making of an organisation as well as use of information technology tools.

Think in other terms

CAC 4204 Financial Management   **10 Credits**

The module focuses on the principles, concept and techniques used in making financial management decisions. It aims at ensuring that the students understand the concepts and applications behind theoretical models, select the techniques most appropriate to optimise the employment of resources, treasury management function, working capital etc.

CAC 4105 Management and Cost Accounting II   **10 Credits**

The module is a continuation of the Management and Cost Accounting IB (CAC 2205) at Part II level and seeks to consolidate students' knowledge and understanding in behavioural aspects of Management and Cost Accounting, covering Management & Cost Accounting, Budgetary Control, Standard Costing and current issues in Management Accounting.

CAC 4205 Strategic Management Accounting   **10 Credits**

The module is a continuation of the Management and Cost Accounting II (CAC 4105) and discusses the characteristics of strategic Management Accounting decision including performance evaluation, control quantitative techniques, TQM, ABC and non-financial performance measures.

CAC 4006 Research Project   **20 Credits**

The purpose of the project is to develop students' research skills and analytical skills, with a strong emphasis on research skills.

MODULES OFFERED TO OTHER DEPARTMENTS

CAC 1107 Accounting IA   **10 Credits**

The module is designed for students without "A" level Accounting. It introduces students to basic principles, concepts and techniques of accounting in general. The module focuses on the use of accounting information by managers. The module covers the following areas accounting cycle, Accounting as an Information system, trial balance, preparation of financial statements for individual companies, non-profit making organisations as well as Accounting ratios.

CAC 1208 Accounting IB   **10 Credits**

The module aims at equipping students with basic management accounting techniques in planning, control and decision making. It is intended for non-accounting students and covers the following areas: relationship of cost and management accounting to other branches of accounting, cost classification, inventory valuation, material and labour costing, cash budgets etc.

Think in other terms

CAC 2106 Accounting IIA   **10 Credits**

The purpose of the module is to build on topics encountered in Accounting IA and B which were tailored for future managers, rather than accountants. Topics will include contract accounts, standard costing, profit volume analysis, introduction to partnership accounts etc.

CAC 2206 Accounting IIB   **10 Credits**

The module will introduce simple group accounts and cash flow statements. Further topics include accounting for the issue and redemption of shares, business valuations and financial statements analysis.

MODULES OFFERED BY OTHER DEPARTMENTS

Module Code	Module Description	Credits
CBA 1104	Micro Economics (Refer to Banking)	10
CBA 1205	Macro Economics (Refer to Banking)	10
CBU 1108	Principles of Management (Refer to Business Management)	10
CBU 1102	Business Communication (Refer to Business Management)	10
CIN 1106	Quantitative Analysis for Business (I Refer to Insurance)	10
CIN 1207	Quantitative Analysis for Business 11 (Refer to Insurance)	10
CIN 1103	Commercial Law I (Refer to Insurance)	10
CIN 2106	Company Law I (Refer to Insurance)	10
CIN 2206	Company Law 11 (Refer to Insurance)	10
CFI 2201	Corporate Finance 11 (Refer to Insurance)	10
CFI 2101	Corporate Finance 1 (Refer to Finance)	10
CMK 1209	Principles of Marketing (Refer to Marketing)	10

Think in other terms

MASTERS DEGREE PROGRAMME

SPECIAL REGULATIONS

1.0 PREAMBLE
1.1 The regulations for the Master of Science Degree hereinafter referred to as the Master of Science in Accounting and Finance complement but are subordinate to the University General Academic Regulations for Master's Degree by Coursework, hereinafter referred to as the General Academic Regulations.
1.2 This programme is designed to enhance and develop the knowledge and skills of accounting in public practice, industry and academia. The degree encompasses studies at an advanced level in finance and managerial accounting, auditing, corporate and international finance and investments.
1.3 Students completing the programme would have studied all the necessary prerequisite modules to apply for associate membership of key Zimbabwean accounting professional bodies such as the Institute of Chartered Secretaries and Administrators of Zimbabwe, ACCA, CIMA and CFA.

2.0 OBJECTIVES
2.1 To attain an advanced conceptual understanding of the fields of accounting and finance, complemented by a wide range of practical applications and case studies.
2.2 To gain an insight into research methodologies and techniques which extend and support their learning.
2.3 To expose them to the contemporary issues and problems confronting modern accountants and finance specialists.

3.0 AIM
3.1 The programme is tailored to provide accounting students with the necessary groundwork required within the accounting field, including the latest standards that represent best practices in the industry.

4.0 ENTRY REGULATIONS
4.1 For entry into the programme, a candidate must have a good honours degree or equivalent with a pass level of 2.2 or better from a recognised university in accounting and finance related fields. Working experience would be an added advantage.

5.0 STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

5.1 Each module shall be taught for a total of 56 contact hours i.e. seven consecutive days of 8 hours each. Hence each semester shall comprise one intensive block of 28 days inclusive of weekends.

5.2 Formal examinations shall normally be held at the end of each part of the programme.

5.3 Candidates to be admitted to the examination must have satisfactorily attended modules of study including submission of required continuous assessment coursework. They should have also paid the required fees for the programme.

5.4 Examinations shall normally be by way of written papers. However, examiners are at liberty to request any candidate to undergo oral examination in addition to the written examinations.

6.0 ASSESSMENT OF CANDIDATES

6.1 Coursework shall account for 30% of the overall assessment while the formal examination shall account for 70% of the overall assessment.

6.2 The pass mark shall be 50% based on the aggregate of continuous assessment and the examination.

7.0 DURATION OF PROGRAMME AND DELIVERY SYSTEMS

7.1 The Programme consisting of coursework shall normally be completed over a maximum period of 24 months on a part-time block-release basis. The academic year shall normally begin in July/August.

7.2 **Determination of results**

The following marking scheme shall be adopted:

80%-100%	-	Distinction
70%-79%	-	Merit
60%-69%	-	Credit
50%-59%	-	Pass
Below 50%	-	Fail

8.0 SUPPLEMENTARY EXAMINATIONS

8.1 Supplementary examinations will not be offered.

9.0 REPEATING MODULES

9.1 In cases where the Programme is not fully semesterised, a candidate who fails a module or modules taken in a particular block may, on the recommendations of the Senate, be granted permission to repeat the failed modules when next offered.

9.2 A candidate who fails more than 50% of the modules taken in a particular part may, on the recommendations of the Senate, be granted permission to repeat the failed modules. Nevertheless, a repeat candidate may be exempted from re-attendance and re-examination in any modules in which he/she previously passed.

9.3   A candidate who is not allowed to proceed to the subsequent Stage of the Programme and has failed the same Stage of the Programme twice will be required to withdraw from the Programme.

9.4   A candidate who fails the dissertation stage with a mark in the range of 40-49% shall be given the option to re-submit within three months from the date of publication of results. The dissertation will only attain a maximum of 50%.

9.5   A candidate who fails the Dissertation Stage with a mark below 40% shall be expected to apply to repeat the module.

9.6   A candidate who fails to complete the Dissertation Stage and does not submit the dissertation within the prescribed period shall be given the option to submit within three months from the date of publication of results. However, such a dissertation will be awarded a maximum of a Pass grade.

10.0 PROCEEDING AND DISCONTINUING

10.1 Students can proceed to the next level carrying previous modules, provided they pass at least 50% of the modules in the preceding stage. Students who fail to meet this condition are required to repeat the failed modules prior to proceeding to the next level. Students will not be allowed to proceed to Stage III carrying a Stage I module, neither will they be allowed to proceed to Stage IV (Dissertation stage) carrying any module from the preceding stages.

11.0 AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

11.1 Candidates must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.

11.2 For the degree to be awarded, the minimum number of credits of 320 must be satisfied.

11.3 The classification of the degree will be as in the General Regulations.

12.0 NOTIFICATION OF RESULTS

12.1 The results are accessible online.

PROGRAMME SUMMARY

STAGE I

Module Code	Module Description	Credits
CAC 5101	International Financial Reporting and Analysis	20
CAC 5102	Assurance and Management Control	20
CAC 5103	Accounting Information Systems	20
CAC 5104	International Governance and Regulation	20
Total Credits Stage I		**80**

STAGE II

CAC 5201	Advanced Financial Accounting	20
CAC 5202	Strategic Financial Management	20
CAC 5203	Local and International Taxation	20
CAC 5204	Project Management	20
Total Credits Stage II		**80**

STAGE III

CAC 5301	Advanced International Financial Reporting and Analysis	20
CAC 5302	Strategic Managerial Accounting and Performance	20
CAC 5303	Corporate Finance and Financial Markets	20

ELECTIVES

CAC 5306	Public Sector Accounting	20
CAC 5308	Corporate Governance Ethics	20
Total Credits Stage III		**80**

STAGE IV

CAC 5400	Dissertation	80
Total MSc credits		**320**

TOTAL CREDITS FOR THE PROGRAMME

STAGE I	80
STAGE II	80
STAGE III	80
STAGE IV	80
Total minimum credits:	**320**

Think in other terms

MODULE SYNOPSES

STAGE I
CAC 5101 International Financial Reporting and Analysis   **20 Credits**
The module aims to gain a comprehensive understanding of the framework, concepts, and practices associated with international financial reporting. A greater understanding of corporate valuation is acquired through the study of this module through the development of integral knowledge of financial statements and financial analysis. Upon completion of this module students should be able to better assess the tools, definitions, and acceptable practises of international financial reporting, based on the international financial reporting standards (IFRS), now required in many countries and economic trade areas. To help ensure short-term and long-term organisational success, the impact of financial and economic fluctuations are examined while topics such as foreign exchange, cash accounting, ratios analysis, and trend analysis will be considered as well.

CAC 5102 Assurance and Management Control   **20 Credits**
The aim is to dissect how management controls the entity and relationships with external partners to enhance organisational value. This module investigates the roles of audit and assurance in management control, and promotes organisational compliance with a focus on internal controls, risk management procedures, assurance and management information. The concept of due diligence, including the acquisition and the monitoring of activities of business partners is also analysed at both the national and international levels. The student will appreciate the nature and roles of assurance engagements and internal audits and develop an understanding of risk management and risk reporting in a global context.

CAC 5103 Local and International Taxation   **20 Credits**
The aim of the module is to gain a comprehensive understanding of the regulations, concepts, and practices associated with local and international taxation. A greater understanding of taxation is acquired through the study of this module as you develop integral knowledge of the global taxation practices. Upon completion of this module students should be able to better assess the regulations, definitions and acceptable practises of local and international taxation based on the different tax laws as required in many countries and economic trade areas.

CAC 5104 International Governance and Regulation   **20 Credits**
The aim is to analyse the regulation of governance, recognise varying international governance practise, and examine the links between governance and corporate performance.
This module will enable the student to gain a practical understanding of how governance structures can promote good decision making and performance, and increase the accountability of directors and managers. Key external regulations can affect organisations such as

Think in other terms

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international tax and law, are highlighted extensively. The capacity to assess and monitor director remuneration will also be an acquired asset by the time module is complete.

STAGE II

CAC 5201 Advanced Financial Accounting 20 Credits

The module aims to gain a comprehensive understanding of the advanced financial accounting concepts, and practices associated with International Financial Reporting Standards. A greater understanding of group financial statements, accounting for foreign currency transactions and financial instruments is acquired through the study of this module as students develop integral knowledge of financial statements. Upon completion of this module students should be able to better assess the tools, definitions and acceptable practises of International Financial Reporting Standards.

CAC 5202 Strategic Financial Management 20 Credits

The aim of this module is to examine and integrate into practice a blend of global financial management strategies and case-based applications. Through intense case study analysis, this module focuses on topics that range from the acquisition, deployment and management of international financial resources, to financial planning and analysis. The student will learn how to devise strategies for identifying and developing international financial resources, and to effectively communicate these strategies with organisational team members, partners and governments. The student will also become adept at analysing an organisation for reorganisation and restructuring from a strategic perspective.

CAC 5203accounting Information Systems and Technology 20 Credits

The aim is to introduce the use and purpose of accounting information systems (AIS) and other relevant technologies from a value creating and organisational alignment perspective. Multiple approaches for employing (AIS) are investigated in this module through a variety of decision making and critical thinking approaches. The student will understand how appropriate internal controls are established and how to verify compliance through audits linked to AIS. This module will equip the student with the skills to analyse business processes and optimise organisational performance by means of AIS, and the aptitude to develop decision making models linked to organisational strategies. The students will also evaluate the challenges associated with computer crimes and information technology security.

CAC 5204 Project Management 20 Credits

The module aims to enable students to develop project planning and management skills following the learning by doing approach. It involves policies, plans and project problem analysis, project identification, stakeholder analysis, alternative option analysis using financial, economic and social criteria, project selection, project planning and budgeting, human resources arrangements, inception phase and annual work plans, accounts keeping, financial reports and

Think in other terms

final project report. The module takes a holistic approach to project appraisal from initiation to completion taking into account financial and non-financial effects.

STAGE III

CAC 5301 Advanced International Financial Reporting and Analysis   20 Credits
The aim is to enhance the knowledge and skills acquired from prior International Financial Reporting and Analysis study and to provide more advanced practice of the application of the application of international financial reporting standards (IFRS). This module involves an in-depth analysis of IFRS, which includes the application of its regulations and the interpretation of financial statements for the assessment of performance and position of an entity, the student will learn how to apply IFRS to a variety of transactions, assess organisational position and understand the reporting of assets, liabilities, provisions and equity. The module also includes subject matter such as reporting overseas activities and advanced group accounting.

CAC 5302 Strategic Managerial Accounting and Performance Management   20 Credits
The aim is to explore the use of management accounting and accounting systems to link strategic leadership, resource management and organisational performance. This module develops the ability to manage resources, create and sustain value and develop a system of organisational score and goal-keeping tools. The ability to integrate these skills with accounting systems will enable the organisation to make performance-based decisions. The student will be able to ascertain, measure, and revise strategic goals associated with performance and develop a performance metrics system that will measure performance against the overall organisational strategic goals. In addition, ethical and moral dimensions of strategic financial decision-making will be explored.

CAC 5303 Corporate Finance and Financial Markets   20 Credits

The aim is to deliver an understanding of the organisational structure of international finance from a corporate perspective and provide an overview of financial markets and institutions, enabling students to understand and critically assess a broad array of economic and financial information. A variety of related subjects including international trade policy; payment methods; how foreign exchange impacts on an organisation; transfer pricing and sources and use of global funds are discussed. The student will also gain a practical understanding of how rends in the balance of trade and balance of payments, and the global demand for commodities, affect organisations linked by the global economy. In addition, a wide range of relevant topics will be explored, including the flow of funds from lenders to borrowers. The role of financial intermediaries, investment banks, and securities firms will be emphasised. Money and capital markets are analysed, and students will investigate foreign exchange rate regimes, and the role played by multilateral financial organisations in the global economy.

Think in other terms

ELECTIVE MODULES

CAC 5304 Social Entrepreneurship   **20 Credits**

The objective of this module is to examine the characteristics and goals of the social entrepreneur as well as an in-depth view into the practices of creating social value for individuals and communities. The student's ability to develop and implement social change will increase significantly as the student becomes acquainted with the theories of social entrepreneurship and learn how to identify the characteristics of the social entrepreneur. Upon completion of this recommended module, the student will also be able to evaluate the organisational structure, human resources, funding, marketing and stakeholder participation; all vital success factors in a social change project. The study of the theories and practice of creating partnerships for social change, the aptitude to resource initiatives to link community needs and the talent to develop a plan to implement social change will all be covered in this study of social entrepreneurship.

CAC 5305 Treasury Management and Ethics   **20 Credits**

The aim is to explore, form a practical perspective, the tools used in managing the treasury function of an organisation. This module studies the instruments necessary to finance an organisation, including banks as well as the money and capital markets. This will involve topics such as risk mitigation techniques, payment methods, data transfer, and working capital management methods. The student will learn how to determine a proper capital structure, manage the costs of long-term capital, and quantitatively evaluate capital resource investments.

CAC 5306 Public Sector Accounting   **20 Credits**

The aim is to gain a comprehensive understanding of the framework, concepts and practices associated with International Public Sector Reporting Standards. A greater understanding of International Public Sector Accounting Standards would help students acquire knowledge on how to assess the performance of public sector entities. Upon completion of this module students should be able to better assess the tools, definitions and acceptable practices for public sector entities as set out in standards developed by the International Accounting Standards Board.

CAC 5307 Municipal Accounting   **20 Credits**

The aim is to gain a comprehensive understanding of the framework, concepts and practices associated with municipal accounting as guided by International Public Sector Reporting Standards. A greater understanding of the performance, financial position and cash flows of municipal entities is acquired through the study of this module as students develop integral knowledge of municipal financial statements. Upon completion of this module students should be able to better assess the tools and, definitions and acceptable practices for municipal accounting.

Think in other terms

CAC 5308 Financial Markets Corporate Governance Ethics   **20 Credits**

The module focuses on how ethical and moral considerations are included in the public issues facing organisations and the decision-making process of managers. It covers the following areas: ethical theories and principles, ways of improving ethical practices in organisations, fraud detection and reduction, corporate control strategies, getting insight into indifferent corporate governance systems, models and mechanisms; stakeholder rights and responsibilities and other corporate governance aspects relating to shareholders and stakeholders.

STAGE IV

CAC 5400 DISSERTATION   **80 Credits**

A student is required to write an original dissertation relevant to the field of study.

DEPARTMENT OF BANKING

Lecturer and Chairperson
T Vhimisai, MSc Banking and Financial Services (NUST), B. Com (Hons) Banking (NUST), Dip (Banking) IOBZ – Associate

Senior Secretary
P Mindu, B. Com (Hons) Business Management (NUST), MDP (NUST), ND Secretarial Studies (Bulawayo Polytechnic College)

Secretary
C Dzikite, B. Com (Hons) Human Resources Mgnt (LSU), HND in Office Management (Bulawayo Polytechnic College)

ACADEMIC STAFF

Lecturers
M. Webb Ndlovu, MSc Banking and Financial Services (NUST), B. Com (Hons) Banking (NUST), Dip. Russian Language & Eco. (Moscow), Cert. Music (CDU), Cert. Higher Edn Mgt, (Wits), RSA

P Nkala, MSc Banking and Financial Services (NUST), B. Com (Hons) Banking (NUST)

C M Mhlope, MSc Eco (UZ), BSc Econ (UZ), Dip in Project Management (UNDP- Zimbabwe Development Bank)

A Nyathi, MSc International Securities, Investment and Banking (Reading University), UK; B.com (Hons) Finance (NUST), Registered Public Accountant (Zimbabwe) R.P.Acc.(Z), ACCA, ACIS, AIOBZ, AICMZ, ICSAZ, Associate member (Association of Certified Fraud Examiner), Certificate in Analysis and Management of Credit Risk, Postgraduate Diploma in Higher Education (NUST)

S Mpofu, MSc Banking and Financial Services (NUST) B. Com (Hons) Banking (NUST), Postgraduate Diploma in Higher Education (NUST)

Think in other terms

T Mutambanadzo, MSc Banking and Financial Service (NUST). B. Com (Hons) Banking (NUST), Cert Advanced Bank Credit Mgt, (Damelin), SA

T Bhiri, MSc Banking and Financial Services (NUST), B. Com (Hons) Banking (NUST), Postgraduate Diploma in Higher Education (NUST)

I Ndlovu, MSc Banking and Financial Services (NUST), B Com (Hons) Econ, (MSU)

S O Dhlamini, MSc Banking and Financial Services (NUST), B Com (Hons) Econ, (MSU)

J Tembo, PhD Business Management (UNISA), MSc Banking & Financial Services (NUST), BBS (Hons) Finance & Banking (UZ)

S Muwando, MSc Finance and Investment (NUST), B. Com (Hons) Banking (NUST)

N Tshuma, MSc Banking and Financial Services (NUST), B. Com (Hons) Banking (NUST), Postgraduate Diploma in Higher Education (NUST)

UNDERGRADUATE DEGREE PROGRAMME

SPECIAL REGULATIONS

1.0 PREAMBLE

1.1 The Department of Banking seeks to offer world-class programmes of study in banking, investment management and financial economics. The Department aims to prepare quality practitioners for the banking, financial services, and other sectors of the economy, suitable for serving in a wide variety of environments. Undergraduate programmes of study are offered on full time and block –release basis while postgraduate programmes are run on a block-release or Weekend School basis.

2.0 ENTRY REQUIREMENTS

2.1 Normal Entry

To qualify for normal entry into the Bachelor of Commerce (Honours) Degree in Banking and Investment Management programme, a candidate, in addition to satisfying the minimum conditions prescribed under the General Regulations and the Faculty Regulations for Five 'O' Level passes including English Language and Mathematics (A, B, or C grades), must have passed Economics and any one of the following subjects at "A" Level: Accounting, Business Studies/Management of Business or Mathematics.

2.2 Special Entry

Applicants who do not have the required "A" Level passes but have successfully completed the Higher National Diploma in Banking and Finance or have otherwise obtained equivalent qualifications may apply for direct entry into Part II of the degree programme.

2.3 Mature Entry

There is also provision for mature entry for persons who may not have the appropriate academic qualifications for entry but who have suitable or relevant experience and who satisfy the University of their ability to complete the degree module satisfactorily.

3.0 STRUCTURE OF DEGREE PROGRAMME AND SELECTION OF MODULES

3.1 The degree will be awarded to candidates who have successfully completed the programme and passed the examinations in accordance with Faculty Regulations.

3.2 The Programme, consisting of coursework, shall normally be completed over a maximum period of 4 years both on a full-time and block-release basis.

3.3 Pre-requisites

3.3.1 A Student must have passed Microeconomics (CBA 1105) and Macroeconomics (CBA 1206) before proceeding to Corporate Finance (CFI 2101).

Think in other terms

3.3.2   A Student must have passed Accounting I (CAC 1107) before proceeding to Accounting II (CAC 1208).

3.3.3   A Student must have passed Banking and Foreign Exchange (CBA 2202) before proceeding to International Banking and Finance (CBA 4107).

4.0   ASSESSMENT OF CANDIDATES

4.1 Candidates shall be assessed in accordance with provisions of the General Academic Regulations.

4.2 Normally, evaluation shall be based on Continuous Assessment as well as University Examinations. Continuous Assessment and the formal written examination shall constitute 30% and 70% of the overall assessment respectively.

4.3 Items incorporated in the Continuous Assessment may include assignment, tests, essays, field work, projects and oral presentations.

4.4 The formal written examinations shall normally be taken by students at the end of each appropriate semester**.**

5.0   DETERMINATION OF RESULTS OF MODULES

5.1 Students must satisfy the examiners in all the prescribed modules and in all requirements for the programmes. For the degree to be awarded, the minimum number of credits of 530 credits must be satisfied.

5.2 The classification of the degree shall be as follows: -

75% -100%	Distinction	(First Division)
65%-74%	Merit	(Upper Second Division)
60%-64%	Credit	(Lower Second Division)
50%-59%	Pass	
Below 50%	Fail	

5.3 For the purposes of degree classification, the parts of the degree programme shall be weighted as follows: -

Part II   30%
Part III   20%
Part IV   50%

6.0 SUPPLEMENTARY EXAMINATIONS

6.1 Supplementary examinations will not be offered**.**

7.0 REPEATING MODULES

7.1 A student who is not allowed to proceed to the subsequent Part of the Programme, but has passed at least 50% of the modules taken in that part of the Programme, may be allowed to apply to repeat a particular part. On the recommendations of the Senate, the candidate may be granted permission to repeat the failed modules. Nevertheless, a student may be exempted

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from re-attendance and re-examination in any modules in which he/she previously passed at Grade 2.2 or better.

8.0 PROCEEDING AND DISCONTINUING

8.1 A student may be allowed to proceed to the subsequent part carrying a module(s) from the previous part provided the total number of carryover modules shall not exceed 25% of the number of normally scheduled modules in a particular year of the programme. No candidate may carryover a particular module for more than two years.

8.2 A candidate who fails more than half of the modules for any part of this programme or obtains an overall aggregate mark of less than 35% should discontinue. Such student will be free to apply for admission/transfer into a different programme and the application will be considered through the normal admission procedures.

9.0 AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

9.1 The Degree shall be awarded to candidates who have successfully completed the programme and passed the examinations in accordance with regulations set out in accordance with the General Academic Regulations on Marking Scheme and degree classification. The award of the Degrees shall be subject to approval by the University Council. Candidates completing the requirements for such award will be entitled to receive a formal certificate of the University, bearing the University seal and signed by the Vice-Chancellor and the Registrar, confirming the award. Students must satisfy the examiners in all the prescribed modules and in all requirements for the degree.

9.2 For the degree to be awarded, the minimum number of credits, 530 must be satisfied.

10.0   NOTIFICATION OF RESULTS

10.1 Results are accessible online.

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PROGRAMME SUMMARY

PART I

FIRST SEMESTER

Module code	Module Description	Credits
CBU 1102	Business Communication	10
CIN 1109	Commercial Law	10
CBA 1105	Microeconomics	10
CIN 1106	Quantitative Analysis for Business I	10
CAC 1107	Accounting IA/ CAC1101 Financial Accounting IA	10
CBU 1108	Principles of Management	10
CTL1101	Conflict Transformation and Leadership	10

SECOND SEMESTER

CFI1203	Financial Mathematics	10
CBA1206	Macroeconomics	10
CIN1207	Quantitative Analysis for Business II	10
CAC1208	Accounting 1B/CAC 1201 Financial Accounting IB	10
CMK1209	Principles of Marketing	10

PART II

FIRST SEMESTER

CFI2101	Corporate Finance I	10
CBA 2110	Banking and Financial Markets	10
CIN2103	Law Relating to Banking I	10
CAC1203	Introduction to Information Technology	10
CAC2106	Accounting IIA/ CAC2101Financial Accounting IIA	10
CBA2108	Treasury Management I	10
CBA2109	Mathematical Applications in Banking	10

SECOND SEMESTER

CFI2201	Corporate Finance II	10
CBA2202	Banking and Foreign Exchange	10
CIN2203	Law Relating to Banking II	10
CAC2206	Accounting IIB/ CAC 2201 Financial Accounting IIB	10
CBA2208	Treasury Management II	10
CBA2209	Introduction to Econometrics	10

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CBA2204	Banking Information Systems	10

PART III

CBA3001	Industrial Attachment	120

PART IV

FIRST SEMESTER

CBA4101	Banking and Development	10
CBA4102	Marketing of Financial Services	10
CBA4103	Applied Economics I	10
CBA4107	International Banking and Finance	10
CBA4108	Investment Analysis and Management	10
CBA4109	Consumer and Corporate Lending	10
CBU4109	Entrepreneurship	10

SECOND SEMESTER

CBA4203	Applied Economics II	10
CBA4204	Derivative Securities	10
CBA4207	Advanced International Banking and Finance	10
CBA4208	Development Finance	10
CBA4209	Financial Risk Management	10
CBA4210	Ethics and Corporate Governance	10
CBA4007	Research Project	20

TOTAL CREDITS FOR THE PROGRAMME

Part I	120
Part II	140
Part III	120
Part IV	150
Total Minimum Credits:	**530**

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MODULE SYNOPSES

CBA 1105 Microeconomics   **10 Credits**

This module will study markets and the decision making embedded therein. It will discuss standard economic arguments that free markets work "best", the conditions under which these arguments are most believable, and policy options when these conditions are not met. The module will examine both competitive markets, for which basic models of supply and demand are most appropriate, and markets in which agents act strategically, for which game theory is the more appropriate tool. The module will cover, inter alia, economic theory and the market economy, consumer theory, choice under uncertainty, production and costs, efficiency and trade, market equilibrium, game theory and imperfect competition.

CBU 1102 Business Communication   **10 Credits**

The module will look at general comprehension and expression, report writing, comprehension of ideas, development of different styles and the use of English in a business setting, communicating skills, letter writing, committee documents, use of questionnaires, note taking, and summarising.

CIN 1109 Commercial Law   **10 Credits**

The module introduces students to the basic legal principles governing the business environment. Focus will be placed on definition of contracts, requirements of a contract, breach of a contract, remedies for breach of contracts, law of agency, contract of sale, law of business organisations and insurance contract.

CIN 1106 Quantitative Analysis for Business I   **10 Credits**

CIN1106 is a quantitative reasoning module for students in the Faculty of Commerce. It covers the techniques business students are most likely to use in future modules and in business related research. The topics covered are useful in economics, finance, accounting, risk, marketing and personnel management and in tandem with international developments in these areas. Students will learn a variety of problem-solving strategies that are applicable in a wide range of business environments. Specific topics include matrix algebra, linear programming, index numbers, calculus, decision making in business and an introduction to financial mathematics.

CAC 1107 Accounting IA   **10 Credits**

The module is designed for students without "A" level Accounting. It introduces students to basic principles, concepts and techniques of Accounting in general. The module focuses on the use of Accounting information by managers. The module covers the following areas Accounting cycle, Accounting as an Information system, trial balance, preparation of financial statements for individual companies, non-profit making organisations as well as Accounting ratios.

Think in other terms

CBU 1108 Principles of Management   **10 Credits**

The module will look into the history and development of management thought, functions of management, organisational structures, decision making, communication, centralisation and decentralisation, delegation, leadership and motivation, controlling budgeting and non-budgetary controls.

CAC 1101 Financial Accounting IA   **10 Credits**

The module is designed for those students with "A" Level Accounting. The module focuses on principles and techniques of Financial Accounting and their application to the preparation of financial statements of sole traders, partnerships, limited companies and non-profit making organisations culminating in analysis and interpretation of financial data.

CTL 1101 Conflict Transformation & Leadership   **10 Credits**

The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development

CBA 1206 Macroeconomics   **10 Credits**

The module is designed to address how economists model the relationships between aggregate economic variables and examine how various fiscal and monetary policies can affect the results. The main goal is to improve students' economic literacy and ability to apply economic models to analyse real world events. This module will be taught from an equilibrium perspective. This means the module will work with economic agents that optimize and with aggregate consistency conditions. Along with building basic economics intuition, the module will be centred on constructing and understanding macroeconomic models. These models will be used to discuss the theory of long-run economic growth and short-run economic fluctuations and to analyse macroeconomic policy, in particular fiscal policy.

CFI 1203 Financial Mathematics   **10 Credits**

The module is an introduction to basic concepts of quantitative finance upon which cash flow-based valuation models of finance are built. In particular, the module explores time value concepts in finance, equations of value, loan amortization and sinking fund problems, money market instruments and different yield measures, bond valuation and bond yield analysis, bond risk analysis and immunization, and the mathematics of portfolio theory. The module seeks to develop student skills in the application of discounted cash flow techniques and other mathematical techniques to investment analysis, portfolio optimization, and capital asset pricing. 'A' Level mathematics is an important pre-requisite for a good understanding of financial mathematics. Mathematics areas of particular interest are differential calculus, progressions, binomial and Taylor expansions, numerical methods and logarithms.

Think in other terms

CIN 1207 – Quantitative Analysis for Business II   **10 Credits**

CIN 1207 is an introductory module in business statistics designed especially for students majoring in Commerce. It covers the techniques business students are most likely to use in their future modules. The module covers descriptive and inferential statistics with business applications to analyse management and organizational problems. Students will learn to apply statistical analysis techniques to practical problems that firms in the real world face. Specific topics include: measures of central tendency and dispersion, probability theory and distributions, estimation, hypothesis testing, regression analysis and correlation analysis.

CAC 1208 Accounting IB   **10 Credits**

The module aims at equipping students with basic Management Accounting techniques in planning, control and decision making. It is intended for non-accounting professionals and covers the following areas: relationship of Cost and Management Accounting to other branches of Accounting, cost classification, stock valuation, material and labour costing, cash budgets etc.

CAC 1202 Financial Accounting IB   **10 Credits**

The module builds on the foundation laid in Financial Accounting IA. The module aims at developing a thorough understanding of the practical framework of Accounting and an ability to prepare, analyse and interpret financial statements. It covers the following areas of study: Accounting for limited companies, published accounts analysis and interpretation of final accounts, cash flow statements as well as latest developments of IAS applications in relationship to the areas covered.

CMK 1209 Principles of Marketing   **10 Credits**

This module explores marketing functions; the environment of marketing; marketing information systems and marketing research; the marketing mix; consumer behaviour; the social responsibility of marketing and public policy with respect to marketing practices.

CAC 2101 Financial Accounting IIA   **10 Credits**

The module builds on the foundation laid in Financial Accounting 1A & B. The module aims at providing students with knowledge of Accounting as related to partnership, accounting for specialised transactions and interpretation of financial statements.

CAC 2201 Financial Accounting IIB   **10 Credits**

This module is a continuation of Financial Accounting IIA. The module aims at helping students develop a thorough understanding of the practical framework of accounting and imbibe an ability to apply the International Standards (IAS), Financial Reporting Standards adopted by the Institute of Chartered Accountants of Zimbabwe and GAAP.

Think in other terms

CAC 2106 Accounting IIA   **10 Credits**

The purpose of the module is to build on topics encountered in Accounting IA and B which were tailored for future managers, rather than accountants. Topics will include contract accounts, standard costing, profit volume analysis, introduction to partnership accounts etc.

CAC 2206 Accounting IIB   **10 Credits**

The module will introduce group accounts and cash flow statements. Further topics include accounting for the issue and redemption of shares, business valuations and financial statements analysis.

CAC 1203 Introduction to Information Technology   **10 Credits**

The module introduces students to the role of computers in the business world and builds on the uses of different application packages in their field of study. It covers the following; basic fundamental concepts, management's need for information and types of systems, transaction processing as well as an industry specific project.

CBA 2110 Banking and Financial Markets   **10 Credits**

This is an introduction to a monetary economy and it acquaints students with the justification for existence of financial systems, development of the Zimbabwean financial system in general and the banking system in particular, its regulation, contribution to economic growth and its place in the global village. Also discussed are the roles and contributions of informal sources of credit such as micro finance institutions and private saving schemes. In addition, the module covers management of financial institutions as well as operations and instruments traded in money and capital markets.

CFI 2101 Corporate Finance I   **10 Credits**

The aim of the module is to identify the objective that Corporate Finance managers pursue or ought to pursue in order to satisfy the needs of corporate stakeholders and to develop, in students, concepts and corporate analytical tools that will enable them to meet this objective. To this end, the module will cover the following critical areas: Goals of a firm and the agency theory; Time value concepts and valuation of bonds and shares; Capital Budgeting under certainty; Operating and financial leverage; Introduction to portfolio theory and capital asset pricing; the stock market and other sources of long-term capital; innovations in Corporate Finance.

CFI 2201 Corporate Finance II   **10 Credits**

The aim of the module is to develop, further, in students, concepts and corporate financial analytical tools. The areas covered will include the following: Introduction to capital structure theory and practice; Cost of capital and valuation; Introduction to capital budgeting under uncertainty; Dividend policy theory and practice; corporate working capital management and innovations in corporate finance.

CBA 2202 Banking and Foreign Exchange   **10 Credits**

The module traces the development of foreign exchange markets and thereafter takes a comparative study of different exchange regimes that have existed at one time or another and examines why none of them alone has proved ideal. The module provides an introduction to the role played by banks in international trade. The last part of the module is on the services offered by banks to their clients in the international sphere including the provision of travel facilities.

CIN 2103 Law Relating to Banking   **10 Credits**

The two-semester module is designed to provide students with an insight into the legal elements of the Banking Business. Issues covered: Bank-Customer relationship, Customer Accounts, Instruments, Participants, Principles of Lending, Advances and Securities, Exchange Controls as well as basic concepts of International Banking.

CBA 2108 Treasury Management I   **10 Credits**

The two-semester module seeks to equip students with a thorough understanding of treasury department operations of financial and non-financial institutions. It covers areas such as structure of a treasury department, treasury management planning, risks in a treasury department, risk management strategies in a treasury department, fund management, liquidity management and asset and liability management. Treasury Management I (CBA 2108) will cover the following topics: Introduction to Treasury Management, Financial Markets, Structure of a Treasury Department, Treasury Management Planning, Liquidity Management and Term Structure of Interest Rates. Treasury Management II (CBA 2208) will cover the following topics: Risk in a Treasury Department, Risk Management Strategies in a Treasury Department, Asset and Liability Management and Fund Management.

CBA 2109 Mathematical Applications in Banking   **10 Credits**

The principal objective of Mathematical Applications in Banking is to inculcate optimisation skills in students of Banking and Investment Management. Optimisation is a key pillar of finance and banking. To this end, the module will revolve around linear programming, Integer programming, and dynamic programming as well as nonlinear optimisation and concave optimisation. Applications of Differentiation and Integration to Banking and Economics will also be covered. It will also develop concepts necessary to impart deeper knowledge in the day/year conventions, money market calculations, discount instruments, CDs and general pricing of assets.

CBA 2209 Introduction to Econometrics   **10 Credits**

The module introduces students to basic econometric principles and the use of statistical procedures in empirical studies of economic and financial models. Assumptions, properties, and problems encountered in the use of multiple regression are discussed as are simultaneous equation models, simulation, and forecasting techniques. Topics include regression analysis, Hypothesis testing, Time series modelling, Multivariate models, Forecasting as well as applications to Research Methods in Banking.

Think in other terms

CBA 2204 Banking Information Systems   **10 Credits**

The module examines e-banking definition, Industry trends and policy, e-banking components, informational websites, transactional websites Technology basics, Network typology, IT operations and risks, global payments landscape, emerging products and technologies, technology and channel access, customer needs and choices, organisational structure, innovation in e-banking, products and product development, mobile commerce/applications, Risk management in e-banking, the risk galaxy – Market, Operations, Credit, Liquidity, Interest Rate, Price, Compliance/legal Risk, Strategic, Reputational, Money laundering, e-banking controls, marketing and service support for e-banking.

CBA 4101 Banking and Development   **10 Credits**

The module provides students with an understanding of the need for, and the role of finance in development, the evolution of state participation in development finance institutions, the economics and operational procedures of the same, etc. The module is policy oriented and would equip students with broad understanding of development finance and its interaction with monetary and fiscal policies, coverage includes the informal sector. Theories of growth and the role of finance in economic growth, Financial Repression, Fiscal policies for growth, mobilisation of domestic savings and foreign technical sources in development, the debt crisis, optimum currency areas, the need for, and order of financial liberalisation. Agricultural finance and the role of the state in industries financial development, Zimbabwe's experience, Profitability, Regulation and portfolio segmentation in Development Finance Institutions (DFIs). Capital adequacy of DFIs' structure conduct and performance in the macro economy, distress and prediction models. The module also looks into information content of prices and interest rates etc., interest determination in controlled markets, financial liberalisation, the performance of the financial sector certainty and uncertainty in Financial Markets, including adverse selection and incentive effects.

CBA 4102 Marketing of Financial Services   **10 Credits**

The main objectives of the module is to equip students with the understanding of the following: - The role of Marketing; evolution of Marketing in the banking sector; understanding customers; the role of market research and methods of segmenting markets; managing marketing; marketing information; the marketing planning process; marketing mix decisions' product; promotion and price decisions; achieving sales, bankers as retailers and service quality. It also looks at the application of marketing techniques at Retail branch level.

CBA 4103 Applied Economics I   **10 Credits**

The two-semester module sets out to present basic features of the macroeconomic environment with special reference to developing economies. Macroeconomic policy has a direct and profound impact on the behaviour and the depth of financial systems in an economy and

Think in other terms

consequently on economic growth. Emphasis on short-term stabilization policies as prescribed by the SAPs in most LDCs has tended to generally post unexpected and non-standard outcomes. Part I is set as an introductory step to analyse the theoretical foundations of such policies; their standard transmission mechanisms and why they may not be the most appropriate and effective policies in LDCs when taken in their raw form. The module also incorporates an introduction to Mathematical Economics part in order to keep students abreast with modern and widely accepted skills and techniques in the field of economic analysis and interpretation. Part II is mainly an application of models discussed to real life situations.

CBA 4204 Derivative Securities   **10 Credits**

Globalisation has brought rapid changes in the Banking and Financial sectors all over the world. These changes have brought the need on the part of banks and other financial institutions, to come up with new ideas to cope in the more competitive and changing environment. To keep pace with the changes, financial innovation or engineering is needed. This module thus aims at equipping students with the basic skills of using derivatives in areas such as investment management, foreign currency exposure management etc. To do this, topics such as valuation, uses and applications of different derivative securities e.g. Interest Rate currency and commodity derivatives will be covered. Hedging instruments, strategies and techniques, real options and warrants will also be covered.

CBA 4107 International Banking and Finance   **10 Credits**

The module builds on the Banking and Financial Markets module. This is designed to acquaint students with the broad perspective of international monetary structure. This module provides insights into international financial markets, operations and instruments, their development and challenges. It covers multinational financial management, international flow of funds, international financial markets, short term asset and liability management, long term asset and liability management, country risk analysis.

CBA 4207 Advanced International Banking and Finance   **10 Credits**

The module consolidates the International Banking and Finance issues regarding market interdependencies, regulation and supervision challenges in the light of increasing competition from non-banks, globalisation and financial conglomerates. It discusses regulatory efforts to harmonise global financial dealings to ensure efficiency and reduce systemic risk, and contagious bank runs. The module also covers alternative international investments, exchange rate determination, currency derivatives, international arbitrage, parity conditions, and exchange rate risk management. Case Studies are used to highlight the regulatory challenges.

Think in other terms

CBU 4109 Entrepreneurship   **10 Credits**

The module looks at the nature of entrepreneurship; the evolving nature of entrepreneurship, understanding entrepreneurship in individuals, environmental assessment; preparation for a new venture; marketing research for new ventures, Financial preparation for entrepreneurship ventures; developing an effective business plan; sources of capital for entrepreneurs; assessment and evaluation of entrepreneurial opportunities; structuring and legal issues associated with new business ventures; strategic planning for emerging ventures; entrepreneurship and the global environment.

CBA 4108 Investment Analysis and Management   **10 Credits**

The module acquaints students with ways of managing their and clients' money so that both can derive the maximum benefit from what they earn. To accomplish this purpose, the module discusses investment alternatives that are available and develops plausible skills of analysing, selecting and managing those investments. The module covers the investment environment, investment markets and instruments, bond prices and yields, fixed Income portfolio management, equity portfolio management, portfolio theory, management of client portfolios (Individual, Personal Trust, Mutual Funds, Pension Funds, Unit Trusts), making investment decisions, asset allocation, security selection approaches, equilibrium in capital markets, market efficiency, and equity valuation models. To enhance the investment management component, the module will also cover institutional investment, tax on investments, and personal finance.

CBA 4109 Consumer and Corporate Lending   **10 Credits**

The module is offered in response to the growing importance of advances in bank and non-bank asset management. It seeks to explain the general principles of lending, propose a structured approach to the evaluation of credit proposals, and draw decisions there from. The concept of lending will therefore be identified as a strategic factor. Coverage will include credit assessment, principles of security, interpretation of financial statements, bad and doubtful debtors as well as control of the same.

CBA 4208 Development Finance   **10 Credits**

The module provides students with an understanding of the need for, and the role of finance in development, the evolution of state participation in development finance institutions, the economics and operational procedures of the same, the interaction of development finance with monetary and fiscal policies. Module coverage also includes the informal sector. Topics covered include theories of growth and the role of finance in economic growth, financial repression, fiscal policies for growth, mobilization of domestic savings and foreign technical sources in development, agricultural finance and the role of state in industries financial development, regulation and portfolio segmentation in development financial institutions.

CBA 4209 Financial Risk Management   **10 Credits**

The module aims at developing a broad understanding of the drivers of risk and to provide a framework for financial risk management from which applications to particular situations will be

made. Specifically, the module will focus on equipping students with skills in developing a systematic framework for handling risk situations, understanding how people in general and managers in particular behave in risky situations and recognizing inconsistent behaviour, identifying sources of risk and evaluating exposures, and developing expertise in the issue of market mechanisms available for mitigation of risk using financial risk management models and techniques. Fundamentals of the module include identification and measurement of financial risk, risk analysis, techniques of dealing with risk, predicting company failure.

CBA 4210 Ethics and Corporate Governance   **10 Credits**

The module seeks to develop in students a firm understanding of the basic of Corporate Governance by getting insights in different corporate governance systems. It includes issues relating to fiduciary duties, risk oversight, audits, internal controls and crisis management. In addition, it focuses on ethical issues, mainly the ability to identify and deal with ethical dilemmas and unethical practices in business.

CBA 4007 Research Project   **20 Credits**

The project is meant to give students an opportunity to apply the knowledge gained over the period. The project is a consolidation of the theoretical knowledge gained in the taught modules and the practical experience gained from Industrial Attachment. Students undertake research in an area of their choice but limited to those that are related to the modules being studied in liaison with their academic supervisors to produce a project which has practical applications/solutions. The research project should be 10 000 – 15 000 words long (excluding preliminary pages and appendices).

MASTERS DEGREE PROGRAMME

SPECIAL REGULATIONS

MASTER OF SCIENCE DEGREE IN BANKING AND FINANCIAL ECONOMICS (MSc BFE)

1.0 PREAMBLE
1.1 The regulations for the Master of Science Degree in Banking and Financial Economics hereinafter referred to as the MSc in Banking and Financial Economics [MSc BFE] Regulations, complement the University General Academic Regulations for Master's Degree by coursework, hereinafter referred to as the General Academic Regulations.

2.0 ENTRY REGULATIONS
2.1 On a full time, basis, the programme shall be studied over a minimum period of 12 months of which a minimum of 3 months shall be for the dissertation.
2.2 On a part-time basis, the MSc programme shall be studied over a minimum period of 24 months of which a minimum of 6 months shall be for the Dissertation. The Programme must be completed within a maximum period of 4 continuous academic years' failure of which a student shall be required to apply to repeat the whole programme starting from Part I.
2.3 On a part-time basis, delivery will be block-release or Weekend School and may be carried out at satellite centres.
2.4 The full-time MSc student may, for good reason and subject to approval by Senate on the recommendation of the Faculty Board, transfer to the part-time programme or vice versa provided the student meets the requirements of the part of the programme the student is transferring to.
2.5 To be considered for admission to the MSc programme, applicants should, normally, hold a good Honours degree in Banking, Finance, Insurance, Accounting or their equivalents. A thorough knowledge of financial market operations will be an added advantage.

3.0 ASSESSMENT
3.1 The taught section shall be examined by both continuous assessment [30%] and a written examination [70%] for each module with the exception of Applied Research Methods (CBA 5108) which shall be assessed 100% by continuous assessment. The pass mark shall be 50%. The written examination shall be taken at the end of each semester for both full time and part time students.
3.2 A student can proceed to Stage III carrying over Stage I and Stage II modules provided the total number of carry-over modules shall not exceed 25% of the number of Stage I and Stage II modules. However, a student shall NOT be allowed to proceed to Stage IV (Dissertation) before they have passed all Stage I, II and III modules.

Think in other terms

3.3 A student who is withdrawn after failing Stage IV, the research section, but had passed the taught section shall be awarded a Postgraduate Diploma in Banking and Financial Economics [PGDB]

3.4 Each stage shall contribute 25% towards the overall degree aggregate.

3.5 The weighting between the taught section and the research section (Dissertation) in the overall assessment shall be 75% and 25% respectively.

4.0   Grading

4.1   The following marking scheme shall be adopted:

80% and above	Distinction	(D)
70% - 79%	Merit	(M)
60% - 69%	Credit	(C)
50% - 59%	Pass	(P)
Below 50%	Fail	(F)

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PROGRAMME SUMMARY

STAGE I

Module Code	Module Description	Credits
CBA 5101	Financial Markets and Regulation	20
CBA 5102	Financial Econometrics	20
CBA 5108	Applied Research Methods	20
CBA 5109	Bank Operations and Strategy	20

STAGE II

CBA 5104	Financial Economics	20
CBA 5110	Risk Management and Corporate Governance	20
CBA 5111	Applied Treasury Management	20
CBU 5106	Marketing of Financial Services	20

STAGE III

CFI 5210	Financial Modelling	20
CFI 5211	Financial Engineering	20
CBA 5210	Applied International Banking	20

STAGE III: *Elective Modules (To Select One)*

CBA 5211	Development Finance	20
CBA 5212	Corporate and Investment Banking	20
CBA 5213	Central Banking and Monetary Economics	20
CBA 5214	Applied Bank Lending	20
CBA 5203	Strategic Financial Management	20

STAGE IV

CFI 5300	Dissertation (Prerequisite Part I and II)	80

TOTAL CREDITS FOR THE PROGRAMME

STAGE I	80
STAGE II	80
STAGE III	80
STAGE IV	80
Total minimum credits:	**320**

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MODULE SYNOPSES

STAGE I CORE MODULES

CBA 5101 Financial Markets and Regulation **20 Credits**
The aim of this module is to provide a strong foundation for an understanding of financial markets and the main types of securities traded in these markets. The module will focus on money and capital markets products, futures, swaps and options. The module will strike a balance between the theoretical paradigms and the empirical literature, and the important links between theory and the real world. The emphasis will be on both principles and problem solving. The module focuses both on quantitative and conceptual foundations. It looks at a number of regulatory issues: why and how regulation takes place and the role of the Basel Codes Framework in bank regulation and supervision. Examination of practical issues of risk management in Regulatory issues are addressed, with attention paid to both 'on' and 'off' balance sheet positions.

CBA 5102 Financial Econometrics **20 Credits**
The aim of this module is to explain how econometric methods can be used to learn about the future behaviour of the prices of financial assets by using the information in the history of asset prices and in the prices of derivative securities. The specific objectives of the module are to, introduce a range of statistical techniques and indicate criteria by which one might judge the appropriateness of each method, identify the decision situation in a problem, formulate and solve econometrics problems and formulate and solve multi-stage problems. The following shall be covered, linear regression, multiple linear regression, qualitative response regression models, panel data regression and time series analysis, etc. Emphasis will also be put on the ability of students to interpret the statistical results and ability to make decisions based on the results.

CBA 5108 Applied Research Methods **20 Credits**
This module shall be examined entirely by coursework. Students will be required to submit an acceptable proposal at the end of the module. It covers a wide range of topics related to the conduct and management of postgraduate research studies in Banking and Finance. It includes an analysis of the application of key research tools and methods in attempting to seek practical answers/explanations to develop scenarios. The module therefore covers development of successful research proposals, research resource management, conducting fieldwork, the logic and structure of theses, quantitative and qualitative methods, referencing techniques and research ethics. This should not only guide students in preparing for their fieldwork for dissertations, but also help them systematically address problems in their communities.

CBA 5109 Bank Operations and Strategy   **20 Credits**

This module aims to detail general and strategic management issues and how they affect banking and operations of other financial institutions. The module covers the evolving structure of financial institutions and balance-sheet analysis. Furthermore, the module also looks at operations in more detail, e.g. managing liquidity and liabilities, asset management – the consumer lending decision and the business lending decision, and loan sales and securitisation. Finally, the module analyses how financial institutions create value through marketing, distribution, diversification and innovation. Analysis of the effects of microeconomic and macroeconomic policies on bank performance is also central in this module.

STAGE II - CORE MODULES

CBA 5110 Risk Management and Corporate Governance   **20 Credits**

This module covers issues of the ownership, control and accountability and risk management in financial institutions. It raises some key issues: for example, in the context of a corporation, how should the interests of directors, shareholders, employees and other stakeholders be prioritized and how can these interests be expressed, aligned and reconciled? Identification, measurement and management of financial risks such as market risk, credit risk and operational risk shall also be covered in line with the requirements of the Basel Accords.

CBA 5104 Financial Economics   **20 Credits**

This module aims to cover some of the main areas in advanced multinational corporate finance namely: the corporate investment decision, the financing decision, term structure of interest rates, payout policy, corporate bankruptcy, venture capital, mergers and acquisitions. A key objective of the module is to demonstrate the link between those various decisions and areas; in particular, exploring how the firm's financing, investment and payout policies interact with each other and how those decisions have implications for corporate bankruptcy and takeovers.

CBA 5111 Applied Treasury Management   **20 Credits**

This module is concerned with how the Treasury function operates in both financial and non-financial environments. The key objective of the module is to equip students with an understanding of a wide range of theoretical financial concepts, tools and techniques as applied to treasury activities, including the key functions of an Active Treasury Department and latest trends in Treasury Management. The module covers concepts such as the trade-off between risk and return, asset allocation, and security analysis in the investment management process. It further examines the design and implementation of formal performance measurement and management control systems in a business set up particularly the banking institution. Further to that, the module synthesizes the theory and practice of treasury management.

CBU 5106 Marketing Of Financial Services   **20 Credits**

This module examines the nature and uniqueness of financial services and examines those aspects of marketing that present particular challenges for marketers of such services. Focus will

be given on product assortments, service quality and development of relationships in the financial services sector.

STAGE III – CORE MODULES

CFI 5210 Financial Modelling   20 Credits
The module involves the financial use of computer software packages to model corporate finance problems such as: Operating Budgets, Capital Budgeting, Decision Tree Analysis, Sensitivity Analysis, Computer Simulations, Business and Securities Valuations.

CFI 5211 Financial Engineering   20 Credits
The module examines, in more detail, and including practical case studies, the types, uses and valuation of derivative products and the derivation of synthetic instruments for the purpose of hedging, speculation or arbitraging and also looks at the regulatory environment for these derivative products. The module also looks at latest developments in innovative Corporate Finance issues such as option embedded issues, swaps, etc.

CBA 5210 Applied International Banking   20 Credits
This module aims to provide an overview of the activities and risks involved in managing international financial institutions; principally commercial banks and investment banks. The module examines the role of major financial intermediaries in internationally open economies. It deals first with fundamental concepts of intermediation in market economies, along with the importance of capital, leverage, systemic risk and moral hazard, as well as the potential risks involved in the more recent trend towards financial conglomerates and financial disintermediation. It then considers the issue of risk; how this manifests itself, how it can be managed as well as the causes of bank failure.

ELECTIVES (TO SELECT ONE)
CBA 5211 Development Finance   20 Credits
This module covers all aspects of the role of finance in development, including the theories underpinning development finance, enterprise-level development finance and sustainable growth. The module is policy oriented and would equip students with a broader understanding of development finance and its interaction with Government's macroeconomic policies. Module coverage shall also include small to medium enterprises financing, infrastructure financing etc.

CBA 5212 Corporate and Investment Banking   20 Credits
This module aims to develop an advanced understanding of the theory and practice of corporate and investment banking. It provides students with an insight into the major features of the banking business and a framework for the understanding of the different activities of these two major functions found in any financial institution. The first part of this module will examine the changing business characteristics of the corporate banking while the second part will focus on

Think in other terms

the main operations of investment banks. The module shall also have a global investment banking slant.

CBA 5213 Central Banking and Monetary Economics 20 Credits

This module provides students with a thorough understanding of monetary theory, the effects of monetary policy (variables) on the macroeconomic system. The theoretical and empirical underpinnings of the monetary policy analysis, the role of the Central Bank and the conduct of monetary policy in closed and open economies will be covered in detail. Critical issues such as macroeconomic stabilisation programmes, central bank independence and governance shall be covered.

CBA 5214 Applied Bank Lending 20 Credits

This module seeks to explain the general principles of lending, propose a structured approach to the evaluation of loan proposals, and draw decisions there from. The concept of lending will therefore be identified as a strategic factor. Coverage will include credit assessment, principles of security, interpretation of financial statements, bad and doubtful debtors, and their control. Attention will be paid to the identification, measurement and financing of risk, including objective and subjective, risk analysis, predicting corporate bankruptcy etc.

CBA 5203 Strategic Financial Management 20 Credits

This module aims to assess and evaluate the value of the firm under different financial and managerial structures. It gives students the ability to understand and determine how investors interpret various financial arrangements such as dividend policy, taxes, and stock offerings. Specific attention will be paid to information and incentives of each party in a financial contract in the context of structuring the firm, running the firm efficiently, and if all else fails, bankruptcy. It addresses the universal challenges related to different sources of funding/financing and reporting. In addition, discusses tactical issues of importance to firms including disaster recovery, distribution management and preparing for exist.

STAGE IV

CBA 5300 Dissertation 80 Credits

The final module on the MSc programme is the dissertation, researched and written over at least four months from February to July. This is a substantial piece of independent work applying research techniques and relevant economic theory to a research topic. This can be an area which has attracted attention in the module of studies, or may be linked to an aspect of professional working experience. A topic is chosen during Stage IV and an appropriate member of the academic staff who acts as a supervisor is then assigned to give the student guidance on the structure and content of the research. In preparation for the research, a Dissertation Seminar is held, which is designed to equip students with the necessary research techniques and analytical tools. Student attendance at the Seminar is compulsory.

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DEPARTMENT OF FINANCE

REGULATIONS FOR UNDERGRADUATE AND POSTGRADUATE DEGREE PROGRAMMES

1.0 PREAMBLE
1.1 The Department of Finance seeks to offer world-class programmes in identified areas of Finance and Investment, Financial Engineering, Quantitative Finance, Customs, Taxes and General Fiscal Studies. The Department aims to prepare quality practitioners, educators and professionals for serving in a wide variety of environments for teaching, training and skills development. The Master's and Doctoral programmes offered in the Faculty will prepare senior professionals for leadership in the local as well as international economies.

2.0 PROGRAMMES AND THEIR WEIGHTING
2.1   **The Department offers the following programmes:**
2.1.1   Bachelor of Commerce Honours Degree in Finance (BComHFin)
2.1.2   Bachelor of Commerce Honours Degree in Fiscal Studies (BComHFisc)
2.1.3   Master of Science in Finance and Investment (MScFInv)
2.1.4   Master of Science in Financial Engineering (MScFEng)
2.1.5   Master of Science in Fiscal Studies (MScFS).

3.0 WEIGHTINGS OF THE PROGRAMMES
3.1 The minimum total credits shall be 540 for undergraduate programmes, and 340 for postgraduate programmes broken down as follows:

Programme	Total Credits per Part/Stage				Total Credits
	I	II	III	IV	
BComm Honours Finance	140	140	120	140	**540**
BComm Honours Fiscal Studies	140	140	120	140	**540**
MSc Finance and Investment	80	80	80	100	**340**

Think in other terms

MSc Financial Engineering	80	80	80	100	**340**
MSc Fiscal Studies	80	80	80	100	**340**

BACHELOR OF COMMERCE HONOURS DEGREE IN FINANCE [BCom HFin)

1.0   PREAMBLE

These regulations should be read in conjunction with the General Academic Regulations for Undergraduate Degrees, hereinafter referred to as General Regulations.

2.0   Programme Profile

Degree Profile of Bachelor of Commerce Honours Degree in Finance

Institution:	**National University of Science and Technology**
Type of Degree:	**Honours**
Credit Load:	**540 credits**
Level:	**SADC-QF - Level 8**
Accreditation Organisation(s):	
Period of reference:	

Purpose of the Programme

The aim is to produce world class graduates that meet the needs of today's finance and investment fields. The degree programme offers opportunity to students to cover modules in a business environment characterized by forces of globalization. It provides practical and entrepreneurial training as well as encompassing a broad range of interdisciplinary interests and skills in the field of finance, economics and business.

Programme Characteristics

Areas of Study	Corporate Finance and Investments, Behavioural Finance, Tax Law and Practice, Accounting and Financial Analysis, Public Finance and Economics, International Finance, Financial Engineering, Asset Pricing, Financial Modelling, Innovations in Finance (such as Programming, Financial Computing), Microfinance and Entrepreneurial Development, Real Estate Finance and Investment, Financial Econometrics, Research Methodology and Practice, Treasury Management, Corporate Governance and Ethical Standards.
Specialist Focus:	Pricing of financial products, model financial products and profitable investing and trading with various financial products
Orientation:	Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.
Distinctive Features:	The programme builds the research-technology-innovation continuum and focuses on knowledge development and application using a student-centred

Think in other terms

approach

Career Opportunities and Further Education

Employability:	Careers in the financial sector, money and capital markets, micro finance sector, treasury departments of private and public sector, non-governmental organisations, regional and international financial organisations, research institutions, academia.
Further Studies:	Master's and doctoral studies Business Administration, Corporate Finance, Development Finance and Economics, Behavioural Finance, Financial Engineering and related fields. Graduates can also pursue professional modules such as CFA.

Programme Delivery

Teaching and Learning Methods:	An eclectic mixture of teaching methods which include but are not limited to lectures, tutorials, case studies, computer laboratory practicals and simulations, field practicals, group work, research projects as well as their dissertations, mini-projects, end of semester professional examinations, continuous assessment tests, written assignments, oral presentations, industrial visits, industrial attachment, research project, individual independent study
Assessment Methods:	Written examinations, tests, assignments, practical and oral presentations and tests, seminar presentations, industrial attachment report, research project report, continuous assessments

Programme Competences

Generic:

Multidisciplinary: Ability to draw appropriately from multiple academic disciplines to define and solve problems based on understanding of complex phenomena

Quantitative and innovative reasoning: Capability to draw on big data and use analytics for informed decision making and strive to seek new ways of doing things

Communication skills: Ability to communicate effectively and to present information orally and in writing and using ICTs to both expert and non-expert audiences

Analysis and synthesis: Capacity for analysis and synthesis using logical arguments and proven facts.

Ethical commitment: Professional integrity and awareness of impact of science and technology on society and the environment

Entrepreneurial skills: Capability to identify and create new business ventures based on knowledge and new thinking paradigms

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Discipline specific:

Technology development skills: Ability to develop new themes, models, problem solving techniques in finance and

Problem-solving skills: Ability to solve a wide range of problems in related finance by identifying their fundamental aspects.

Exit Level Outcomes

Problem solving
Identify, formulate, analyse and solve complex economic, customs, taxes, general revenue problems creatively and innovatively.

Application of scientific knowledge
Apply knowledge of mathematics, quantitative techniques in economics, customs, taxes, finance and financial software to solve economic and financial problems.

Investigations, experiments and data analysis
Demonstrate competence to design and conduct investigations and experiments.

Information technology knowledge
Demonstrate competence to use appropriate information technology skills and competences

Professional and technical communication
Demonstrate competence to communicate effectively, both orally and in writing, with audiences in all sectors of the economy and at various levels, and the community at large.

Sustainability and revenue generating activity
Demonstrate critical awareness of the sustainability and impact of revenue activity on the social, economic, financial sectors and business environment in general.

Individual, team and multidisciplinary working
Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments.

Independent learning ability
Demonstrate competence to engage in independent learning through well-developed learning skills.

Financial professionalism
Demonstrate critical awareness of the need to act professionally and ethically and to exercise judgment and take responsibility within own limits of competence.

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Financial management
Demonstrate knowledge and understanding of financial and investment management principles and economic decision making.

3.0 ENTRY REQUIREMENTS
3.1 Normal Entry
For normal entry, applicants should have passed at least 5 subjects at Ordinary Level including Mathematics and English; and, have good passes in at least two subjects at 'A' Level from Mathematics, Economics and Accounting, and any other commercial related subject(s) such as: - Mathematics, Economics, Statistics, Management of Business, Computer Science, Business Studies.

3.2 Special Entry
3.2.1 Applicants should have minimum of a National Diploma in Banking and Finance, Accountancy or recognised equivalent.
3.2.2 Applicants who hold a Higher National Diploma in Accountancy, Banking and Finance, or an equivalent qualification from a recognized institution may be considered for direct entry into Part two of the degree programme provided necessary modules have been covered after mapping the passed modules with our programme.
3.2.3 Special entry shall be in accordance with the General Regulations.

3.3 Mature Entry
3.3.1 Applicants who are at least 25 years old for men and 23 years for women on the day of academic year and not legible for entry under the normal entry requirements may apply for mature entry provided;
3.3.2 They have passed at least five approved 'O' Level subjects including Mathematics and English language

4.0 DURATION OF PROGRAMME AND DELIVERY
4.1 The Programme, consisting of coursework, shall normally be completed over a maximum period of 4 years on a full-time and/or block-release basis.
4.2 On both basis, delivery shall be allocated as follows:

Year of Study	Number of Modules
Year 1	14
Year 2	14
Year 3	Industrial Attachment

Think in other terms

Year 4	10
Total Number of Modules	**38**
	1 Research Project

4.3   Programme of Study
4.3.1 The programme constitutes four academic years on a full-time and/or block-basis, each academic year representing a part of the degree programme. Year III shall be spent on industrial attachment with an appropriate organisation.

4.4   Mode of Delivery
4.4.1   The programme will be offered on a full-time and/or block-release basis and may be carried out at satellite centres.

4.5   Taught Modules
4.5.1   Each module shall be assessed by coursework and a formal examination.
4.5.2   Practical modules shall fully be examinable by coursework, of which the weighting of the coursework shall be: Practical Work 60%; Assignments and Tests 40%.
4.5.3   For theoretical modules the coursework shall be 30% and the formal examination shall be 70%.

5.0   Industrial Attachment/ Work Placement
5.1   Semesters I&II students will spend at least eight (8) months of this period on approved industrial attachment.
5.2   The Industrial Attachment will be governed by the General University regulations.
5.3   Where a student obtains less than 50% in the Industrial Attachment Continuous assessment, the student is required to repeat Industrial Attachment.
5.4   Continuous Assessment shall contribute 50% to the final Industrial Attachment mark.
5.5   The Final Assessment mark shall be determined on the basis of the final report assessment (40%) and oral presentation assessment (10%).

6.0   ASSESSMENT AND SCHEME OF EXAMINATIONS
The assessment of attainment and scheme of examination regulations for this degree programme must be read in conjunction with General Regulations of National University of Science and Technology

6.1   Weighting
6.1.1   The determination of the overall degree programme aggregate will be as follows:
Part II -   30%

Think in other terms

Part III -   20%
Part IV -   50%

6.2   **Classification of the Degree**
      6.2.1   Candidates must satisfy the examiners in all the prescribed modules and in all requirements for the programmes.
      6.2.2   For the degree to be awarded, the minimum number of credits of 540 must be satisfied.

6.3   **Programme Duration**
      In accordance with the General Regulations, the degree requires the study of a range of modules over four years (8 semesters). This includes one academic year of Industrial attachment.

6.4   **Structure of the Programme**

      In accordance with the General Regulations, the degree requires the study of a range of modules over four years (8 semesters). This includes one academic year of Industrial attachment.

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PROGRAMME SUMMARY

Year	Semester	Module Code	Module Name	Credits
I	I	CFI1102	Accounting and Financial Analysis IA	10
		CBA1104	Principles of Microeconomics	10
		CIN1109	Commercial Law	10
		CIN1106	Quantitative Analysis for Business I	10
		CBU1102	Business Communication	10
		CBU1108	Principles of Management	10
		CTL1101	Conflict Transformation and Leadership	10
				70

Total Credits Year I Semester I

Year	Semester	Module Code	Module Name	Credits
I	II	CFI1202	Introduction to Information Technology and Programming *(Practical)*	10
		CFI1203	Financial Mathematics	10
		CFI1204	Accounting and Financial Analysis IB	10
		CFI1205	Financial Markets and Regulation	10
		CBA1205	Principles of Macroeconomics	10
		CIN1207	Quantitative Analysis for Business II	10
		CBU1208	Principles of Marketing	10
				70

Total Credits Year I Semester II

Total Credits Year I   **140**

Year	Semester	Module Code	Module Name	Credits
II	I	CFI2101	Corporate Finance I	10
		CFI2107	Introduction to Financial Computing *(Practical)*	10
		CFI2108	Accounting and Financial Analysis IIA	10
		CFI2110	Corporate Law and Practice	10
		CFI 2111	Microfinance and Entrepreneurial Development	10
		CFS2105	Tax Law and Practice I	10
			To select 1 elective	
		CAC2106	Management and Cost Accounting 1A *(elective)*	10
		CBA2108	Treasury Management I *(elective)*	10
				70

Total Credits Year II Semester I

Year	Semester	Module Code	Module Name	Credits
II	II	CFI2201	Corporate Finance II	10
		CFI2205	Research Methods in Finance and Economics *(Practical)*	10

Think in other terms

			Financial Information Systems *(Practical)*	10
		CFI2207	Accounting and Financial Analysis IIB	10
		CFI2208	Public Finance and Economics	10
		CFS2205	Tax Law and Practice II	10
		CFS2206	**To select 1 elective**	10
			Management and Cost Accounting IB *(elective)*	
		CAC2205	Treasury Management *(elective)*	10
		CBA2208		10
				70

Total Credits Year II Semester II

Total Credits Year II   **140**

III	I & II	CFI3001	Industrial Attachment	120

Total Credits Year III   **120**

IV	I	CFI4102	International Finance	12
		CFI4103	Institutional Investment Analysis	12
		CFI4108	Financial Econometrics and Data Analysis	12
		CFI4109	Financial Engineering and Asset Pricing	12
		CFI4110	Corporate Governance and Ethical Standards	12
			Year IV Semester I Total Credits	**60**
IV	II	CFI 4201	Corporate Financial Strategy and Restructuring	12
		CFI4202	Institutional Investment Management	12
		CFI4205	Real Estate Investment and Finance	12
		CFI4206	Financial Modelling *(Practical)*	12
		CFI4208	sk Analysis and Management	12
		CFI4006	search Project	20
				80

Year IV Semester I Total Credits
Total Credits Part IV   **140**
Overall Credits for the Programme   **540**

Think in other terms

MODULE SYNOPSES

YEAR I SEMESTER I

CFI 1102 Accounting and Financial Analysis I   **10 Credits**

This module introduces basic financial accounting principles for a business and presumes no previous Finance and Accounting knowledge. Upon completion, students should be able to gather financial information and to demonstrate an understanding of accounting principles and apply those skills to a business organization. It should cover techniques of identifying and describing information sources that financial analysts use in financial statement analysis besides annual financial statements and supplementary information and the steps in the financial statement analysis framework. Topics include the complete accounting cycle, accounts hierarchy (account classes, account groups, subsidiary accounts); journal entries related to sales, purchases, collections, payments, and expenses; posting; accounting of value added tax; payroll accounting; accounting of current assets; trial balance, preparation of financial statements for different types of business entities and closing/opening entries; petty cash and various types of reconciliation statement analyses.

CBA 1104 Principles of Microeconomics   **10 Credits**

The module provides a basic foundation for the subject matter of Economics to enable students to prepare themselves to use the concept of rationality to analysing behaviour at a micro level. The module includes: Definitions of Economics, Evaluation and Development of Socio-Economic systems, Factor Prices, Pricing and Production Certainty and Uncertainty in Economic theory, Markets and Economic Decision-making.

CIN 1109 Commercial Law   **10 Credits**

The module introduces students to the basic legal principles governing the business environment. Focus will be placed on definition of contracts, requirements of a contract, breach of a contract, remedies for breach of contracts, law of agency, contract of sale, law of business organisations and insurance contract.

CIN 1106 Quantitative Analysis for Business I   **10 Credits**

The module introduces students to the mathematical tools relevant for application to the business environment. Students will be expected to recognise the value of quantitative methods in analysing data and interpreting it in order to make relevant business decisions.

CBU 1102 Business Communication   **10 Credits**

The module examines the general comprehension and expression, report writing, comprehension of ideas, development of different styles and the use of English in a business setting,

communicating skills, letter writing, committee documents, use of questionnaires, note taking, summarising.

CBU 1108 Principles of Management   10 Credits

The module explores the history and development of management thought, functions of management, organisational structures, decision making, communication, centralisation and decentralisation, delegation, leadership and motivation, controlling budgeting and non-budgetary controls.

CTL 1101 Conflict Transformation and Leadership   10 Credits

The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development

CBA 1205 Principles of Macroeconomics   10 Credits

Having done Principles of Micro Economics, it is a well-known fact that what is true with regard to individual parts of the whole may not be true with the whole. The module Principles of Macro Economics builds on the module on Principles of Micro Economics. It seeks to introduce students on how economic aggregates such as national income, investment, savings, taxation, imports, exports, government expenditure, fiscal and monetary policies, employment/unemployment and inflation are related to micro economic behaviour. Emphasis is put on the definition; measurement and inter linkages of these so that students can be prepared for more advanced policy formulation and implementation.

YEAR I
Semester II

CFI 1202 Introduction to Information Technology and Programming   10 Credits

The module provides a brief overview of the discipline of computer science and information technology topics including computer architecture, operation systems and networks, automata and models of computation, programming languages and compilers, algorithms, databases, security and information assurance, artificial intelligence, graphics, and social/ethical issues of computing. This module also provides an introduction to computer programming using the Python programming language, which covers basic procedural techniques such as variables, data types, selection, iteration, and functions. It will also introduce students to object-oriented programming. It also looks at various general programming concepts, such as algorithm design and debugging. By the end of the module, students should be able to construct a moderately-sized Python program.

Think in other terms

CFI 1203 Financial Mathematics   **10 Credits**

The module is an introduction to basic concepts of quantitative finance upon which cash flow-based valuation models of finance are built. In particular, the module explores time value concepts in finance, equations of value, loan amortization and sinking fund problems, money market instruments and different yield measures, bond valuation and bond yield analysis, bond risk analysis and immunization, and the mathematics of portfolio theory. The module seeks to develop student skills in the application of discounted cash flow techniques and other mathematical techniques to investment analysis, portfolio optimization, and capital asset pricing. 'A' Level mathematics is an important pre-requisite for a good understanding of financial mathematics. Mathematics areas of particular interest are differential calculus, progressions, binomial and Taylor expansions, numerical methods and logarithms.

CFI 1204 Accounting and Financial Analysis IB   **10 Credits**

The module builds on the foundation laid in CFI 1102. Emphasis is on analysing, summarizing, reporting, and interpreting financial information. Upon completion, students should be able to prepare, analyse and interpret financial statements. The objective of the module is to provide students with hands-on experience in financial statement analysis. Students will be exposed to general tools of financial analysis, theoretical concepts, and practical valuation issues. By the end of the module, students should be comfortable with using firms' financial statements to develop an understanding of their performance and to establish a basis for making reasonable valuation estimates. Students will be introduced to financial packages that are used in analysing financial statements and decision making.

CFI 1205 Financial Markets and Regulation   **10 Credits**

The module gives an overview of the characteristics of financial markets, including their structure and organization. Its aim is to provide a thorough understanding of both the mechanics and the operations of financial markets, whilst paying particular attention to the trading and evaluation of securities in equity and bond markets. It also covers a study of the structural features of debt markets, credit analysis for corporate bonds, term structure analysis of interest rates and bond valuation, assessing sources of risk for debt portfolios, including the role of duration and convexity in evaluating the effects of interest rate changes. This module will address the institutional and regulatory framework for capital markets and the role that financial institutions such as banks, bank holding companies, investment banks, and investment funds perform in these markets. The role of government regulation and its effects on financial innovation are analysed. The module will also analyse those elements of financial markets that set it aside from other regulated sectors in the economy. Upon completion of the module, participants should be able to demonstrate an understanding of recent developments in the theories and practices of financial sector regulation.

CIN 1207 Quantitative Analysis for Business II   **10 Credits**

This module seeks to introduce students to the application of quantitative methods to the business environment. Students will be expected to grasp mathematical tools which are used for analysing data and to be able to accurately interpret it and apply them in decision making.

CMK 1209 Principles of Marketing   **10 Credits**

This module explores marketing functions; the environment of marketing; marketing information systems and marketing research; the marketing mix; consumer behaviour; the social responsibility of marketing; public policy with respect to marketing practices.

YEAR II
Semester I
CFI 2101 Corporate Finance I   **10 Credits**

The aim of the module is to identify the objective that corporate finance managers pursue or ought to pursue in order to satisfy the needs of corporate stakeholders and to develop, in students, concepts and corporate analytical tools that will enable them to meet this objective. To this end, the module will cover the following critical areas: goals of a firm and the agency theory; time value concepts and valuation of bonds and shares; capital budgeting under certainty; operating and financial leverage; introduction to portfolio theory and capital asset pricing; the stock market and other sources of long-term capital; innovations in corporate finance.

CFI 2107 Introduction to Financial Computing   **10 Credits**

Financial Computing comprises both Computational Finance (algorithmic trading, risk management, market simulation and portfolio optimisation) and Financial IT (financial software engineering, cloud computing, GPU and scalable high-performance computing). The module aims to provide students considering careers in Finance and Investment (such as Analysts, Traders) with an in-depth understanding of financial services and significant computing and statistical skills. Content will include: Financial Instruments, Financial Software Systems and IT used in the Financial Industry. The module will contain a basic practical element involving financial modelling and the use of software packages common to the Financial Services industry. Specific areas covered are: Time value of money; Bonds, mortgages, and annuities; Duration, convexity, and immunization; Yield curve, forward rate, and spot rate; Option pricing; Derivatives basics; The random walks; stochastic calculus, and Ito integral; Risk-neutral valuation; Risk management; Fixed-income securities with embedded options and interest rate derivatives; Mortgage-backed securities (MBS); Numerical methods; Monte Carlo methods;; Least-squares technique; Solving partial differential equations; Yield curve fitting; GARCH models; Interest rate models and calibration.

CFI 2108 Accounting and Financial Analysis IIA   **10 Credits**

This module is a continuation of the study of accounting principles with in-depth coverage of theoretical concepts and financial statements. Topics include comparison of International Financial Reporting Standards (IFRS) with Generally Accepted Accounting Principles and

extensive analyses of financial statements. Upon completion, students should be able to demonstrate competence in the conceptual framework underlying financial accounting, including the application of financial standards. The module will give students the tools to perform a fundamental analysis of a company. Focus will be on developing these skills for assessing quality of financial statements, potential accounting distortions, recasting financial statements, DuPont framework , cash flow analysis, prospective analysis, using accounting numbers in forecasting ,forecasting for valuation, and investor communication. Students must understand the effects of alternative financial reporting policies on financial statements and ratios and be able to execute appropriate adjustments to enhance comparability between companies. In addition, students must be alert to differences between a company's reported financial statements and economic reality.

CFI 2110 Corporate Law and Practice   **10 Credits**

The module introduces students to the legal environment and statutes that affects the operation of companies and other corporate bodies. Students are guided to understand the process of company formation and the characteristics of different types of companies, including private companies, public companies, companies limited by guarantee, cooperative companies and statutory corporations. An overview of the purpose and practices of the Companies Registrar's Office that confronts financial practitioners in today's environment is explored. Students get an opportunity to understand the constitutions of companies that include the memorandum and articles of association; Legal principles that affect the raising company capital, through issuing new shares and allotment and other types of redeemable securities, including share transfers, protections offered to minority shareholders, the purpose a practice of judicial management, reconstruction of and the winding up of companies; the types of meetings, resolutions, notices, proxies, quorum and minutes of meetings, that include the general meetings and the meetings of the boards of directors; the election of directors, rotation, and the role, rights and duties and liabilities of directors and the board chairperson; the appointment to office, rights and duties and the vacation from office of the company secretary; the purpose and conducting of board meetings, composition, roles, procedures and the delegation of authority to committees. The concept of company membership and the rights and duties of members is explored; the role, appointment and removal of auditors of the company; the generation of annual reports, retention or records, statutory registers and filing with the Registrar of Companies

CFI 2111   Microfinance and Entrepreneurial Development   **10 Credits**

The module aims to enlighten broad understanding of the major issues in microfinance practices and development, with special emphasis on small scale businesses and entrepreneurial development. Africa's future development hinges to a large extent on the effective harnessing of the potentials in the informal sector and the myriad of informal institutions that dot the landscape in many of these economies. Given the sizeable number of people engaged in SMEs in Zimbabwe who lack access to financial services, a thorough understanding of the sustainability and growth of these institutions is germane to the growth issue in many developing countries. This multi-faceted module explores the core aspects of entrepreneurial and small business

development including value-add partnerships, technical assistance programs, financing, business incubation and more. Thus, this module will identify, explain and discuss the role of microfinance institutions in socio-economic development, review how these institutions are regulated and unravel some of the myths that have dogged their operations for many decades with a view to unveiling their potentials for growth and development in many developing countries. Proposed Topics include: The Nature of Microfinance and Development; Informal Microfinance Institutions and Markets and Informal Finance; Microfinance for Small Scale Enterprises; Institutional Self Sufficiency, Leverage and Outreach; The design of financial programmes for the poor; Measuring Impact and Financial and Social Performance; Microfinance Commercialization and Regulation; Role of Microfinance in Socio-Economic Development; Microfinance in a Global context and the future of the microfinance industry.

CFS2105 Tax Law and Practice I   **10 Credits**
The module introduces students to taxation and the tax system in Zimbabwe by covering topics that include an introduction to and current trends in the tax system in Zimbabwe. The concepts of and the difference between tax avoidance and tax evasion is explored. The sources of tax law, including an appreciation of the role of statutes, case law in Zimbabwe's tax system and the practices of the Commissioner of Taxes. The principle of gross income and the sources of income and the taxation of fringe and other benefits are explored in detail. Students get an appreciation of the concepts of exempt income, deductions from income, capital allowances and an appreciation of the final deduction system and NSSA contributions. The calculation of income tax liability for individuals and credits that accrue to them from employment and simple types of business that include sole traders, partnerships, farming income and an introduction to the taxation of business income principles of capital gains taxes is covered. The module also gives an overview of the role and appreciation of taxation in personal financial management.

CAC 2105 Management and Cost Accounting IA   **10 Credits**
The module aims at providing an understanding of the principles, concepts and techniques of Management and Cost Accounting and helps students develop an ability to apply this knowledge to practical situations related to cost ascertainment, cost control and planning.

CBA 2108 Treasury Management I   **10 Credits**
The two-semester module seeks to equip students with a thorough understanding of treasury department operations of a financial institution. It covers areas such as structure of a treasury department, treasury management planning, risks in a treasury department, risk management strategies in a treasury department, fund management, liquidity management and asset and liability management. The first semester module (Treasury Management I - CBA 2105 will cover the following topics: Introduction to Treasury Management, Financial Markets, Structure of a Treasury Department, Treasury Management Planning, Liquidity Management and Term Structure of Interest Rates.

YEAR II
Semester II

CFI 2201 Corporate Finance II   **10 Credits**
The aim of the module is to develop further, in students, concepts and corporate financial analytical tools. The areas covered will include the following: Introduction to capital structure theory and practice; Cost of capital and valuation; Introduction to capital budgeting under uncertainty; Dividend policy theory and practice; corporate working capital management; and innovations in corporate finance.

CFI 2205 Research Methods in Finance and Economics   **10 Credits**
The objective is to provide treatment of research methods and simple statistical application that will enable students to carry out sound research projects. The module enables students to do applied research by introducing students to empirical methods in finance and economics. It introduces statistical techniques used in the analysis of economic and financial data. Topics covered include: descriptive statistics, probability distributions, sampling and sampling distributions, point estimation and interval estimation, hypothesis testing, regression analysis, time-series analysis, elementary discussion of multicollinearity, autocorrelation, heteroscedasticity and principles of modelling. It also includes empirical techniques with specific emphasis on multivariate and nonlinear methods, event-studies; asset prices mean variance estimation techniques and other topics in behavioural finance.

CFI 2207 Financial Information Systems   **10 Credits**
The module provides instruction in the impact and use of information technology in the financial services sector, including exposure to and experience with different kinds of financial services software applications. Upon successful completion of the module, students will understand information technology's impact on the financial industry and markets; have knowledge of the leading-edge applications of information technology in financial services firms; understand financial automation and how industry continues to be altered by telecommunications and information systems; be able to implement computer-based financial analysis and apply financial models to solve problems; understand how to use financial decision support software; have knowledge of specific classes of financial information systems such as electronic communication networks (ECNs) and multilateral auction systems, trader workstations, fund transfer networks and back office systems; and be able to apply the knowledge and understanding they have gained in real-world financial service contexts. It focuses on payment products and financial markets, their key systems, how they evolved and where might they be going, algorithmic trading, market structure dark, liquidity and electronic markets. Straight through processing, risk management and industry consolidation and convergence will be viewed in light of current events.

Think in other terms

CFI 2208 Accounting and Financial Analysis IIB   **10 Credits**

The module examines concepts; conventions, standards, issues, the regulatory regime and, the reasons and progress towards harmonization of the preparation of Financial Statements and the Analysis of the Financial Statements prepared on these bases. Emphasis is on special problems which may include leases, bonds, investments, ratio analyses, present value applications, accounting changes, and corrections. Upon completion, students should be able to demonstrate an understanding of principles involved and display an analytical problem-solving ability for the topics covered. Accounting computer problems involving preparation and completion of spreadsheets are integrated throughout the module. Areas to be covered include financial reporting quality and application of financial statement analysis to debt and equity investments. Frequently used tools and techniques for evaluating companies include common-size analysis, cross-sectional analysis, trend analysis, and ratio analysis. Beyond mere knowledge of these tools and techniques, however, the student must recognize the implications of accounting choices on the quality of a company's reported financial results. Then the student can apply financial analysis techniques to tasks such as the evaluation of past and future financial performance, credit analysis, the screening of potential equity investments, and other emerging needs.

CFS 2206 Tax Law and Practice II   **10 Credits**

The module develops further on the principles of taxation covered in Tax Law and Practice I to introduce students to the administration of the tax system in Zimbabwe, corporate taxes, other special taxes that are applicable in Zimbabwe and the concept of tax planning. An introduction to value added tax is also covered. The administration of corporate payment dates that is applicable to companies and other corporate and business bodies is explored. Special types of taxes that are applicable to different entities are covered, including the computation of tax liability for companies, mining operations, trusts, estate duty and other types of investment income that include the taxation of dividends. An integral part of this module is the development of the principle of tax planning and how corporations minimise the taxes payable. The role of the tax planner in the corporate environment and in private advisory capacity is explained; International aspects to taxation including double tax agreements between Zimbabwe and other countries. It develops further the concept of capital gains taxes in as far as it applies to the taxation of business and investments.

CFS 2205 Public Finance and Economics   **10 Credits**

The module is meant to enable students to have a deeper understanding of the operations of public finance from the theoretical and practical point of view. It commences by looking at the nature and scope of public finance, theory of public goods, welfare theories and proceeds to consider the financial and economic role of the government. It also examines the scope and control of public expenditure, the main methods of diverting resources from private to public use by way of taxation, financial and macroeconomic problems, financial and macro-economic policies, and sources of finance/revenue. Because of the prominence of taxation as a source of

public revenue, the module provides students with a conceptual framework for examining government taxing so as to analyse current tax policy and provide proposals for reform. The focus will be on evaluating the impact of taxation on the allocation of resources and the distribution of income.

CFS 2205 Tax Law and Practice II   **10 Credits**
The module develops further on the principles of taxation covered in Tax Law and Practice I to introduce students to the administration of the tax system in Zimbabwe, corporate taxes, other special taxes that are applicable in Zimbabwe and the concept of tax planning. An introduction to value added tax is also covered. The administration of corporate payment dates that is applicable to companies and other corporate and business bodies is explored. Special types of taxes that are applicable to different entities are covered, including the computation of tax liability for companies, mining operations, trusts, estate duty and other types of investment income that include the taxation of dividends. An integral part of this module is the development of the principle of tax planning and how corporations minimise the taxes payable. The role of the tax planner in the corporate environment and in private advisory capacity is explained; International aspects to taxation including double tax agreements between Zimbabwe and other countries. It develops further the concept of capital gains taxes in as far as it applies to the taxation of business and investments.

CAC 2205 Management and Cost Accounting IB   **10 Credits**
The module is a continuation of Management and Cost Accounting IA. It is designed to equip students with a thorough and comprehensive knowledge related to Accounting techniques in planning, control decision making under various conditions and implementation of management policies.

CBA 2208 Treasury Management II   **10 Credits**
The two-semester module seeks to equip students with a thorough understanding of treasury department operations of financial and non-financial institutions. It covers areas such as structure of a treasury department, treasury management planning, risks in a treasury department, risk management strategies in a treasury department, fund management, liquidity management and asset and liability management. Treasury Management I (CBA 2108) will cover the following topics: Introduction to Treasury Management, Financial Markets, Structure of a Treasury Department, Treasury Management Planning, Liquidity Management and Term Structure of Interest Rates. Treasury Management II (CBA 2208) will cover the following topics: Risk in a Treasury Department, Risk Management Strategies in a Treasury Department, Asset and Liability Management and Fund Management.

YEAR III

CFI 3001 Industrial Attachment   **120 Credits**

This academic year is about work-related activities consisting continuous assessment, academic supervision and evaluation culminating in submission of a final year report which is an equivalence of an industry-oriented research activities dissertation.

YEAR IV SEMESTER I

CFI 4102 International Finance   **12 Credits**

The module seeks to introduce students to international financial decision making regarding investment, financing, and risk management. Students are guided to an understanding of drivers of foreign direct investment, incorporating international investment in corporate strategy development, managing political and country risk in foreign investment, designing a global financing strategy that minimizes costs and risks, foreign exchange markets, foreign exchange parity conditions, and foreign exchange rate forecasting. The module also equips students with tools for multinational capital budgeting and investment analysis, as well as foreign exchange risk management. Students are further introduced to multinational working capital management as an extension of domestic working capital management.

CFI 4103 Institutional Investment Analysis   **12 Credits**

This module is designed to evaluate, describe and make recommendations on various investments for both private and institutional investors within the context of available investment vehicles in the investment markets. The emphasis will be on the development of analytical skills and expertise required in carrying out the country, company and securities analysis in order to arrive at informed institutional investment decisions. Various investment analysis techniques encompassing investment mathematics and statistics will be utilized in order to avail robust information crucial for making sound institutional investment decisions.

CFI 4108 Financial Econometrics and Data Analysis   **12 Credits**

The module provides an introduction to econometric techniques used in the analysis of financial data. Topics include: Statistical Properties of Financial Returns Matrix Algebra, Regression and Applications in Finance, Maximum Likelihood Estimation, Univariate Time Series and Applications to Finance, Modelling Volatility – Conditional Heteroscedastic Models, Modelling Volatility and Correlations – Multivariate GARCH Models, Vector Autoregressive Models, Limited Dependent Variable Models. Further, this module will discuss apply statistical techniques that are particularly well suited for analysing financial data. Candidates should be able to collect, analyse, and interpret data relevant to decision-making, identify and interpret trends, use excel spreadsheets to calculate statistical measures and interpret excel outputs, apply relevant statistical techniques to solve the underlying problems/issues, and report on statistical findings.

CFI 4109 Financial Engineering and Asset Pricing   **12 Credits**

This module, which is a follow up to Financial Mathematics and Quantitative Corporate Finance I and II, examines, in greater detail, the concepts, issues and practical limitations in the valuations of both financial and real assets, in order to empower students to make decisions that optimize the needs of corporate stakeholders. Topics covered will include: Efficient market hypothesis, Capital asset pricing model, Capital market theory; Arbitrage pricing theory, Option pricing theory, Capital budgeting under uncertainty and existence of real options and Business valuations. The module aims to give a pragmatic and applied approach to statistical techniques relevant to modern financial analysis. Students will also study the fundamentals of financial innovation in quantitative finance. This will involve the ability to explore and use financial instruments to restructure an existing profile into one having more desirable properties. It enables students to appreciate the need to restructure financial instruments through mathematical analysis so as to keep pace with dynamic financial systems. Topics covered include: major valuation techniques in a variety of contexts including arbitrage pricing, interest rate futures, forward rate agreements (FRAs), bond and stock Index futures, swaps, equity option, currency option, fixed income and other exotic derivatives, structured finance and other fundamentals of innovation in quantitative finance.

CFI4110 Corporate Governance and Ethical Standards   **12 Credits**

The module seeks to develop in students a firm understanding of the basics of Corporate Governance by getting insights into different corporate governance systems. It includes issues relating to fiduciary duties, risk oversight, audits, internal controls and crisis management. In addition, it focuses on ethical issues, mainly the ability to identify and deal with ethical dilemmas and unethical practices in business.

YEAR IV
Semester II

CF1 4201 Corporate Financial Strategy and Restructuring   **12 Credits**

The aim of the module is to develop, in students, corporate financial strategies which should allow them to continuously manage firms in a manner that is both value additive and market competitive. The areas covered will include: Capital structure and financial strategy, Financial engineering involving synthetic corporate security issues: Leasing finance, Term structure of interest rate theory and corporate interest rate risk management options; Incentives, information and corporate control (to include: Agency problem, information asymmetry). Mergers and acquisitions, Business valuations); Financial distress and financial restructuring (to include sell offs, spin offs, equity carveouts, ownership restructuring, debt equity swaps etc.)

CFI 4203 Institutional Investment Management   **12 Credits**

This module will enable the students to gain a broad understanding of the theory and practice of institutional investment to equip them to undertake the management of funds for institutional

Think in other terms

clients. The module will elucidate on the characteristics of the principal Zimbabwe and global managed investing institutions and their investment objectives including ethical and environmental considerations, the matters of statutory and non-statutory regulations concerning the practice of fund management and fund manager.

CFI 4205 Real Estate Investment and Finance   **12 Credits**

This module looks at how various investors in property or real estate put money into the asset. The major focus will be on the property markets, the returns obtainable, property performance measurement, securitisation, refurbishment, rehabilitation and redevelopment, risk peculiar to property and valuation. This module will also give prominence to global property markets, and the impact of globalization on global property returns. Further this module is intended to impart deeper knowledge about sources of property development finance. In pursuance of this goal, special attention will be given to the two main property finance branches of Corporate Finance and Project Finance. Shares issues, Loan stocks, debt finance, Lease finance and short-term finance will be examined under corporate funding while partnerships, unitization, securitization, finance matrix will be dealt with under project finance. The use of derivatives in property finance, multi-option facilities, remodule loans, non-remodule and limited remodule, joint ventures will be explored in this module.

CFI 4206 Financial Modelling   **12 Credits**

This is purely a practical module, which involves the use of computer packages to model data and challenges in finance, investment and economics. It covers Corporate Finance Models (such as Financial Statement Modelling, Operating Budgets, Capital Budget, Covariance, Beta estimation, Value at Risk, Event studies), Option, Pricing Models, Sensitivity Analysis, Scenario Analysis, and Computer Simulations and other fundamental innovations.

CFI 4208 Risk Analysis and Management   **12 Credits**

The aim of the module is to introduce the students to modern techniques of analysing and identifying financial risk. Areas to be covered will include: Sources of financial risk, Value at Risk (VaR) techniques, Mean-variance analysis, Bond duration, Convexity and dispersion, Utility index models, Simulation, Stress testing i.e. mechanical approaches to stressing testing, Credit risk analysis and Liquidity risk analysis. The module will also look at the use of models to hedge risk exposures, creation of instruments to enable investors to transfer risk, enhance liquidity; and the arbitraging process. At the core of this will be derivatives which will encompass: Options, Forwards, Futures, and Swaps etc. It will also include: Decision making, Portfolio selection, Credit risk, Liquidity risk, Legal risk and Operational risk management and Bond immunization, emerging issues in risk management. The module will also look at the use of models to hedge risk exposures, creation of instruments to enable investors to transfer risk, enhance liquidity; and the arbitraging process. At the core of this will be derivatives which will encompass: Options, Forwards, Futures, and Swaps etc. It will also include: Decision making, Portfolio selection, Credit risk, Liquidity risk, Legal risk and Operational risk management and Bond immunisation.

Think in other terms

CFI 4006 Research Project   **20 Credits**

The project is meant to give students an opportunity to apply the knowledge gained over the period. Students undertake research in an area of their choice but limited to the taught modules in liaison with their supervisors to produce a project which has practical applications/solutions.

BACHELOR OF COMMERCE HONOURS DEGREE IN FISCAL STUDIES

PREAMBLE

1.1 The Bachelor of Commerce Honours Degree in Fiscal Studies (BComHFisc) programme is a four-year honours degree programme. The degree programme focuses on revenue generation and expenditure by the state and its agents, particularly areas of customs, taxes, and excise duties.

1.0 PROGRAMME PROFILE

Degree Profile of Bachelor of Commerce Honours Degree in Fiscal Studies	
Institution:	**National University of Science and Technology**
Type of Degree:	**Honours**
Credit Load:	**540 credits**
Level:	**SADC-QF - Level 8**
Accreditation Organisation(s):	
Period of reference:	

Purpose of the Programme

The degree programme offers opportunity to students to cover modules in an environment characterized by forces of globalization. The programme provides undergraduates with a rigorous economics-oriented education aimed at developing a broad understanding of the theoretical, empirical, and institutional aspects of revenue generation and administration, particularly customs/tax policy implementation and administration. Survivals of economies depend on personnel who are able to generate adequate revenue for the state regardless of economic forces at play.

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Areas of Study	

Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.	Freight forwarding and logistics, accounting and financial analyses especially for government and quasi-government sectors, public finance and economics, customs and taxes information systems, computer applications in revenue management, tax computations and planning, compute customs and excise duty, national income accounting, taxation accounting, financial modelling, ethics, governance and integrity
Specialist Focus:	Revenue generating tools and techniques using taxes, customs duty and excise duty. Also includes use of modern tools and techniques in computation and administration of tax and customs authority as well as other revenue generating entities of the government and its agents as well as central government.
Orientation:	Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.
Distinctive Features:	The programme builds the research-technology-innovation continuum and focuses on knowledge development and application using a student-centred approach

CAREER OPPORTUNITIES AND FURTHER EDUCATION

Employability:	Careers as customs and taxes economists and practitioners, tax consultants at corporation, SME, NGO and governmental levels, regional and international revenue authorities, research institutions, as well as lecturers at universities and colleges. Some can pursue higher degrees in other universities. More importantly, this programme is designed to offer students with undergraduate knowledge and skills in setting up and running their own businesses and consultant firms especially in transport, logistics, manufacturing enterprises, institutions involved in international economic

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	cooperation, or working as a custom broker. .
Further Studies:	Master's and doctoral studies Business Administration, Development Finance and Economics, Customs, Taxes and Fiscal Studies and related fields

PROGRAMME DELIVERY

Teaching and Learning Methods:	An eclectic mixture of teaching methods which include but are not limited to lectures, tutorials, case studies, computer laboratory practicals and simulations, field practicals, group work, research projects as well as their dissertations, mini-projects, end of semester professional examinations, continuous assessment tests, written assignments, oral presentations, industrial visits, industrial attachment, research project, individual independent study
Assessment Methods:	Written examinations, tests, assignments, practical and oral presentations and tests, seminar presentations, industrial attachment report, research project report, continuous assessments

PROGRAMME COMPETENCES

Generic:

Multidisciplinary: Ability to draw appropriately from multiple academic disciplines to define and solve problems based on understanding of complex phenomena

Quantitative and innovative reasoning: Capability to draw on big data and use analytics for informed decision making and strive to seek new ways of doing things

Communication skills: Ability to communicate effectively and to present information orally and in writing and using ICTs to both expert and non-expert audiences

Analysis and synthesis: Capacity for analysis and synthesis using logical arguments and proven facts.

Ethical commitment: Professional integrity and awareness of impact of science and technology on society and the environment

Entrepreneurial skills: Capability to identify and create new business ventures based on knowledge and new thinking paradigms

Discipline specific:

Technology development skills: Ability to develop new themes, models, problem solving techniques in finance and

Problem-solving skills: Ability to solve a wide range of problems in related finance by identifying their fundamental aspects.

Exit Level Outcomes

Problem solving

Identify, formulate, analyse and solve complex financial problems creatively and innovatively.

Application of scientific knowledge

Think in other terms

Apply knowledge of mathematics, quantitative techniques in finance, financial software to solve economic and financial problems.

Investigations, experiments and data analysis

Demonstrate competence to design and conduct investigations and experiments.

Information technology knowledge

Demonstrate competence to use appropriate information technology skills and competences

Professional and technical communication

Demonstrate competence to communicate effectively, both orally and in writing, with audiences in all sectors of the economy and at various levels, and the community at large.

Sustainability and financial activity

Demonstrate critical awareness of the sustainability and impact of financial activity on the social, economic, financial sectors and business environment in general.

Individual, team and multidisciplinary working

Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments.

Independent learning ability

Demonstrate competence to engage in independent learning through well-developed learning skills.

Customs, Taxes and Financial professionalism

Demonstrate critical awareness of the need to act professionally and ethically and to exercise judgment and take responsibility within own limits of competence.

Customs, Taxes and Financial management

Demonstrate knowledge and understanding of customs, taxes, economic, logistics management principles and economic decision making.

2.0 ENTRY REQUIREMENTS

3.1 Normal Entry

For normal entry, candidates should have passed at least 5 subjects at Ordinary Level including Mathematics and English; and, have good passes in at least two subjects at 'A' Level from Economics and any other related commercial subject(s) such as: - Accounting, Mathematics, Statistics, Management of Business/ Business Studies, Computer Science, Geography.

3.2 Special Entry

3.2.1 Candidates should have minimum of a National Diploma in Banking and Finance, Accountancy or recognised equivalent.

3.2.2 A candidate who holds a Higher National Diploma in Accountancy, Banking and Finance, or an equivalent qualification from a recognized institution may be considered for direct entry into semester two of the degree programme provided necessary modules have been covered after mapping the passed modules with our programme.

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3.2.3 Special entry shall be in accordance with the General Regulations.

3.3 Mature Entry

3.3.1 Potential students who are at least 25 years old for men and 23 years for women on the day of academic year and not legible for entry under the normal entry requirements apply for mature entry provided;

3.3.2 They have passed at least five approved 'O' Level subjects including Mathematics and English language,

3.3.3 Applicants wishing to be considered under mature entry provisions may have to attend interviews and/or specific tests administered by the university to assess their general suitability for the admission.

3.3.4 Meeting the minimum admission requirements does not necessarily ensure admission. Admission is based on the number of places available and is awarded based on merit. The Department of Finance reserves the right to interview candidates to assess their suitability for admission into this programme.

3.0 DURATION OF PROGRAMME AND DELIVERY

3.1 The Programme consisting of coursework shall normally be completed over a maximum period of 4 years on a full-time and/or block-release basis.

3.2 On both basis, delivery shall be allocated as follows:

Year of Study	Number of Modules
Year 1	14
Year 2	14
Year 3	Industrial Attachment
Year 4	10
Total Number of Modules	**38**
	1 Research Project

3.3 Programme of Study

3.3.1 The programme constitutes four academic years on a full-time and/or block-release basis, each academic year representing a part of the degree programme. Year III shall be spent in industrial attachment with an appropriate organisation.

Think in other terms

3.4 Mode of Delivery
3.4.1   The programme will be offered on a full-time and/or block-release basis and may be carried out at satellite centres.

3.5 Taught Modules
3.5.1   Each module shall be assessed by coursework and a formal examination.
3.5.2   Practical modules shall fully be examinable by coursework, of which the weighting of the coursework shall be: Practical Work 60%; Assignments and Tests 40%.
3.5.3   For theoretical modules the coursework shall be 30% and the formal examination shall be 70%.

4.0 INDUSTRIAL ATTACHMENT/ WORK PLACEMENT
4.1 In both semesters I&II students will spend at least eight (8) months of this period on approved industrial attachment.
4.1.1   The Industrial Attachment will be governed by the General University regulations.
4.1.2   Where a student obtains less than 50% in the Industrial Attachment Continuous assessment, the student is required to repeat Industrial Attachment.
4.1.3   Continuous Assessment shall contribute 50% to the final Industrial Attachment mark.
4.1.4   The Final Assessment mark shall be determined on the basis of the final report assessment (40%) and oral presentation assessment (10%).

5.0 ASSESSMENT AND SCHEME OF EXAMINATIONS
5.1 The assessment of attainment and scheme of examination regulations for this degree programme must be read in conjunction with General Regulations of National University of Science and Technology.

5.2 Weighting
The determination of the overall degree programme aggregate will be as follows:

Part II -   30%
Part III - 20%
Part IV - 50%

5.3   Classification of the Degree
5.3.1   Candidates must satisfy the examiners in all the prescribed modules and in all requirements for the programmes.

5.3.2 For the degree to be awarded, the minimum number of credits of 540 must be satisfied.

5.4   Programme Duration
5.4.1   In accordance with the General Regulations, the degree requires the study of a range of modules over four years (8 semesters). This includes one academic year of Industrial attachment.

Think in other terms

PROGRAMME SUMMARY

YEAR I
Semester I

Module Code	Module Description	Credits
CFI1102	Accounting and Financial Analysis IA	10
CBA1105	Microeconomics	10
CIN1109	Commercial Law	10
CIN1106	Quantitative Analysis for Business I	10
CBU1102	Business Communication	10
CBU1108	Principles of Management	10
CTL1101	Conflict Transformation and Leadership	10
Total Credits		70

Semester II

Module Code	Module Description	Credits
CFS1201	Customs and Excise Laws	10
CFS1202	Freight Forwarding and Logistics	10
CFI1202	Introduction to Information Technology and Programming *(Practical)*	10
CFI1204	Accounting and Financial Analysis IB	10
CBA1206	Macroeconomics	10
CIN1207	Quantitative Analysis for Business II	10
CBU1208	Principles of Marketing	10
Total Credits		70

YEAR II

Semester I

Module Code	Module Description	Credits
CFS2105	Tax Law and Practice I	10
CFS2102	Computer Applications in Revenue Management *(Practical)*	10
CFS2103	Value Added Tax I	10
CFS2104	Audit Principles and Skills	10
CFI2101	Corporate Finance I	10
CFI2108	Accounting and Financial Analysis IIA	10
CFI2110	Corporate Law and Practice	10
Total Credits		70

Semester II

Module Code	Module Description	Credits
CFS2204	Customs Management Theory and Practice I	10
CFS2205	Public Finance and Economics	10
CFS2206	Tax Law and Practice II	10
CFS2207	Customs and Taxes Information Systems (Practical)	10
CFI2201	Corporate Finance II	10
CFI2205	Research Methods in Finance and Economics (Practical)	10
CFI2208	Accounting and Financial Analysis IIB	10
Total Credits		70
Total Year Credits		140

YEAR III

Semester I&II

Module Code	Module Description	Credits
CFI3001	Industrial Attachment	120

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YEAR IV

Semester I

Module Code	Module Description	Credits
CFS4101	Customs Management Theory and Practice II	12
CFS4103	Value Added Tax II	12
CFS4105	Taxation Accounting	12
CFS4107	Corporate Governance, Ethics and Integrity	12
CFS4108	Audit Practice and Investigation	12
Total Credits		60

Semester II

Module Code	Module Description	Credits
CFS4203	Economic and Fiscal Policy	12
CFS4204	National Income Accounting	12
CFS4205	Interpretation of Statutes and Legal Drafting	12
CFS4206	International Economic Integration and Trade	12
CFI4206	Financial Modelling (Practical)	12
CFS4200	Research Project	20
Total Credits		80
Total Credits Year IV		140
Overall Credits for the Programme		540

Think in other terms

MODULE SYNOPSES

YEAR I
Semester I
CFI 1102 Accounting and Financial Analysis I   **10 Credits**
This module introduces basic financial accounting principles for a business and presumes no previous Finance and Accounting knowledge. Upon completion, students should be able to gather financial information and to demonstrate an understanding of accounting principles and apply those skills to a business organization. Module should cover techniques of identifying and describing information sources that financial analysts use in financial statement analysis besides annual financial statements and supplementary information and the steps in the financial statement analysis framework. Topics include the complete accounting cycle, accounts hierarchy (account classes, account groups, subsidiary accounts); journal entries related to sales, purchases, collections, payments, and expenses; posting; accounting of value added tax; payroll accounting; accounting of current assets; trial balance, preparation of financial statements for different types of business entities and closing/opening entries; petty cash and various types of reconciliation statement analyses.

CBA 1105 Microeconomics   **10 Credits**
This module will study markets and the decision making embedded therein. It will discuss standard economic arguments that free markets work "best", the conditions under which these arguments are most believable, and policy options when these conditions are not met. The module will examine both competitive markets, for which basic models of supply and demand are most appropriate, and markets in which agents act strategically, for which game theory is the more appropriate tool. The module will cover, inter alia, economic theory and the market economy, consumer theory, choice under uncertainty, production and costs, efficiency and trade, market equilibrium, game theory and imperfect competition.

CIN 1109 Commercial Law   **10 Credits**
The module introduces students to the basic legal principles governing the business environment. Focus will be placed on definition of contracts, requirements of a contract, breach of a contract, remedies for breach of contracts, law of agency, contract of sale, law of business organisations and insurance contract.

CIN 1106 Quantitative Analysis for Business I   **10 Credits**
The module introduces students to the mathematical tools relevant for application to the business environment. Students will be expected to recognise the value of quantitative methods in analysing data and interpreting it in order to make relevant business decisions.

CBU 1102 Business Communication   **10 Credits**

The module explores the general comprehension and expression, report writing, comprehension of ideas, development of different styles and the use of English in a business setting, communicating skills, letter writing, committee documents, use of questionnaires, note-taking and summarising.

CBU1108 Principles of Management   **10 Credits**

The module examines the history and development of management thought, functions of management, organisational structures, decision making, communication, centralisation and decentralisation, delegation, leadership and motivation, controlling budgeting and non-budgetary controls.

CTL 1101 Conflict Transformation & Leadership   **10 Credits**

The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development.

YEAR I
Semester II
CFS 1201 Customs and Excise Laws   **10 Credits**

This module seeks to examine the customs law act and the regulations that govern the importation of goods. The valuation of imported goods for customs purpose is also going to be covered. The module is guided by the Customs and Excise Act of Zimbabwe is primarily designed to provide students with knowledge of Customs related laws of Zimbabwe and how it is affected by International Customs norms or standards such as the Harmonised System and the GATT valuation code. This in turn will provide the basis for the management and administration of the customs and excise and for matters relating thereto and connected therewith.

CFS 1202 Freight Forwarding and Logistics   **10 Credits**

The module provides basic knowledge of cargo, traffic management skills, and an understanding of the unique requirements of international transportation and logistics within the confines of international best practices. Candidates will gain insight into cargo handling related to required shipment documentation and communication. Expected outcomes include knowledge of intermodal transportation, supply chain packaging, warehouse operations and track protection.

CFI 1202 Introduction to Information Technology and Programming   10 Credits

The module provides a brief overview of the discipline of computer science and information technology topics including computer architecture, operation systems and networks, automata and models of computation, programming languages and compilers, algorithms, databases, security and information assurance, artificial intelligence, graphics, and social/ethical issues of computing. This module also provides an introduction to computer programming using the Python programming language, which covers basic procedural techniques such as variables, data types, selection, iteration, and functions. It will also introduce students to object-oriented

Think in other terms

programming. It also looks at various general programming concepts, such as algorithm design and debugging. By the end of the module, students should be able to construct a moderately-sized Python program.

CFI 1204 Financial Accounting and Analysis IB   **10 Credits**
The module builds on the foundation laid in CFI 1102. Emphasis is on analysing, summarizing, reporting, and interpreting financial information. Upon completion, students should be able to prepare, analyse and interpret financial statements. The objective of the module is to provide students with hands-on experience in financial statement analysis. Students will be exposed to general tools of financial analysis, theoretical concepts, and practical valuation issues. By the end of the module, students should be comfortable with using firms' financial statements to develop an understanding of their performance and to establish a basis for making reasonable valuation estimates. Students will be introduced to financial packages that are used in analysing financial statements and decision making.

CBA 1206 Macroeconomics   **10 Credits**
The module is designed to address how economists model the relationships between aggregate economic variables and examine how various fiscal and monetary policies can affect the results. The main goal is to improve students' economic literacy and ability to apply economic models to analyse real world events. This module will be taught from an equilibrium perspective. This means the module will work with economic agents that optimize and with aggregate consistency conditions. Along with building basic economics intuition, the module will be centred on constructing and understanding macroeconomic models. These models will be used to discuss the theory of long-run economic growth and short-run economic fluctuations and to analyse macroeconomic policy, in particular fiscal policy.

CIN 1207 Quantitative Analysis for Business II   **10 Credits**
This module seeks to introduce students to the application of quantitative methods to the business environment. Students will be expected to grasp mathematical tools which are used for analysing data and to be able to accurately interpret it and apply them in decision making.

CMK 1209 Principles Of Marketing   **10 Credits**
This module explores marketing functions; the environment of marketing; marketing information systems and marketing research; the marketing mix; consumer behaviour; the social responsibility of marketing; public policy with respect to marketing practices.

YEAR II
Semester I
CFI 2105 Tax Law and Practice I   **10 Credits**
The module introduces students to taxation and the tax system in Zimbabwe by covering topics that include an introduction to and current trends in the tax system in Zimbabwe. The concepts of and the difference between tax avoidance and tax evasion is explored. The sources of tax law,

including an appreciation of the role of statutes, case law in Zimbabwe's tax system and the practices of the Commissioner of Taxes. The principle of gross income and the sources of income and the taxation of fringe and other benefits are explored in detail. Students get an appreciation of the concepts of exempt income, deductions from income, capital allowances and an appreciation of the final deduction system and NSSA contributions. The calculation of income tax liability for individuals and credits that accrue to them from employment and simple types of business that include sole traders, partnerships, farming income and an introduction to the taxation of business income principles of capital gains taxes is covered. The module also gives an overview of the role and appreciation of taxation in personal financial management.

CFS 2102 Computer Applications in Revenue Management   10 Credits
This module seeks to introduce the students to the computer-based revenue management models that can help improve the collection and management of revenue.

CFS 2103 Value Added Tax (Vat) I   10 Credits
The module provides a brief introductory study of the VAT legislation in Zimbabwe. As a foundation module to the study of VAT/GST, it exposes students to a more general overview of the tax system including, inter alia, the rationale for replacing various sales taxes with VAT/GST, specifically pointing to the deficiencies in these sales tax systems and especially the cascading effect in them. The regressively of VAT/GST will be explored as one of the crucial demerits afflicting the VAT/GST system. The evolution, including a general historical background to the VAT/GST will be done. The module will also review GST implementation in Zimbabwe and other countries. The study will then explore the following issues in VAT/ GST: Interpretation of fiscal legislation; definition of some important terms, such as trade, consideration, supply, goods and services, connected persons; registration for VAT/GST; some special types of supplies; timing and value of supplies zero-rated supplies and exempt supplies; VAT on the importation of goods and services; accounting for VAT and documentation requirements such as tax invoices, debit and credit notes; calculation of tax payable; prohibited deductions and returns, payments and assessments.

CFS 2104 Audit Principles and Skills   10 Credits
The purpose of this module is to introduce the student to the underlying theories, principles and practices of modern auditing. In doing so, it will examine the modern auditing process and identify contemporary issues in auditing practice. It will provide students with the ability to assess audit risk and its component parts and evaluate the internal control systems and environment of an organisation.

CF12101 Corporate Finance I   10 Credits
The aim of the module is to identify the objective that corporate finance managers pursue or ought to pursue in order to satisfy the needs of corporate stakeholders and to develop, in students, concepts and corporate analytical tools that will enable them to meet this objective. To this end, the module will cover the following critical areas: goals of a firm and the agency

Think in other terms

theory; time value concepts and valuation of bonds and shares; capital budgeting under certainty; operating and financial leverage; introduction to portfolio theory and capital asset pricing; the stock market and other sources of long-term capital; innovations in corporate finance.

CFI 2101 Accounting and Financial Analysis IIA   **10 Credits**
This module is a continuation of the study of accounting principles with in-depth coverage of theoretical concepts and financial statements. Topics include comparison of International Financial Reporting Standards (IFRS) with Generally Accepted Accounting Principles and extensive analyses of financial statements. Upon completion, students should be able to demonstrate competence in the conceptual framework underlying financial accounting, including the application of financial standards. The module will give students the tools to perform a fundamental analysis of a company. Focus will be on developing these skills for assessing quality of financial statements, potential accounting distortions, recasting financial statements, DuPont framework, cash flow analysis, prospective analysis, using accounting numbers in forecasting, forecasting for valuation, and investor communication. Students must understand the effects of alternative financial reporting policies on financial statements and ratios and be able to execute appropriate adjustments to enhance comparability between companies. In addition, students must be alert to differences between a company's reported financial statements and economic reality.

CFI 2110 Corporate Law and Practice   **10 Credits**
The module introduces students to the legal environment and statutes that affects the operation of companies and other corporate bodies. Students are guided to understand the process of company formation and the characteristics of different types of companies, including private companies, public companies, companies limited by guarantee, cooperative companies and statutory corporations. An overview of the purpose and practices of the Companies Registrar's Office that confronts financial practitioners in today's environment is explored. Students get an opportunity to understand the constitutions of companies that include the memorandum and articles of association; Legal principles that affect the raising company capital, through issuing new shares and allotment and other types of redeemable securities, including share transfers, protections offered to minority shareholders, the purpose a practice of judicial management, reconstruction of and the winding up of companies; the types of meetings, resolutions, notices, proxies, quorum and minutes of meetings, that include the general meetings and the meetings of the boards of directors; the election of directors, rotation, and the role, rights and duties and liabilities of directors and the board chairperson; the appointment to office, rights and duties and the vacation from office of the company secretary; the purpose and conducting of board meetings, composition, roles, procedures and the delegation of authority to committees. The concept of company membership and the rights and duties of members is explored as well as the role, appointment and removal of auditors of the company; the generation of annual reports, retention or records, statutory registers and filing with the Registrar of Companies.

Think in other terms

YEAR II
Semester II
CFS 2204 Customs Management Theory and Practice I   10 Credits

This module introduces students to the policy and principles of customs administration and international trends that impact on customs, including social expectations, emerging technologies and the global economy. A detailed analysis of the role and responsibilities of customs authorities is undertaken, including a historical perspective of the customs function, its evolving role in the International trade and commerce and the various international conventions and agreements which impact on customs policy.

CFS 2205 Public Finance and Economics   10 Credits

The module is meant to enable students to have a deeper understanding of the operations of public finance from the theoretical and practical point of view. It commences by looking at the nature and scope of public finance, theory of public goods, welfare theories and proceeds to consider the financial and economic role of the government. It also examines the scope and control of public expenditure, the main methods of diverting resources from private to public use by way of taxation, financial and macroeconomic problems, financial and macro-economic policies, and sources of finance/revenue. Because of the prominence of taxation as a source of public revenue, the module provides students with a conceptual framework for examining government taxing so as to analyse current tax policy and provide proposals for reform. The focus will be on evaluating the impact of taxation on the allocation of resources and the distribution of income.

CFS 2206 Tax Law and Practice II   10 Credits

The module develops further on the principles of taxation covered in Tax Law and Practice I to introduce students to the administration of the tax system in Zimbabwe, corporate taxes, other special taxes that are applicable in Zimbabwe and the concept of tax planning. An introduction to value added tax is also covered. The administration of corporate payment dates that is applicable to companies and other corporate and business bodies is explored. Special types of taxes that are applicable to different entities are covered, including the computation of tax liability for companies, mining operations, trusts, estate duty and other types of investment income that include the taxation of dividends. An integral part of this module is the development of the principle of tax planning and how corporations minimise the taxes payable. The role of the tax planner in the corporate environment and in private advisory capacity is explained; international aspects to taxation including double tax agreements between Zimbabwe and other countries. It develops further the concept of capital gains taxes in as far as it applies to the taxation of business and investments.

CFS 2207 Customs and Taxes Information Systems   10 Credits

The module enables the candidate to understand fiscal information systems that provide public sector managers a modern set of tools to assist them in performing a variety of tasks, such as: (a) designing appropriate fiscal and monetary responses to changing macro-economic conditions; (b)

ensuring accountability for the deployment and use of public resources; (c) improving the effectiveness and efficiency of public expenditure programs; (d) mobilizing domestic resources and managing external resources (foreign aid and loans); (e) managing the civil service; and (f) decentralizing operations with adequate controls. Candidates should be able to use modern tools and technologies to perform macro-economic forecasting, budget preparation, execution, perform audits and prepare financial reports.

CFI 2202 Corporate Finance II   10 Credits
The aim of the module is to develop further, in students, concepts and corporate financial analytical tools. The areas covered will include the following: Introduction to capital structure theory and practice; Cost of capital and valuation; Introduction to capital budgeting under uncertainty; Dividend policy theory and practice; corporate working capital management; and innovations in corporate finance.

CFI 2205 Research Methods in Finance and Economics   10 Credits
The objective is to provide treatment of research methods and simple statistical application that will enable students to carry out sound research projects. The module enables students to do applied research by introducing students to empirical methods in finance and economics. It introduces statistical techniques used in the analysis of economic and financial data. Topics covered include: descriptive statistics, probability distributions, sampling and sampling distributions, point estimation and interval estimation, hypothesis testing, regression analysis, time-series analysis, elementary discussion of multicollinearity, autocorrelation, heteroscedasticity and principles of modelling. It also includes empirical techniques with specific emphasis on multivariate and nonlinear methods, event-studies; asset prices mean variance estimation techniques and other topics in behavioural finance.

CFI 2208 Accounting and Financial Analysis IIB   10 Credits
The module examines concepts; conventions, standards, issues, the regulatory regime and, the reasons and progress towards harmonization of the preparation of Financial Statements and the Analysis of the Financial Statements prepared on these bases. Emphasis is on special problems which may include leases, bonds, investments, ratio analyses, present value applications, accounting changes, and corrections. Upon completion, students should be able to demonstrate an understanding of the principles involved and display an analytical problem-solving ability for the topics covered. Accounting computer problems involving preparation and completion of spreadsheets are integrated throughout the module. Areas to be covered include financial reporting quality and application of financial statement analysis to debt and equity investments. Frequently used tools and techniques for evaluating companies include common-size analysis, cross-sectional analysis, trend analysis, and ratio analysis. Beyond mere knowledge of these tools and techniques, however, the student must recognize the implications of accounting choices on the quality of a company's reported financial results. Then the student can apply financial analysis techniques to tasks such as the evaluation of past and future financial performance, credit analysis, the screening of potential equity investments and other emerging needs.

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YEAR III
CFS 3001 Industrial Attachment 120 Credits
This academic year covers work-related activities consisting continuous assessment, academic supervision and evaluation culminating in submission of a final year report which is an equivalence of an industry-oriented research activities dissertation.

YEAR IV
Semester I
CFI 4101 Customs Management Theory and Practice II 12 Credits
This module introduces students to key aspects of customs policy and practice, international principles governing the assessment of import duties and other taxes, and the implementation of international agreements across a range of customs jurisdictions. It includes a detailed analysis of particular aspects of customs purposes, international rules of origin, customs ware-houses and free trade zones, transit and transhipment, excise of special import arrangements.

CFS 4103 Value Added Tax II 12 Credits
The module aims at providing an advanced appreciation of VAT/GST law through the analysis of complex issues in the law. It will provide a broad overview of the territorial and economic scope of VAT. There are two conflicting principles on which the territorial scope of VAT can be based: The Origin Principle and the Destination principle. Students will be able to appreciate-ate the above principles and ultimately identify their economy's VAT/GST system in relation to the above principles. Complex issues related to the deeming provisions in the legislation, zero rating, VAT/GST implications relating to the so called 'property in possession' (PIP), the general disallowance rule (GRD) and exceptions thereof. The module will also aim to provide an appreciation of the complex area of input and output tax adjustments in relation to change of use of goods or services, sales of business as a going concern, irrecoverable debts, refunds in relation to overpaid tax and schemes for obtaining undue tax advantages, among other intricate VAT/GST issues. The module will also specifically refer to VAT/GST case law and students are expected to familiarize themselves with local and international cases and be able to analyse the influence of such cases to the development of VAT/GST.

CFS 4105 Taxation Accounting 12 Credits
The module provides a study of the federal revenue acts as they relate primarily to individual income tax theory and practice. Topical coverage includes the individual income tax return, gross income inclusions and exclusions, business expenses and retirement plans, self-employed and employee expenses, itemized and other deductions, accounting periods, accounting methods, depreciation, capital gains and losses and payroll taxes.

CFS 4107 Corporate Governance, Ethics and Integrity   **12 Credits**
The module seeks to develop in students a firm understanding of the principles and theoretical underpinnings of corporate governance by getting insights into different corporate governance systems. It includes issues relating to fiduciary duties, risk oversight, audits, internal controls and crisis management. In addition, it focuses on ethical issues, mainly the ability to identify and deal with ethical dilemmas and unethical practices in business. Further, the module touches on integrity issues, particularly anti-corruption, and transparency and other areas of responsible business conduct. It aims to bridge the gap between business integrity standards and their implementation in practice. It is anchored in international principles of corporate governance that put forward the expectation of the board and executive management on setting the ethical tone in an organisation and oversight of its business integrity policies.

CFS 4108 Audit Practice and Investigation   **10 Credits**
This module will develop auditing and assurance knowledge and will examine special auditing topics such as comprehensive auditing, non-profit auditing, environment auditing and small business auditing. The module will examine the application of economic tools and theory to daily issues and problems in the economy of Zimbabwe. It will include concepts on scarce resource allocation, intervention economics and political decision making, fiscal institutions, cost-benefit analysis for public projects, privatization and economics of state enterprises.

YEAR IV
Semester II

CFS 4203 Economic and Fiscal   **12 Credits**
The module will concentrate on selected important economic policy issues, tools and models. The specific topics will be of contemporary interest and the topics covered include some of the following: the operation and the activities of the state related to the taxation and spending and the impact they have on resource allocation, welfare and income distribution. Areas of focus include tax policy, trade agreements and public programmes. Inequality; international negotiations and trade policies; global imbalances; world trade collapse; fiscal policy and unemployment; monetary policy and exchange rate frameworks; financial integration and currency unions; financial crises and relevant policies; endogenous growth, exhaustible resources and relevant policies. Further it explores issues of efficiency, countercyclical policy along the business cycles, when to issue debt and what kind of debt; automatic stabilizers; fiscal sustainability; interactions between fiscal and monetary policy and empirical measurements of effects of taxation and debt. By the end of the module it is hoped that candidates will be able to use their knowledge of economic policy so as to have a better understanding of how an economy function.

CFS 4204 National Income Accounting   **12 Credits**
The module will examine the complete circular flow model and measuring the national income. The income and expenditure approaches will be covered.

CFS 4205 Interpretation of Statutes and Legal Drafting   **12 Credits**

The module provides a general introduction to interpretation of statutes and fundamental rules and techniques of good drafting of pieces of legislation. It examines both the legislative process and the interpretation of statutes. Students will study various tools of statutory interpretation, including the use of legislative history materials and the doctrines and textual canons of statutory construction. Practice of law: module may focus on litigation documents, documents, or a combination thereof.

CFS 4206 International Economic Integration and Trade   **12 Credits**

The aim of this module is to understand the changing global order by analysing the basis of globalisation and regionalization. This covers the core trade theories under perfect and imperfect competition and applies them to understanding the pattern of trade, gains from trade, 'new trade theory' and trade with heterogeneous firms. The module also covers strategic trade policy, the formation of regional trade agreements, and the world trade organisation. In this context, international integration theory and practice constitute the core of the module, covering issues like customs unions versus free trade areas, common market and other trade agreements, the welfare consequences from integration, using international income transfers to facilitate trade liberalization, and the effects of integration on economic growth.

CFI 4206 Financial Modelling   **12 Credits**

This is purely a practical module, which involves the use of computer packages to model data and challenges in finance, investment and economics. It covers Corporate Finance Models (such as Financial Statement Modelling, Operating Budgets, Capital Budget, Covariance, Beta estimation, Value at Risk, Event studies), Option, Pricing Models, Sensitivity Analysis, Scenario Analysis, and Computer Simulations GARCH models; Interest rate models and calibration and other fundamental innovations.

CFS 4006 Research Project   **20 Credits**

The project is meant to give students an opportunity to apply the knowledge gained over the module period. Students undertake research in an area of their choice but limited to the taught modules in liaison with their supervisors to produce a project which has practical applications/solutions.

REGULATIONS FOR THE MASTER OF SCIENCE DEGREES

1.0 PREAMBLE

1.1 The following regulations relate to the Master of Science programmes in the Department of Finance, mainly: Master of Science in Finance and Investment (MSc FInv), Master of Science in Financial Engineering (MSc FEng), and Master of Science in Fiscal Studies (MSc FS).

3.0 ASSESSMENT AND SCHEME OF EXAMINATIONS

3.1 The assessment of attainment and scheme of examination regulations for this degree programme must be read in conjunction with General Regulations of National University of Science and Technology.

3.2 Module delivery will be divided into two sections:

3.2.1 The *Taught Section*, Stages I, II and III, comprising: 11 core modules and 1 elective module to be selected from 4 modules (MSc FInvZ); 10 core modules and 2 elective modules to be selected from 5 modules (MSc FEng): and 8 core modules and 4 elective modules to be selected from 19 modules (MSc FS).

3.2.2 The *Research Section*, Stage IV, comprising of a dissertation of 15 000 to 20 000 words excluding appendices.

3.2.3 The *Taught Section* shall be assessed by coursework and a formal examination.

3.2.4 *Practical modules* shall be fully examinable by coursework, of which the weighting of the coursework shall be; practical work 60%, assignments and tests 40%). For *theoretical modules* the coursework shall be 30% and the formal examination shall be 70%.

3.2.5 The pass marks threshold, based on the aggregate of continuous assessment and the examination, shall be 50%. The written examination shall be taken at the end of each stage.

3.2.6 Supplementary examinations will not be offered. Students can proceed to the next level carrying a previous module, provided they pass three-quarters of the preceding stage. However, students will not be allowed to proceed to stage III carrying a stage one module, neither will they be allowed to proceed to stage IV (dissertation stage) carrying any module from the preceding stages.

3.2.7 The weighting between the *Taught Section* and the *Research Section* in the overall assessment shall be 75% and 25% respectively.

3.3 Dissertation

3.3.1 The dissertation shall, on its own, constitute the final stage of the programme.

Think in other terms

3.3.2 The assessment of the Research Project is designed to determine the relative ability of students to write and present a research proposal, implement the research proposal using appropriate designs and methods and analyse data to reach credible scientific inferences.

3.3.3 Further, the student must demonstrate ability to write a research project report in the scientific format and be ready to present the synopsis of the research at a seminar.

3.3.4 Each candidate is required to submit a dissertation of 15 000 to 20 000 words on a topic relating to his/her area of interest and shall be approved in writing by the dissertation supervisor.

3.3.5 Two typed bound copies plus one electronic copy of the dissertation shall be submitted to the Department.

3.4 Examination Regulations

3.4.1 For detailed examination and promotion regulations, please refer to the General Academic Regulations for National University of Science and Technology.

3.5 Weighting

3.5.1 The contribution of each semester towards calculation of the overall degree class will be in accordance with the General Regulations of the University.

3.5.2 The determination of the overall degree programme aggregate will be:

Taught component
Stage I   25%
Stage II   25%
Stage III 25%
Research component
Stage IV 25%

3.6 Failure to Satisfy Examiners

3.6.1 A candidate who fails a module or modules taken in a particular stage is expected to repeat the module(s) when next offered.

3.6.2 A candidate who fails the same stage of the programme twice will be required to withdraw from the programme.

3.6.3 A candidate who fails the Dissertation Stage with a mark in the range of 40-49% shall be given the option to re-submit within three months from the date of the publication of results. The submitted dissertation will only attain a maximum of 50%.

3.6.4 A candidate who fails the Dissertation Stage with a mark below 40% shall be expected to apply to repeat the module.

3.6.5 A candidate who fails to complete the Dissertation Stage and does not submit the dissertation within the prescribed period shall be given the option to submit within three months from the date of publication of results. However, such a dissertation will be awarded a maximum of a Pass grade.

Think in other terms

3.7 Classification of the Degree

3.7.1 Candidates must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.

3.7.2 For the degree to be awarded, the minimum number of credits of 340 must be satisfied.

3.7.3 A candidate who is withdrawn after failing the dissertation state but had passed the taught components may be awarded a Postgraduate Diploma in: Finance and Investment (PGDFInv); Financial Engineering (PGDFEng); OR Fiscal Studies (PGDFS).

3.8 Grading System

The following classification scheme for individual modules as well as the overall degree class shall be adopted:

80% and above	Distinction
70% - 79%	Merit
60% - 69%	Credit
50% - 59%	Pass
50% - 59%	Pass
0% - 49%	Fail

4.0 Duration and Delivery Systems

4.1 On full time basis the programme will be studied over a minimum period of 12 months of which a minimum of 3 months shall be for the dissertation.

4.2 On part-time basis the MSc programme shall be studied over a minimum period of 24 months of which a minimum of 6 months shall be for the dissertation.

4.3 On a part time basis delivery will be block release or weekend school and may be carried out at satellite centres.

4.4 On all models, delivery shall be allocated as follows:

Stage	Number of Modules
1	4
2	4
3	4
4	1
Total Number of Modules	13
Dissertation	1

4.4.1 The full time MSc student may, for good reason and subject to approval by the Senate on the recommendation of the Faculty Board, transfer to part time programme or vice versa provided the student meets the requirements of the stage of the programme he/she is transferring to.

4.4.2 The academic year shall normally begin in July/August (January/February) and end in June/July (December/January) the following year.

Think in other terms

MASTER OF SCIENCE DEGREE IN FINANCE AND INVESTMENT

1.0 PREAMBLE

1.1 The Master of Science in Finance and Investment (MScFInv) programme is a two-year postgraduate programme which offers scientific and professional training in the areas of Corporate Finance and Financial Markets, which is suitable for those intending to pursue their scientific and technical education in the area of Finance. In addition, it provides the students with appropriate background to attend appropriate PhD Programs in the fields of banking, finance and other business-related areas.

2.0 PROGRAMME PROFILE

Degree Profile of Master of Science Degree in Finance and Investment	
Institution:	**National University of Science and Technology**
Type of Degree:	**Masters**
Credit Load:	**340 credits**
Level:	**SADC-QF - Level 9**
Accreditation Organisation(s):	
Period of reference:	

Purpose of the Programme

The programme enables students to learn about the qualitative and quantitative techniques used to evaluate financial decisions; understand and interpret market reactions to geopolitical events such as oil price shocks and financial crises. Most importantly, it enables students to develop skills in the analysis of: corporate financial decisions, behavioural biases, financial statements, derivatives, investment portfolios, investment, risk and economic data. In addition, the programme also gives students the opportunity to study much of the CFA module syllabus as well as prepare for challenging opportunities in the local and global arena.

Programme Characteristics

Areas of Study	Advanced corporate financial strategy, qualitative and quantitative analysis of investments, behavioural finance, global financial markets, financial statement analysis and planning, public finance and debt management, international multinational business finance and trade, financial engineering, advanced assed pricing, risk management, financial modelling and trading rules, innovations in finance (such as structured finance), alternative investments, corporate ethics and governance, quantitative and qualitative research on current financial problems or opportunities.
Specialist Focus:	Pricing of financial products, model financial products and profitable investing and trading with various financial products
Orientation:	Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.
Distinctive Features:	The programme builds the research-technology-innovation continuum and focuses on knowledge development and application using a student-centred approach.

Career Opportunities and Further Education

Employability:	Careers as finance and investment practitioners, tax consultants at corporation, SME, NGO and governmental levels, private and public sector, regional and international finance and investment organisations, research institutions as well as lecturers at universities and colleges.
Further Studies:	Master's and PhD Programs in the fields of economics, banking, business administration, corporate finance, development finance and economics, behavioural finance, financial engineering and related fields. Graduates can also pursue professional modules such as CFA.

Programme Delivery

Teaching and Learning Methods:	An eclectic mixture of teaching methods which include but are not limited to lectures, tutorials, case studies, worked examples, problem-based learning, computer laboratory activities, simulations, field practicals, group work, research projects as well as their dissertations, mini-projects, term papers, end of semester professional examinations, continuous assessment tests, written assignments, oral presentations and industrial visits will be used in the programme. Students benefit from the access to financial and business databases and other hands-on learning tools to develop valuable practical skills in analysing the finance industry so as to stand out in the job market.
Assessment Methods:	Written examinations, tests, assignments, practical and oral presentations and tests, seminar presentations, industrial attachment report, research

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<center>project report, and continuous assessments</center>

Programme Competences

Generic:
Multidisciplinary: Ability to draw appropriately from multiple academic disciplines to define and solve problems based on understanding of complex phenomena

Quantitative and innovative reasoning: Capability to draw on big data and use analytics for informed decision making and strive to seek new ways of doing things

Communication skills: Ability to communicate effectively and to present information orally and in writing and using ICTs to both expert and non-expert audiences

Analysis and synthesis: Capacity for analysis and synthesis using logical arguments and proven facts.

Ethical commitment: Professional integrity and awareness of impact of science and technology on society and the environment

Entrepreneurial skills: Capability to identify and create new business ventures based on knowledge and new thinking paradigms

Discipline specific:
Technology development skills: Ability to develop new themes, models, advanced problem-solving techniques in finance and investment, including corporate finance, risk management
Problem-solving skills: Ability to solve a wide range of problems in related finance by identifying their fundamental aspects.

Exit Level Outcomes

Problem solving
Identify, formulate, analyse and solve complex economic, financial and investment problems creatively and innovatively.

Application of scientific knowledge
Apply knowledge of mathematics, quantitative techniques in economics, finance, financial models and software to solve economic and economic, financial and investment problems.

Investigations and data analysis
Demonstrate competence to design and conduct investigations and contribute to the debate, research on contemporary issues in the area of Finance

Information technology knowledge
Demonstrate competence to use appropriate information technology skills and competences

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<center>*Think in other terms*</center>

Professional and technical communication
Demonstrate competence to communicate effectively, both orally and in writing, with audiences in all sectors of the economy and at various levels, and the community at large.

Sustainability and financing and investing activity
Demonstrate critical awareness of the sustainability and impact of application of modern techniques in finance and investment on the social, economic, financial sectors and business environment in general.

Individual, team and multidisciplinary working
Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments.

Independent learning ability
Demonstrate competence to engage in independent learning through well-developed learning skills. Parameterize and use commonly used models in Finance and other related fields for research to solve financial and societal problems.

Finance and investment professionalism
Demonstrate critical awareness of the need to act professionally and ethically and to exercise judgment and take responsibility within own limits of competence.

Finance and investment management
Produce strategic and enterprising finance and investment professionals and academics; Create highly qualified finance and investment professionals to lead the industry into the future.

3.0 ENTRY REQUIREMENTS
3.1 **Normal Entry**
3.1.1   To be considered for admission to the MSc programme, a candidate should, normally, hold a good Honours degree or equivalent in Finance, Accounting, Economics and Banking, Risk, Insurance, Actuarial Science, or their equivalents.
3.1.2   In addition, applicants should have completed the following modules, or their equivalents, at undergraduate level: Accounting, Principles of Economics, and Quantitative Analysis for Business and Corporate Finance.
3.1.3   Experience in financial markets will be an added advantage.

PROGRAMME SUMMARY

Stage	Module Code	Module Name	Credits
1	CFI5101	Financial Statement Analysis and Planning	20
	CFI5115	Global Financial Markets	20
	CFI5111	Advanced Corporate Financial Strategy	20
	CFS5101	Public Finance and Debt Management	20
		Total Credits Stage I	**80**
2	CFI5215	Applied Financial Econometrics and Data Analysis	20
	CFI5217	Investment Analysis	20
	CFI5207	Fund Management	20
	CFI5208	Risk Management	20
		Total Credits Stage II	**80**
3	CFI5301	Multinational Business Finance and Trade	20
	CFI5302	Financial Engineering	20
	CFI5303	Financial Modelling and Trading Rules *(Practical)*	20
		To select 1 from electives	
	CFI5304	Structured Finance *(Elective)*	20
	CFI5305	Corporate Ethics and Governance *(Elective)*	20
	CFI5306	Alternative Investments *(Elective)*	20
	CFI5307	Infrastructure Finance *(Elective)*	
		Total Credits Stage III	**80**
4	CFI5401	Research Methodology *(Practical)*	20
	CFI5400	Dissertation	80
		Total Credits Stage IV	**100**
		Total Credits for the Programme	**340**

Think in other terms

MODULE SYNOPSES

STAGE I

CFI 5101 Financial Statement Analysis and Planning   **20 Credits**
The module examines concepts; conventions, standards, issues, the regulatory regime and, the reasons and progress towards harmonization of the preparation of Financial Statements and the Analysis of the Financial Statements prepared on these bases.

CFI 5111 Advanced Corporate Financial Strategy   **20 Credits**
The objective of the module is to examine advanced concepts and issues in corporate financial management. Topics to be covered include: The main building blocks of financial theory of: Efficient Markets Hypothesis, Agency Theory, Asset Price Theory [CAPM, APT], Option Pricing Theory, Portfolio Theory.

CFI 5114 Global Financial Markets   **20 Credits**
The module tracks developments in global financial markets in terms of institutional, regulatory, legal, and product innovation. Material covered in the module includes the evolution of global financial infrastructure and the systemic complexities associated with increasing volumes of global financial transactions, as well as institutional and legal reforms to manage the potential impact of financial contagion on the global economy. Furthermore, the module examines the emergence of new global financial centres and the other dynamics of the global financial system. The module seeks to keep students abreast with latest developments in world financial markets with a view to motivate them to come with innovative financial technology to exploit emerging opportunities and alleviate impending crises.

CFS 5101 Public Finance and Debt Management   **20 Credits**
The thrust of the module is to develop among students an understanding and appreciation of Public Finance and Debt Management from the theoretical and practical point of view. It also enables the students to analyse the financial systems of Zimbabwe and other countries. The major aspects of the module will include sources of public revenue, public expenditure, financial administration, and budgeting principles. For Debt Management, the major aspects will comprise corporate debt management, public debt management, origins of debt crisis, and the oil price shocks, the external debt difficulties of low-income Africa, debt reduction and reconstructing.

STAGE II

CFI 5215 Applied Financial Econometrics and Data Analysis   **20 Credits**
The module examines statistical and econometric techniques for empirical finance and model, ARCH, GMM, and Regime Switching Models, test of the CAPM, term structure models and volatility models (implied stochastic volatility). Students will also learn aspects of the time series econometrics for both stationary and non-stationary variables at different time frequencies, with emphasis on financial/economic variables. The module also focuses on the use of statistical

techniques to understand market behaviour, including methods for organizing, accessing, and ensuring the quality of data.

CFI 5217 Investment Analysis   **20 Credits**

The module will focus on the tools available in analysing investments, the investment decision criteria used to select assets to invest from the local and international investment markets. It provides a comprehensive coverage of theories, applications and decision-making rules in financial investments. In particular, the module material will be tilted heavily towards equity and bond markets since there are separate modules that cover alternative investments and derivative securities. Topics to be covered to include: Stock Market architecture and market microstructure; Top-down Fundamental and Technical Analysis, Analysis of Risk, Return and Higher moments, Capital allocation and Optimal Risky Portfolios, Capital Asset Pricing Model (CAPM), Arbitrage Pricing Theory (APT), Term Structure of Interest rates, Duration and Convexity, Although the ultimate objective of the module is to develop a conceptual and theoretical background for investment decisions, emphasis will be put on practical applications.

CFI 5207 Fund Management   **20 Credits**

To familiarize the student with fund management strategies, investment performance measurement tools available to fund managers and the suitability of these two different client requirements and other constraints including the regulatory environment. Topics to be covered include: Statement of Investment Policy (SIP), Strategic Asset Allocation (SAA), Asset Picking, Tactical Asset Allocation (TAA), Classical immunization, contingent immunization, Cash flow matching portfolio insurance, (through State Allocation and Dynamic Asset Allocation, and portfolio performance measurement.

CFI 5208 Risk Management   **20 Credits**

The module focuses on teaching and developing risk management models such as VaR for purposes of handling risk by investors. It also looks at tools for and constraints in quantifying and managing an individual firm's risk exposure.

STAGE III

CFI 5301 Multinational Business Finance and Trade   **20 Credits**

The module is designed to provide students with an in-depth knowledge of the operational aspect of the interface between the multinational firm and international financial institutions, markets and systems it elucidates on how decisions about financial management are made and applied in the modern multinational enterprises. The module covers such areas as the multinational firm and its environment, evolution of the international monetary and financial system, the foreign exchange exposure management, financing the multinational corporation, multinational capital budgeting and investment, taxation of the multinational firm, international accounting and control of foreign operations, working capital management, portfolio and direct foreign investment, financing international trade, the global debt issue, other issues impacting multinational financial management, etc.

Think in other terms

CFI 5302 Financial Engineering   **20 Credits**

The module examines, in more detail, and including practical case studies, the types, uses and valuation of derivative products and the derivation of synthetic instruments for the purpose of hedging, speculation or arbitraging and also looks at the regulatory environment for these derivative products. The module also looks at latest developments in innovative Corporate Finance issues such as option embedded issues, swaps, etc.

CFI 5303 Financial Modelling and Trading Rules   **20 Credits**

The module involves the financial use of computer software packages to model corporate finance problems such as: Operating Budgets, Capital budgeting, Decision Tree Analysis, Sensitivity Analysis, Computer Simulations, Business and Securities Valuations. In addition, the module examines the dominant technical analysis tools in the stock exchange markets, foreign exchange markets, and other financial markets. Furthermore, the module seeks to equip students with advanced skills needed to test for the weak-form, semi-strong form, and strong form versions of the Efficient Market Hypothesis (EMH), in the process of identifying opportunities for successful application of technical analysis tools. The learning process is not limited to the study and evaluation of existing technical analysis tools, but also equips students with skills to develop new skills.

CFI 5304 Structured Finance   **20 Credits**

The module is aimed at designing debt, equity and hybrid financing techniques in order to resolve particular issues or investor problems that cannot be resolved by conventional methods. The focus is on identifying situations that call for nonstandard corporate finance solutions, and the design and pricing of the situation-specific financing instruments. Such situations include, stress-induced financial restructuring, recapitalisations, private equity and leveraged buyouts, and arbitrage-driven hybrid notes; security issues that arise in securitisation transactions, financing with asset-backed securities; medium term notes and equity-linked structured notes; design and pricing of convertible, hybrids and mezzanine debt; structured leveraged finance; high leveraged bridge loans and interim financing; presale investments; sale leaseback transactions; complex domestic and cross-border leasing transactions; a variety of project financing structures, including programs provided by the World Bank, IFC, ADB and other governmental and multinational risk insurance lending agencies.

CFI 5305 Corporate Ethics and Governance   **20 Credits**

The module focuses on how ethical and moral considerations are included in the public issues facing organizations and the decision-making process of managers. It covers the following areas: principles of business ethics, ethical dilemmas, unethical business practices and approaches to improve ethical conduct, fraud detection and reduction; corporate control strategies; getting insight in different corporate governance systems; understanding of different board models and how boards are elected; corporate governance aspects relating to shareholders, board of directors, management and other stakeholders of corporations; audit committees; banks

Think in other terms

and institutional investors as external monitors; legislations on corporate governance and responsibility; ethical issues in Finance; analysis of corporate scandals along with corporate best practices. The module also touches on contemporary issues relating to globalisation and sustainability. The module relies mostly on standards and best practices in professional fields, especially, the Finance and Investment fields.

CFI 5306 Alternative Investments   20 Credits
This advanced module gives an investment approach for evaluating the opportunities and pitfalls of alternative investments. Alternative investments generally include real estate, hedge funds, venture capital, private equity, commodities, as well as some other specialized areas. While this module covers some of the basics, it revolves around examples and discussions in class in order to enrich the knowledge of this topic. It is expected that students already have familiarity of introductory finance topics.

CFI 5307 Infrastructure Finance   20 Credits
Africa faces a persistent infrastructure deficit and the need for infrastructure improvements is critical. Infrastructure development, thus, is viewed as a key ingredient for economic growth and a prerequisite for poverty alleviation and employment creation. Innumerable numbers of businesses suffer from lack of reliable power for industrial processes or because they cannot get their goods to the market. At the most basic level, millions of lives are threatened every day for lack of clean water or safe sanitation. This module should cover the relationship between infrastructure and economic growth and interrogate the depth of the infrastructure gap facing the African continent, with a focus of four (4) sectors: Energy, water, telecommunications, and transportation. The module should look at; understanding of the economic theories linking infrastructure development and growth and its practical implications; evaluate infrastructure financing needs of various sectors in sub-Saharan Africa; apply development finance theory to identify various sources of funding for infrastructure development in sub-Saharan Africa; evaluate various financing models in infrastructure development and their implications.; apply development finance theory to evaluate infrastructure development policies and programmes in Africa and develop motivate well-articulated intervention programmes.

STAGE IV

CF1 5401 Research Methodology   20 Credits
At the end of this module, the students should be able to: • understand some basic concepts of research and its methodologies • identify appropriate research topics • select and define appropriate research problem and parameters • prepare a project proposal (to undertake a project) • organize and conduct research (advanced project) in a more appropriate manner • write a research report and thesis • write a research proposal (grants) focusing on the field of economics, finance and investments.

Think in other terms

CFI 5400 Dissertation   **80 Credits**

The dissertation, which is compulsory, helps students to consolidate theoretical knowledge gained in the taught section of the programme by completing a research project under the supervision of the Department of Finance staff and/or professionals in the Financial Sector.

MASTER OF SCIENCE DEGREE IN FINANCIAL ENGINEERING

1.0 PREAMBLE

1.1 The Master of Science Programme in Financial Engineering (MScFEng) is a multidisciplinary field which will encompass three areas of study – finance, computer science and mathematics and statistics. It also accommodates the typical engineer-entrepreneur who wishes to gain insights into finance, investment and management of corporate risks, given the dynamic nature of the global environment. The Master of Science in Financial Engineering programme is an intensive degree with a bias towards the development and management of strategic financial products. It is a typical quantitative finance discipline, which makes extensive use of computational approaches to the design and evaluation of financial claims. The programme integrates essential topics in finance, applied mathematics, statistics and computing. It seeks to blend the technical mathematical capabilities essential to financial engineering with financial management and leadership capabilities for effective and responsible risk management.

2.0 PROGRAMME PROFILE

Degree Profile of Master of Science Degree in Financial Engineering	
Institution:	**National University of Science and Technology**
Type of Degree:	**Masters**
Credit Load:	**340 credits**
Level:	**SADC-QF - Level 9**
Accreditation Organisation(s):	**Zimbabwe Council for Higher Education (ZIMCHE)**
Period of reference:	

PURPOSE OF THE PROGRAMME

Graduates will acquire analytical skills and technical competencies needed to design and evaluate complex financial products. Enables students to gain knowledge in mathematical modelling and application of quantitative techniques to the design and operation of systems. It encompasses the design, analysis and construction of financial contracts to meet the needs of enterprises;

To offer advanced training in quantitative skills used in modern financial institutions and corporations; and to equip graduates with the ability to tackle challenging problems in high-technology finance, such as portfolio risk management, product structuring, quantitative asset management, quantitative trading, quantitative research and financial information technology.

Programme Characteristics

Areas of Study	Advanced corporate financial strategy, qualitative and quantitative analysis of investments, behavioural finance, global financial markets, financial statement analysis and planning, public finance and debt management, international multinational business finance and trade, financial engineering, advanced assed pricing, risk management, financial modelling and trading rules, innovations in finance (such as structured finance), alternative investments, corporate ethics and governance, quantitative and qualitative research on current financial problems or opportunities.
Specialist Focus:	Advanced models to Pricing and modelling of financial products, extensive use of computational approaches to design and evaluation of financial claims. Integration of finance, applied mathematics, statistics and computing in designing and pricing of financial products and derivatives; Risk management models.
Orientation:	Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.
Distinctive Features:	The programme builds the research-technology-innovation continuum and focuses on knowledge development and application using a student-centred approach.

Career Opportunities and Further Education

Employability:	Careers as financial analysts, investment managers, bankers or traders, product designers, financial risk managers, using their financial engineering background to improve the quality of existing investment products. As a financial analyst, the financial engineer creates real-time financial simulations to predict the future behaviour of the market. Also, as financial advisers at local, state and central government level. Most often graduates are also engaged as lecturers at universities and colleges.
Further Studies:	PhD Programs in the fields of quantitative finance, financial engineering, risk management, economics, banking, business administration, corporate finance, development finance and economics, behavioural finance, financial engineering and related fields.

Programme Delivery

Teaching and Learning Methods:	An eclectic mixture of teaching methods which include but are not limited to lectures, tutorials, case studies, worked examples, problem-based learning, computer laboratory activities, simulations, field practicals, group work, research projects as well as their dissertations, mini-projects, term papers, end of semester professional examinations, continuous assessment

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	tests, written assignments, oral presentations and industrial visits will be used in the programme. Students benefit from the access to financial and business databases and other hands-on learning tools to develop valuable practical skills in analysing the finance industry so as to stand out in the job market.
Assessment Methods:	Written examinations, tests, assignments, practical and oral presentations and tests, seminar presentations, industrial attachment report, research project report, and continuous assessments.

Programme Competences
Generic:
Multidisciplinary: Ability to draw appropriately from multiple academic disciplines to define and solve problems based on understanding of complex phenomena

Quantitative and innovative reasoning: Capability to draw on big data and use analytics for informed decision making and strive to seek new ways of doing things

Communication skills: Ability to communicate effectively and to present information orally and in writing and using ICTs to both expert and non-expert audiences
Analysis and synthesis: Capacity for analysis and synthesis using logical arguments and proven facts.

Ethical commitment: Professional integrity and awareness of impact of science and technology on society and the environment

Entrepreneurial skills: Capability to identify and create new business ventures based on knowledge and new thinking paradigms

Discipline specific:
Technology development skills: Ability to develop new themes, models, advanced problem-solving techniques in finance and investment, including corporate finance, risk management
Problem-solving skills: Ability to solve a wide range of problems in related finance by identifying their fundamental aspects.

Exit Level Outcomes

Problem solving
Identify, formulate, analyse and solve complex economic, financial and investment problems creatively and innovatively.

Application of scientific knowledge
Apply knowledge of mathematics, quantitative techniques in economics, finance, financial models and software to solve economic and economic, financial and investment problems.

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Investigations and data analysis

Demonstrate competence to design and conduct investigations and contribute to the debate, research on contemporary issues in the area of Finance

Information technology knowledge

Demonstrate competence to use appropriate information technology skills and competences. Programming skills are needed to build simulating financial models to learn about market behaviour. Through these simulations, the financial engineer is expected to generate results, as much as accurately possible.

Professional and technical communication

Demonstrate competence to communicate effectively, both orally and in writing, with audiences in all sectors of the economy and at various levels, and the community at large.

Sustainability and financing and investing activity

Demonstrate critical awareness of the sustainability and impact of application of modern techniques in finance and investment on the social, economic, financial sectors and business environment in general.

Individual, team and multidisciplinary working

Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments.

Independent learning ability

nstrate competence to engage in independent learning through well-developed learning skills. Parameterize and use commonly used models in Finance and other related fields for research to solve financial and societal problems.

Finance and investment professionalism

Demonstrate critical awareness of the need to act professionally and ethically and to exercise judgment and take responsibility within own limits of competence.

Finance and investment management

Produce strategic and enterprising finance and investment professionals and academics; Create highly qualified finance and investment professionals to lead the industry into the future. Parameterize and use commonly used models in Finance and other related fields for research to solve financial and societal problems.

3.0   ENTRY REQUIREMENTS

3.1 To be considered for admission to the MSc programme, a candidate should, normally, hold a good Honours degree or equivalent in Finance, Accounting, Economics and Banking, Risk, Insurance, Actuarial Science, or their equivalents.

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3.2 In addition, applicants should have completed the following modules, or their equivalents, at undergraduate level: Accounting, Principles of Economics, and Quantitative Analysis for Business and Corporate Finance.

3.3 Experience in financial markets will be an added advantage.

4.0 BRIDGING MODULES

4.1 The nature of the programme requires that students be in possession of both mathematical and financial backgrounds prior to undertaking any of the modules. To ensure that this requirement is met, prospective students will be required to attend bridging modules as follows:

4.2 *Corporate Finance*: This module will be compulsory to students who do not have Corporate Finance, Financial Management, or equivalent, at undergraduate level, as determined by the Department.

4.3 *Accounting*: The module will be compulsory to students who do not have Accounting I, Financial Accounting I, or equivalent, at undergraduate level, as determined by the Department.

4.4 *Numerical Methods in Finance*: The module will be compulsory to students who have a weak background in Stochastic Calculus, as determined by the Department.

PROGRAMME SUMMARY

Stage	Module Code	Module Name	Credits
1	CFE5101	Advanced Financial Econometrics and Data Analysis	20
	CFE5102		20
	CFI5101	Stochastic Analysis and Optimisation in Finance	20
	CFI5111	Financial Statement Analysis and Planning Advanced Corporate Financial Strategy	20
		Total Credits Part I	**80**
2	CFE5201	Advanced Asset Pricing Theory and Practice	20
	CFE5202	Derivative Securities	20
	CFE5203	Quantitative Risk Management	20
	CFE5204	Financial Computing *(Practical)*	20
		Total Credits Part II	**80**
3	CFE5301	Product Design and Engineering *(Practical)*	20
	CFI5303	Financial Modelling and Trading Rules	20
		To select 2 electives	
	CFE5302	Foreign Exchange Exotic Options	20
	CFE5303	Intellectual Property and Contracts Law	20
	CFE5304	Financial Time Series Analysis	20
	CFE5307	Advanced Capital Budgeting	20
	CFI5304	Structured Finance	
		Total Credits Part III	**80**
4	CFE5401	Research Methodology *(Practical)*	20
	CFE5400	Dissertation	80
		Total Credits Part IV	**100**
		Total Credits for the Programme	**340**

Think in other terms

MODULE SYNOPSES

STAGE I
Core Modules

CFE 5101 Advanced Financial Econometrics and Data Analysis   **20 Credits**

This is a module in advanced econometric theory, providing a rigorous basis for the techniques of analysis of economic data. The emphasis is on analytical methods and tools of econometric analysis. It focuses upon likelihood methods. Maximum likelihood estimation, elements of asymptotic theory and the principles of hypothesis testing are covered. The implementation of these techniques to important special linear and nonlinear models is studied. Methods of non-parametric estimation are also analysed. The application of computer-based methods (e.g. Monte-Carlo analysis, the bootstrap) to econometric problems is discussed. The modern area of empirical likelihoods is introduced, combining the principles of non-parametrics and the likelihood, and is related to the bootstrap. The module also examines the techniques available in applied research for the analysis of micro-level data in the study of economic behaviour and policy problems. Further, it examines binary choice, multiple choice and ordered response models, limited dependent variable techniques, including censored and truncated regression, selectivity and double hurdle models and switching regression models, and associated diagnostic tests

CFE 5102 Stochastic Analysis and Optimization In Finance   **20 Credits**

The objective of this module is to provide the background, basic ideas and methods of stochastic calculus and to apply these methods to financial models. The module introduces the concepts of arbitrage and risk-neutral pricing in a discrete-time setting. In addition, it provides an introduction to those aspects of partial differential equations and diffusion processes most relevant to finance, Random Walk and first-step analysis, Markov property, Martingales and Semi-martingales, Brownian Motion, Stochastic Integrals, Ito's Formula, backward and forward Kolgomorov equations, the Feynman-Kac formula, stepping times, Hull and White models, Cox-Ingersoll-Ross Model. It covers fundamental techniques for portfolio optimization, pricing and hedging derivative securities and other aspects of continuous time finance. Finally, the module will introduce and study Levy processes both from an analytic point of view and also from a probabilistic one.

CFI 5101 Financial Statement Analysis and Planning   **20 Credits**

The module examines concepts; conventions, standards, issues, the regulatory regime and, the reasons and progress towards harmonization of the preparation of Financial Statements and the Analysis of the Financial Statements prepared on these bases.

CFI 5111 Advanced Corporate Financial Strategy **20 Credits**

The objective of the module is to examine advanced concepts and issues in corporate financial management. Topics to be covered include: The main building blocks of financial theory of: Efficient Markets Hypothesis, Agency Theory, Asset Price Theory [CAPM, APT], Option Pricing Theory, Portfolio Theory,

STAGE II
Core Modules

CFE 5201 Asset Pricing Theory and Practice **20 Credits**

The aim of the module is to provide a formal introduction to asset pricing through the study of its main topics, mainly: the mathematics behind the CAPM model, the APT model, and option pricing models; the review of the CAPT pricing formula derivation with and without a risk-free asset; the APT pricing formula with a one-factor structure and multi-factor structures; and option pricing formulas in discrete time (the Binomial Model) and continuous time (the Black-Scholes (Brownian) Model). On completion of the model the students should be able to: find expressions for the portfolio frontier with and without a risk-free asset; derive expressions for expected asset returns in the CAPM framework; derive expressions for expected asset returns in the CAPM framework; derive expressions for expected asset return in a factor model (APT); demonstrate an understanding of risk neutral probabilities; derive derivative prices in a Binomial Model; derive the partial differential equation that governs derivatives prices in a Brownian Model; apply put-call parity to options prices problems; apply the Black-Scholes Model to work out option prices.

CFE 5202 Derivative Securities **20 Credits**

This module blends theory and practice that incorporates a new approach to teaching derivatives. This is an advanced module combining theory and practice of pricing and hedging derivative securities. The module emphasizes the applications of financial engineering and covers option and futures pricing theory and practice. Emphasis will be on the pricing of derivatives in continuous time, from the formulation of the pricing problem to the implementation of computational and numerical solution techniques.   In addition, it introduces the arbitrage-based pricing of derivative securities, focusing on topics such as arbitrage, risk neutral valuation, the log-normal hypothesis, binomial trees, the Black-Scholes formula and applications, the Black-Scholes partial differentiation equation, and other analytical and numerical models.   The objective is to develop modelling skills needed to value the full range of derivative securities from exchange-traded options to over-the-counter products including American versus European options, one-factor interest rate models, swaps, caps, floors, swaptions, and other interest rate-based derivatives and credit risk and credit derivatives. In addition, it covers the theory and practical applications of currency derivatives, as well as exotic and embedded options.

CFE 5203   Quantitative Risk Management   20 Credits
This module provides a broad theoretical and practical grasp of the latest risk management and security valuation techniques used in financial industry and corporate treasury. Although the core content is mathematical in nature, the non-technical student should be able to understand the mathematics through application. The emphasis is placed upon the use of martingale techniques for pricing risk. Topics include the basic hedging techniques used to handle equity and exchange rate risk; forwards, futures and derivative contracts and models of bond pricing and the term structure of interest rates.

CFE 5204   Financial Computing   20 Credits

The module introduces approaches useful in practical applications of computing, namely Microsoft Excel, Matlab and C-programming. Comparisons between the approaches will be made by using simple common problems. The objective is to enable students to gain a level of competence with, and understanding of, computers and computer packages in a financial environment. At the end of the module, students will be able to analyse a wide range of problems arising in finance using a mixture of spreadsheets, Matlab and C programming. Topics include: Microsoft Excel – simple spreadsheets using in-built functions, optimization using Goal-Seek tool; finding roots using the Solver tool; data analysis; MATLAB – graphics, matrix computations, in-built functions, programming in MATLAB; ANSI C Programming – basic C programming (data types, arithmetic and mathematical functions, flow control, arrays); Functions – passing information to and from functions; Pointers – pointer arithmetic, the relationship between arrays and pointers; File handling – opening and closing files, reading from and writing files. Application focuses on derivative pricing and fixed income applications, treatment of discrete dividends, numerical methods for stochastic differential equations, random number generators, Monte-Carlo Methods for European and American options.

STAGE III
Core Modules

CFI 5303 Financial Modelling and Trading Rules   20 Credits
The module involves the financial use of computer software packages to model corporate finance problems such as: Operating Budgets, Capital budgeting, Decision Tree Analysis, Sensitivity Analysis, Computer Simulations, Business and Securities Valuations. In addition, the module examines the dominant technical analysis tools in the stock exchange markets, foreign exchange markets, and other financial markets. Furthermore, the module seeks to equip students with advanced skills needed to test for the weak-form, semi-strong form, and strong form versions of the Efficient Market Hypothesis (EMH), in the process of identifying opportunities for successful application of technical analysis tools. The learning process is not limited to the study

Think in other terms

and evaluation of existing technical analysis tools, but also equips students with skills to develop new skills.

CFE 5301product Design and Engineering   **20 Credits**
The module provides students with the opportunity to design and engineer financial products, taking them from the fundamentals of design, from conception of an idea, prototype design, to a marketable end-product. The module is designed to encourage creativity and innovation so that the students may be more successful in the real-world. It provides the preliminary planning of complex and realistic financial engineering systems, which include the design, use and pricing of structured products, how the products are constructed and hedged and applied in live situations. Design concepts and techniques are introduced and the students' design ability is developed in a design or feasibility study chosen to emphasize innovation and ingenuity to provide wide coverage of financial engineering topics. It also emphasizes design optimization of financial models. Topics include; application of engineering methods in financial design, analysis, and construction of financial contracts to meet the needs of enterprises; architecture and creation of structured notes, structured notes through repackaging vehicles, creating financial investments to match investors' requirements, constructing a delta hedge, options Greeks and their applications, Delta, Gamma, Theta, Vega, Rho; Dynamic hedging; Black-Scholes model, Binomial model; Ho and Lee model Cox Ross Rubinstein model Interest rate-, currency-, equity-linked notes, complex interest rate swap structures, risk management of structured products and derivatives; and reverse engineering.

ELECTIVES

CFE 5302 Foreign Exchange Exotic Options   **20 Credits**
The objective of the module is to develop a solid understanding of the exotic currency derivatives used in international treasury management, thus providing the mathematical and practical background necessary to deal with all the products on the market. Topics include: pricing and hedging in the Black-Scholes model, Vanilla options, volatility measures, first generation exotics (products, pricing and hedging), structuring with Vanilla options, the Traders' Rules of Thumb, Second generation exotics (single and multi-currency).

CFE 5203 Intellectual Property and Contracts Law   **20 Credits**
The objectives of the module are: (a) to familiarize with intellectual property (IP) mechanisms such as, copyrights, patents, trademarks and trade secrets, and other related state law doctrines; (b) to provide an overview of the contracting process in a common law country. Topics on IP rights embody how the need to balance between public and private interests shape the contours of the legal protection conferred on IP rights; general and codified legal institutions found within the IP law, such as fair use, compulsory licenses, substantial similarity, direct, indirect and contributory infringements, public policy defence and the implementation of these principles; and how IP rights are affected by emergence of the internet, the digital environment and international treaties (e.g. TRIPS Agreement). Contracts law focuses on types of contracts and the requirements for their validity, breach of contract and legal consequences of a breach; formation of contracts (the offer and its acceptance, as well as effective revocation of offers,

Think in other terms

counter-offers and their acceptance); comparisons of different international legal systems pertaining to contracts; rights of each contracting parties, breach of contract, remedies for breach of contract; consideration of the Uniform Commercial Code (UCC) and its role in international commercial transactions.

CFE 5304   Financial Time Series Analysis   **20 Credits**
The aim of the module is to introduce the special statistical character of series of observations measured overtime, and to show how this affects modelling Time Series data. Stochastic processes are introduced, and measures of their heterogeneity and memory are investigated. Special important processes are covered, and these include Vector Auto-Regressive Integrated Moving-Average (VARIMA) models. The analysis covers both the time and frequency domains. We also analyse the effects of seasonality, comovements (such as cointegration and error-correction), spurious correlations, structural breaks and outliers.

CFE 5307 Advanced Capital Budgeting   **20 Credits**
The module explains several methods of analysis that can help business managers in valuation of investment projects and making investment decisions using a rigorous cost/benefit analysis. Topics include: calculating the payback period and evaluating capital investments using the payback period; calculating the accounting rate of return and evaluating investments using the ARR; capital budgeting using the time value of money; capital rationing; inflation and capital budgeting; risk and capital budgeting; replacement of assets; scenario, sensitivity and break-even analysis; capital structure and capital budgeting; leverage and NPV analysis; managerial options; CAPM and capital budgeting; multi-period capital budgeting. Innovations in the field of capital budgeting will also be considered.

CFI 5304 Structured Finance   **20 Credits**
The module is aimed at designing debt, equity and hybrid financing techniques in order to resolve particular issues or investor problems that cannot be resolved by conventional methods. The focus is on identifying situations that call for nonstandard corporate finance solutions, and the design and pricing of the situation-specific financing instruments. Such situations include, stress-induced financial restructuring, recapitalisations, private equity and leveraged buyouts, and arbitrage-driven hybrid notes; security issues that arise in securitisation transactions, financing with asset-backed securities; medium term notes and equity-linked structured notes; design and pricing of convertible, hybrids and mezzanine debt; structured leveraged finance; high leveraged bridge loans and interim financing; presale investments; sale leaseback transactions; complex domestic and cross-border leasing transactions; a variety of project financing structures, including programs provided by the World Bank, IFC, ADB and other governmental and multinational risk insurance lending agencies.

Think in other terms

STAGE IV
CFE 5401 Research Methodology **20 Credits**
At the end of this module, the students should be able to: understand some basic concepts of research and its methodologies; identify appropriate research topics; select and define appropriate research problem and parameters; prepare a project proposal (to undertake a project organize and conduct research (advanced project) in a more appropriate manner; write a research report and thesis and write a research proposal (grants).

CFE 5400 Dissertation **80 Credits**
The dissertation, which is compulsory, helps students to consolidate theoretical and practical knowledge gained in the Taught Section of the programme by completing a research project under the supervision of the Department staff and or professionals in sectors relevant to the topic being pursued.

Think in other terms

MASTER OF SCIENCE DEGREE IN FISCAL STUDIES

1.0 PREAMBLE

1.1 Master of Science Degree in Fiscal Studies (MScFS) is a multidisciplinary field which will encompass three areas of study – public finance/revenue management, customs management and taxes management. Revenue mobilisation and management in the 21st century is becoming complex and challenging. This calls forth the need for governments to adopt a more professional approach in managing fiscal issues. The MScFS programme provides a comprehensive understanding of issues relating to fiscal activities of the government and quasi-governments on a comparative basis. The programme takes a strategic focus to the management of public finances and revenues and addresses challenges posed by regional integration and globalisation.

2.0 PROGRAMME PROFILE

Degree Profile of Bachelor of Master of Science Degree in Fiscal Studies	
Institution:	National University of Science and Technology
Type of Degree:	Masters
Credit Load:	340 credits
Level:	SADC-QF - Level 9
Accreditation Organisation(s):	Zimbabwe Council for Higher Education (ZIMCHE)
Period of reference:	

Purpose of the Programme

To provide a distinct set of knowledge, skills and behaviours that are needed to serve the diverse stakeholders in the field of public finance/revenue/economics.

To provide internationally recognised standards for the professional development of managers in the areas of public finance/revenue/economics.

To provide a global resource for the government and the private sector, as well as regional governments.

To provide a knowledge-base for those students who wish to pursue further studies and research in the field of public finance/revenue/economics, particularly, trade, customs and taxes.

Programme Characteristics

Areas of Study	Public finance and economics, policy development and implementation, fiscal decentralization and local government financial management, ethics, governance and development, revenue forecasting, mobilization and modelling, international and comparative intellectual property, trade facilitation, advanced budgeting, programme planning and risk management, advanced topics in customs and taxes e.g. strategic export controls, non-tariff trade rules, comparative tax policy and reform, environmental taxation etc., as well as quantitative and qualitative research on current economic, fiscal, customs and tax issues. Problems or opportunities.
Specialist Focus:	nced models to computation of optimal taxation and tariffs, forecasting and mobilization of revenue for the state, local government and regional and international organisations. Contribute to the debate, research and experimentation on contemporary issues in the area of fiscal studies, particularly customs, taxes and public Finance/economics. The programme takes a holistic, case-based approach aimed at creating a national strategist as opposed to institutional-focused practitioner. It also has both a national focus and global perspective
Orientation:	Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.
Distinctive Features:	The programme builds the research-technology-innovation continuum and focuses on knowledge development and application using a student-centred approach

Career Opportunities and Further Education

Employability:	Careers as revenue specialists in government and quasi-government institutions as well as regional and international organisations. Consultancy opportunities are also available especially as risk management advisors, customs and tax economist and related fields. Most often graduates are also engaged as lecturers at universities and colleges. In addition, it provides the students with appropriate background to attend appropriate PhD Programs in the fields of customs, taxes, public revenue and finance and related fields
Further Studies:	PhD Programs in the fields of customs, taxes, public revenue and finance, banking, logistics, freight forwarding and related fields.

Programme Delivery

Teaching and Learning Methods:	An eclectic mixture of teaching methods which include but are not limited to lectures, tutorials, case studies, worked examples, problem based learning, computer laboratory activities, simulations, field practicals, group work, research projects as well as their dissertations, mini-projects, term papers, end of semester

Think in other terms

professional examinations, continuous assessment tests, written assignments, oral presentations and industrial visits will be used in the programme. Students benefit from the access to financial and business databases and other hands-on learning tools to develop valuable practical skills in analysing the finance industry so as to stand out in the job market.

Assessment Methods: Written examinations, tests, assignments, practical and oral presentations and tests, seminar presentations, industrial attachment report, research project report, continuous assessments

Programme Competences
Generic:
Multidisciplinary: Ability to draw appropriately from multiple academic disciplines to define and solve problems based on understanding of complex phenomena
Quantitative and innovative reasoning: Capability to draw on big data and use analytics for informed decision making and strive to seek new ways of doing things
Communication skills: Ability to communicate effectively and to present information orally and in writing and using ICTs to both expert and non-expert audiences
Analysis and synthesis: Capacity for analysis and synthesis using logical arguments and proven facts.
Ethical commitment: Professional integrity and awareness of impact of science and technology on society and the environment
Entrepreneurial skills: Capability to identify and create new business ventures based on knowledge and new thinking paradigms
Discipline specific:
Technology development skills: Ability to develop new themes, models, advanced problem-solving techniques in finance and investment, including corporate finance, risk management
Problem-solving skills: Ability to solve a wide range of problems in related finance by identifying their fundamental aspects.

Exit Level Outcomes

Problem solving
Identify, formulate, analyse and solve complex economic, financial and investment problems creatively and innovatively.

Application of scientific knowledge
Apply knowledge of mathematics, quantitative techniques in economics, finance, financial models and software to solve economic and economic, financial and investment problems.

Investigations and data analysis
Demonstrate competence to design and conduct investigations and contribute to the debate, research on contemporary issues in the area of Finance

Think in other terms

Information technology knowledge

Demonstrate competence to use appropriate information technology skills and competences.
Professional and technical communication
Demonstrate competence to communicate effectively, both orally and in writing, with audiences in all sectors of the economy and at various levels, and the community at large.

Sustainability and financing and investing activity

Demonstrate critical awareness of the sustainability and impact of application of modern techniques in public finance and economics, customs and taxes management, on the social, economic, financial sectors and business environment in general.

Individual, team and multidisciplinary working

Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments.

Independent learning ability

nstrate competence to engage in independent learning through well-developed learning skills. Parameterize and use commonly used models in economics and econometrics, public finance, finance, risk management and other related fields for research to solve financial and societal problems.

Fiscal studies, public economics/finance, customs and taxes professionalism

Demonstrate critical awareness of the need to act professionally and ethically and to exercise judgment and take responsibility within own limits of competence.

Fiscal studies, public economics/finance, customs and taxes management

Display sufficient practical skills and knowledge in revenue generation and management to be sought-after practitioners in research institutes, government and quasi government institutes, regional and international organisations such as COMESA, SADC, and WCO.   Parameterize and use commonly used models in economics and finance and other related fields for research to solve challenges and risks in revenue generating organisations.

3.0 ENTRY REQUIREMENTS
3.1 To be considered for admission to the Master of Science in Fiscal Studies programme, a candidate should normally hold:
3.1.1   A good Honours degree in any of the following: Fiscal Studies; Public Finance; Public Economics; Customs; Taxation; Economics; Finance; Accounting; Business Studies; Commerce; or their equivalents; or
3.1.2   A Bachelor's degree in any discipline plus an acceptable postgraduate diploma or professional qualifications from an accredited university/institution with a Fiscal, Public Finance, Public Economics, Customs, Taxation, Business, Finance, Economics, Accounting,

or Commerce-related content. In addition, the candidate should possess relevant experience; or

3.1.3 An Honours degree in any discipline, plus extensive experience in the areas of Fiscal, Public Finance, Public Economics, Economics, Finance, or equivalents.

PROGRAMME SUMMARY

Stage	Module Code	Module Description	Credits
1	CFS5101	Public Finance and Debt Management	20
	CFS5102	Policy Development and Implementation	20
	CFS5103	Fiscal Decentralisation and Local Government Financial	20
	CFS5104	Management	20
		Ethics, Governance and Development	
		Total Credits Part I	**80**
2	CFS 5201	Financial Econometrics and Data Analysis	20
	CFS 5202	Revenue Forecasting, Mobilisation and Modelling	20
	CFS 5203	International and Comparative Intellectual	20
	CFS 5205	Property	20
		Trade Facilitation	
		Total Credits Part II	**80**

3		To select 4 modules from the following electives *General Fiscal Studies/Public Finance/Revenue Electives**	
	Module code	**Module Name**	**Credits**
	CFS5301	Advanced Budgeting in the Public Project and	20
	CFS5303	Programme Planning and Management	20
	CFS5304	Public Sector Risk Management	20
	CFS5305	Valuation, Pricing and Revenue Management	20
	CFS5319	Service Operations Management	20
	CFS5204	Applied Strategic Management	20
		Customs Electives	
	CFS5306	International Commercial Transactions Law	20
	CFS5307	Multilateral System of Trade and Relations	20
	CFS5308	Customs Management and Reform	20
	CFS5309	International Supply Chain Management	20
	CFS5310	Strategic Export Controls	20
	CFS5311	International Aviation and Space Law	20
	CFS5312	Non-Tariff Trade Rules	20
		Taxes Electives	
	CFS5313	Comparative Tax Policy and Reform	20
	CFS5314	Taxation of International Trade	20
	CFS5315	Environmental Taxation	20
	CFS5316	Toxic and Narcotic Substances	20
	CFS5317	International Tax Planning	20
	CFS5318	Taxation in a Computable General Equilibrium (CGE) Model	20
		Total Credits Part III	**80**
4	CFS5105	Research Methodology *(Practical)*	20
	CFS5400	Dissertation	80
		Part I Total	**100**
		Total Credits for the Programme	**340**

Think in other terms

MODULE SYNOPSES

STAGE I
Core Modules

CFS 5101   Public Finance and Debt Management   20 Credits

The thrust of the module is to develop among students an understanding and appreciation of Public Finance and Debt Management from the theoretical and practical point of view. It also enables the students to analyse the financial systems of Zimbabwe and other countries. The major aspects of the module will include sources of public revenue, public expenditure, financial administration, and budgeting principles. For Debt Management, the major aspects will comprise corporate debt management, public debt management, origins of debt crisis, the oil price shocks, the external debt difficulties of low-income Africa, debt reduction and reconstructing.

CFS 5102   Policy Development and Implementation   20 Credits

The module exposes students to the public policy making process, institutions and actors involved in the public policy making, the political economy of public policy making and role of private sector and non-state actors in public policy making, as well as implementation, monitoring and evaluation of public policies. It includes generic policy processes as well as ways in which such processes are undertaken in different countries; managing politics and the internal and external challenges and opportunities of managing public and non-profit organizations, including organizational mission, values, communication, culture, organizational environment and the policy process, legislative-executive relations, interest group advocacy and media relations; the gap between policy and implementation and how to bridge them. Focus will also be made on different policy environments, focusing on strategies, tactics, and frameworks needed to initiate and sustain policy in authoritarian, democratic, liberal, and one-party states. Pressures from the international system and issues such as globalisation will also be addressed.

CFS 5103 Fiscal Decentralisation and Local Government Financial Management   20 Credits

The module contextual framework for transfer of power from central to subnational governments, the scope and nature of fiscal decentralization, and the varied issues involved in affecting it. Specific topics include: trends in fiscal decentralization; alternative models for structuring a multilevel public sector; expenditure assignment, revenue assignment and mobilization; local government budgeting; intergovernmental transfers, borrowing and debt, creditworthiness and the financial risks of local authorities; capacity building arrangements; "sequencing" of intergovernmental reforms, determination of "fiscal space" for local revenue mobilization; decentralization reform as a strategy for nation building; design of budget policies that support a stable macroeconomic manner; mechanisms for mobilizing revenues in an

Think in other terms

accountable, transparent manner, mechanisms to support public infrastructure development and its appropriate financing; global lessons of intergovernmental systems and fiscal decentralization.

CFS 5104 Ethics, Governance and Development   20 Credits
The module addresses ethical and governance issues in development and in the public sector, at the same time providing an opportunity for building sustained ethical leadership as well as strategies to build strong institutional cultures that support ethical practices in public and development institutions. International perspectives are merged with considerations relating to Sub-Sahara Africa.

STAGE II CORE MODULES
CFS 5201   Financial Econometrics and Data Analysis   20 Credits
The module examines statistical and econometric techniques for empirical finance and applied economics. It examines the theory and approach of multivariate regression model, ARCH, GMM, Regime Switching Models, test of the CAPM, term structure models and volatility models (implied, stochastic volatility). Students will also learn aspects of the time series econometrics for both stationary and non-stationary variables at different time frequencies, with emphasis on financial/economic variables. The module also focuses on the use of statistical techniques to understand market behaviour, including methods for organizing, accessing, and ensuring the quality of data.

CFS 5202 Revenue Forecasting, Mobilisation and Modelling   20 Credits
The module covers current practices in revenue forecasting and mobilization in different countries and regional blocs; pricing and revenue optimization and legal issues associated with different pricing strategies; influence of economic forecast errors and political institutional factors on the general fund revenue forecast errors; challenges from globalization, corporate tax competition and trade liberalization and revenue replacement principles; distinction between resource-related and other revenues. Further, the module equips students with techniques of building models on excel, specifically: financial analysis models; sensitivity and scenario analysis; capital budgeting; bond analysis; VAR and simulation models.

CSFS 5203   International and Comparative Intellectual Property   20 Credits
The module enables students to be able to identify the sources of international intellectual property (IP) law and apply them to their own country's environment. Topics include: principles and concepts of IP law, including copyright, trademark, and patent law; role of IP as a tool of world trade; role and impact of global industry and non-governmental organizations in shaping IP policy, including regulation of biotechnology, electronic commerce and impact of IP on the environment and human rights; IP rights in the international trading environment and application thereof across a range of jurisdictions and in relation to specific issues; international agreements and dispute procedures on IP; and comparative evaluative studies on implementation of particular treaties in various countries.

Think in other terms

CFS 5204   Applied Strategic Management   **20 Credits**

The module aims at identifying and evaluating options for strengthening the performance of public organizations and managing changes in the public sector. Topics include: concepts and thesis of strategic management in public sector; vision, mission and objectives; development of strategy process; strategic planning; implementation; monitoring; evaluation and taking corrective steps; management of change in organization. It also requires students to distinguish between strategy process, strategy content and strategy context and merging the three dimensions into a comprehensive view of strategic management. It also covers advanced topics in the strategy field and challenges in strategy implementation faced when operating in the global environment.

CFS 5205 Trade Facilitation   **20 Credits**

The module aims to enhance knowledge and understanding of the concept of trade facilitation, its impacts on trade flows and trade costs, with particular focus on the impact of TFA on developing countries, businesses and custom authorities. The module examines the importance of trade facilitation measures to improve a country's trading performance. In particular it is intended to provide guidance in creating the institutional structure for processing trade facilitation measures. It focuses on one platform — the trade facilitation body — in the form of an interdisciplinary committee where private sector managers, public sector administrators and policymakers can work together towards the effective implementation of trade facilitation measures. Approaches to the setting up of a trade facilitation body by different developing countries are reviewed on the basis of case studies carried out by UNCTAD and relevant work by other institutions. From the review, key lessons are drawn for developing countries intent on establishing and operating trade facilitation committees.

STAGE III
Elective Modules
CFS 5204   Applied Strategic Management   **20 Credits**

The module aims at identifying and evaluating options for strengthening the performance of public organizations and managing changes in the public sector. Topics include: concepts and thesis of strategic management in public sector; vision, mission and objectives; development of strategy process; strategic planning; implementation; monitoring; evaluation and taking corrective steps; management of change in organization. It also requires students to distinguish between strategy process, strategy content and strategy context and merging the three dimensions into a comprehensive view of strategic management. It also covers advanced topics in the strategy field and challenges in strategy implementation faced when operating in the global environment.

CFS 5301   Advanced Budgeting In the Public Sector   **20 Credits**

The module covers more advanced topics in governmental budgeting and financial management. It gives an overview of public and non-profit budgeting systems and covers tools and techniques

for budget analysis. Further, it provides an overview of the functions, expenditures, and revenues of state and local governments. Topics include: budget structures, classification and reform, revenue forecasting, revenue estimating and tax expenditure budgets, revenue and expenditure analysis (determining the supply and demand for public fiscal resources); intergovernmental fiscal relations, debt administration, managing funds (including working capital); budgeting as a mechanism for financial planning and management; budget cycle; budget adoption and execution; analytical techniques for budgeting and financial planning; fiscal impact analysis; management information and performance evaluation systems.

CFS 5303   Public Sector Risk Management   **20 Credits**
The module provides the opportunity to view risk management strategically than more conservatively as compliance to regulations, providing effective risk management systems and tools and incorporating effective use of information and technology in managing risk. It examines a variety of frameworks and models of risk with respect to regulation, policy, and decision-making. The aim is to enable management to effectively deal with uncertainty and its associated risk and opportunities, enhancing the capacity to build value, to deliver more effective services more efficiently and economically. Topics include: risk assessment and analysis methodology (quantitative and qualitative); sources of risk; risk management process; identifying events; appropriate risk management strategies; control activities; information and communication tools; public sector risk structures and processes.

CFS 5304   Service Operations Management   **20 Credits**
The module examines how services can be delivered in a way that is responsive to the needs of those being served and maximised the effective utilization of resources. It addresses questions of organisational design, personnel, and operations management, inter-organisational networks, process analysis, sustaining the service organisation, services integration, improving production flows, measuring and managing for performance.

CFS 5305 Valuation, Pricing and Revenue Management   **20 Credits**
The module equips students with the necessary skills and knowledge to determine the value of goods and services in the public sector. It also covers valuation for taxes and customs purposes. It also covers appreciation determining the impact of issues such as royalties and discounts on the value of goods. Specifically, it enables students to determine the customs value of imported goods under their national legislation, drawing extensively from international practice and domestic case law. In addition, it provides the principles of the World Trade Organisation (WTO) Valuation Agreement on Tariffs and Trade (Valuation Agreement), analyse adjustments required to arrive at a correct valuation for their customs administration, determine when to use a valuation method other than the transaction valuation, using acceptable WTO Valuation

CFS 5306   International Commercial Transactions Law   **20 Credits**
The objective of the module is to provide students with an understanding of the legal environment in which international trade and commerce are conducted by business entities in

both civil and common law countries. Both private and public law aspects of international trade and commerce will be examined. Private law covers transactions relating to sale of goods, forms of payments, customs, shipping law, insurance law, securities over international transactions in traditional and electronic forms, and private international aspects with particular reference to dispute resolution. Public law covers the impact of international obligations, both multilateral and bilateral, on the conduct of trade and commerce, as well as principles of international law relating to contracts and dispute settlement and arbitration.

CFS 5307   Multilateral System of Trade and Relations   **20 Credits**
The module provides students with a comprehensive understanding of GATT/WTO law in the regulation of international commerce, with particular emphasis on trade in goods, trade in services, dispute resolution, and trade facilitation. This includes identification of GATT/WTO issues and their implications for practice; GATT/WTO law reform and implications thereof for customs law and practice; and other areas of trade law with suggestions for reform. Other topics include: economics of trade; investment issues; the WTO Agreement on Trade-Related Investment Measures; bilateral investment treaties; GATT/WTO rules on regional trade agreements (RTAs).

CFS 5308   Customs Management and Reform   **20 Credits**
The module enables students to apply contemporary administration methods and the newest management practices in practical everyday activities, analyse practical situations, evaluate arising problems and make proper decisions; use national and international networks and customs computer databases; apply special international trade customs policy, international carriage and logistics knowledge; implement contemporary customs tasks and functions and form customs strategy. Specific topics include: comparative analysis of public administration; administrative legal relations in customs activities administration of customs; strategic development of the state; customs policy of different regional blocs; international trade; protection of intellectual property in international trade; customs strategies of different regional blocs. Further, the module addresses issues relating to customs reform and modernization, mainly, the requirements for reform and modernization of customs structures, policies and procedures; the significance of international conventions, such as the Kyoto Convention and the role of the World Customs Organization (WCO) in supporting customs reform and modernization; the design and implementation of strategic planning for customs administration; challenges to the change process; strategic planning and change management techniques and strategies to support a reform and modernization process.

CFS 5309   International Supply Chain Management   **20 Credits**
The module provides an understanding of the effective operation of the international supply chain and the role of customs (both for imports and exports) inside it, the needs of its component parts and the opportunities it presents for effective control and trade facilitation. It provides a detailed study of: the WTO instruments for trade facilitation and safeguard measures; the Revised Kyoto Convention; the SAFE Framework of Standards; supply chain management;

Think in other terms

opportunities and barriers; stakeholder requirements (banking and insurance sector, importers and exporters, logistics and transportation companies, clearance agents, public, international associations and organisations, national bilateral and multilateral agencies, and the final clients); capacity to integrate customs inside the supply chain.

CFS5310   Strategic Export Controls   20 Credits

The module is designed to equip students with a comprehensive knowledge of export controls of defence and strategic goods and how these controls fit into global non-proliferation efforts of weapons of mass destruction (WMI). It covers international treaties, regimes and UN sanctions; export control administration and process; Export control legislation in various countries and their global impact; risk assessment/risk of diversion and the role of intelligence.

CFS5311   International Aviation and Space Law   20 Credits

The module examines the environment and multilateral legal principles and institutional framework within which international aviation operates. It provides an analysis and interpretation of the nature of bilateral air services agreements. Further, it examines international conventions and state practices in relation to offences against aircraft; rules relating to liability regime established by the warsaw convention and subsequent agreements; international standards relating to establishment and operation of airports, clearance of passengers and cargo through international airports and norms applying to customs quarantine and immigration. The module then examines the multilateral regulation governing the use of outer space for peaceful (and non-peaceful) purposes.

CFS 5312   Non-Tariff Trade Rules   20 Credits

The module focuses on current and emerging issues concerning security of the supply chain and authorized trader programs that have been legislated for in many countries. It provides a comprehensive introduction to international supply chain concepts, benchmarking and best practice approaches to the management of supply chain issues including regulatory compliance and security. To achieve this the module requires that students be able to articulate and apply the principles contained in the world customs organization's framework of standards, explain issues relevant to international regulation of the supply chain, and be capable of developing and implementing a variety of compliance approaches to the regulatory requirements.

CFS 5313   Comparative Tax Policy and Reform   20 Credits

The module provides an overview to the principles and policies that underlie and shape tax systems and reforms. Principles of good tax policy are explained and applied to various tax rules and tax system features. Policy issues of key types of taxes are examined. Students will gain a broader appreciation of the tax law beyond its technical application, as well as how tax, economic, social and environmental policies interact. In addition, the module examines key tax policy issues that arise in different countries, with a particular focus on the design and structure

of the income tax. It will consider comparative analysis of tax systems, and tax policy principles including equity, efficiency, and ability to pay, progressivity and tax expenditures. Specific topics include: tax rates, definition of income, personal deductions, that tax unit, taxing corporate and capital income, and tax administration and management on a comparative basis.   An understanding of fundamental tax reform will be gained through study of why major reform is often proposed, the key types of proposals and the issues that arise.

CFS 5314   Taxation of International Trade   20 Credits
The module covers: taxation regulations and practices faced by international firms (corporate tax, income tax, value added tax, tariffs); tax refunds; tariffs in free zones; taxation in customs union operations; provisional importation; taxation in cross border leasing; and double taxation.

CFS 5315   Environmental Taxation   20 Credits
The module provides an introduction to the areas of excise law and administration which relates to the taxation of certain products or processes that impact upon the environment. There is particular focus on the differing types of approaches to the taxation of such products and processes through the excise system, including levies, off-sets, rebates and incentives. The module also addresses contemporary issues relating to application of environmentally based taxes, such as impact on local industry and consumers, development of environmental protection technology, and cross border issues. Specifics include: carbon taxation principles; other pollution-based taxes; Kyoto Convention and taxation; motor vehicle excises; and the use of taxation incentives to achieve environmental outcomes.

CFS 5316   Toxic and Narcotic Substances   20 Credits
The module covers issues relating to the importation and export of alcohol, tobacco and illicit drugs, and the excise and taxation infrastructure thereof. It provides the framework for understanding the different types of alcohol and their origins, the taxation and administrative issues around the manufacture of alcohol such as blending and repackaging; the main means of taxing alcohol; the factors in setting alcohol policy; impact of alcohol tax on government, consumers and the industry; contemporary issues in alcohol policy and compliance issues. The module also covers understanding of different types of tobacco products and their origins; excise law and administration which impact upon the manufacture and distribution of tobacco and tobacco products; the main means of taxing tobacco; impact of tobacco tax on government, consumers and industry; factors in setting tobacco tax policy; tobacco tax fraud and global compliance issues.

CFS 5317 International Tax Planning   20 Credits
The module covers the theories, doctrines and principles of international taxation; international trade and taxation principles (including internet trade and its tax liabilities); offshore activities

and their tax implications; tax burden minimization; tax avoidance schemes in international trade, licensing, leasing and franchising operations as well as international double taxation avoidance treaties, and international collaborations in the field of taxes; international anti treaty-shopping provisions; comparison of different model conventions (e.g. UN and OECD); comparison of major tax jurisdiction; tax harmonization; tax havens/tax-privileged nations; and off-shore jurisdictions.

CFS 5318   Taxation in a Computable General Equilibrium (CGE) Model   20 Credits
The module enables students to capture many of the complex interactions between different types of taxes, and their effects upon different sectors, agents, or regions in an economy. It enables students to understand the basic concepts and theories used in the construction of a computable general equilibrium model (or applied general equilibrium (AGE) model, then use this framework to analyse the impacts of some important taxes, such as environmental tax or goods and services tax, in an economy. Initially, the issue of interactions (or trade-off) between different types of taxes given a particular level of taxation, will be addressed, followed by the issue of optimal level of taxation which gives rise to the concept of marginal cost of public funds. Topics include: taxation in a first best and second-best economy; computable general equilibrium modelling of taxation issues (basic structure of CGE model and how taxes fit into this structure, use of CGE to analyse taxation issues relating to environmental, goods and services, and labour income tax, excess tax burden and marginal cost of public fund); empirical examples (analysis of the results from a practical CGE model of taxation).

STAGE IV
CFS 5105 Research Methodology   20 Credits
At the end of this module, the students should be able to: understand some basic concepts of research and its methodologies; identify appropriate research topics; select and define appropriate research problem and parameters; prepare a project proposal (to undertake a project); organize and conduct research (advanced project) in a more appropriate manner; write a research report and thesis as well as to write a research proposal (grants) focusing on the field of public finance/revenue/economics, customs and taxes.

CFS 5400 Dissertation   20 Credits
The dissertation, which is compulsory, helps students to consolidate theoretical and practical knowledge gained in the taught section of the programme by completing a research project under the supervision of the department staff and or professionals in sectors relevant to the topic being pursued**.**

DEPARTMENT OF INSURANCE AND ACTURIAL SCIENCE

Lecturer and Chairperson
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Secretary
F. Usavi, MBA Counselling, BSc Hons Counselling, ND in Human Resources, ND in Secretarial Z'bwe

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L. M. Sibanda, MScLLM, University of Fort Hare, SA, LLB University of Fort Hare, SA

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Research Fellows
B. W. Mazviona, MPhil Mathematics Finance, UCT RSA, BCom (Hons) Actuarial Science, NUST Z'bwe

UNDERGRADUATE DEGREE PROGRAMME

SPECIAL REGULATIONS

BACHELOR OF COMMMERCE HONOURS DEGREE IN RISK MANAGEMENT AND INSURANCE

1.0 PREAMBLE

1.1 The Department of Insurance and Actuarial Science offers world-class programmes of study in risk management, insurance and actuarial science. The department aims to prepare quality practitioners for the financial services sector, particularly the insurance industry, capable of serving in a wide variety of environments. Undergraduate programmes of study are offered on a full time basis for the Conventional and evening Parallel classes as well as on a block-release basis. The postgraduate programme is run on a block-release basis only. The department offers two Honours Degree programmes and one Postgraduate Degree programme.

2.0 ENTRY REGULATIONS

2.1 **Normal Entry**

Applicants who wish to study a Bachelor of Commerce Honours Degree in Risk Management and Insurance must have the following qualifications or their equivalent:-
  i.   Five 'O' level passes including English and Mathematics
  ii. At least two passes at 'A' level.

2.2 **Special Entry**

Applicants without the appropriate 'A' Level qualifications for entry but who have professional qualifications from Institutions such as CII (UK), IIS (SA), IRM and Institute or Faculty of Actuarial (UK) as well as relevant working experience and who satisfy the University and the Department of their ability to complete the degree study programme satisfactorily will be considered for study.

2.3 **Mature Entry**

There is also a provision for mature entry for persons who may not have academic qualification for entry but who have suitable or relevant post school experience and who satisfy the General Regulations.

3.0 STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

In accordance with the General Regulations, the degree requires the study of a range of modules over four years (8 semesters). This includes one academic year of Industrial

attachment. The programme will have a minimum of 510 CREDITS in total. Each part will contribute to this total as follows:

Year 1	120 credits
Year 2	120 credits
Year 3	120 credits
Year 4	150 credits

3.1 **Weighting of the Programmes**

The minimum total credits per programme are: 510 CREDITS for undergraduate programmes, and 320 CREDITS for the postgraduate programme, broken down as follows:

Programme	Total Credits per Part/Stage				Total Credits
	I	II	III	IV	
B.Comm. Honours Risk Management and Insurance	120	120	120	150	510
B.Comm. Honours Actuarial Science	120	135	120	135	510
MSc. Risk Management and Insurance	80	80	80	80	320

3.2 These regulations should be read in conjunction with the General Academic Regulations for Undergraduate Degree, hereinafter referred to as General Regulations and Faculty Regulations.

3.3 The degree will be awarded to candidates who have successfully completed the examinations in accordance with the regulations set out above in the Faculty Regulations.

3.4   PROGRAMME PROFILE

Degree profile for Bachelor of Commerce Honours Degree in Risk Management and Insurance	
Institution:	**National University of Science and Technology**
Type of Degree:	**Undergraduate**
Credit Load:	**510 CREDITS**
Level:	**SADC-QF - Level 8**
Programme Duration:	**4 years**

Purpose of the Programme

This programme aims to impart on students the technical and analytical skills required in the risk management and insurance profession.

Programme Characteristics

Areas of study: **Insurance economics**

Analyse and describe the mechanics of ideal and real insurance markets, their organisation, function and role in the economy and society. Focuses on the economics of uncertainty, risk perception and risk aversion. Also cover micro- and macro-economic concepts and their application to risk management and insurance. Issues of supply and demand in insurance markets are also covered. Theories of moral hazard and adverse selection and their impact on insurance markets is explored.

Insurance

Covers theory of insurance, principles of premium calculation, underwriting and claims management as they are applied to property insurance, life insurance, liability insurance, health insurance and reinsurance.

Finance

Provides corporate and financial analytical skills critical to the financial management of insurance companies.

Risk Management

Focuses on the identification, assessment, transfer and mitigation of various types of risks such as operational risks and financial risks. Also covers the concepts theories of risk management and how risk management creates value.

Law

Legal aspects of insurance contracts and insurance business, regulation of insurance markets and public policy issues. It also focuses on principles of utmost good faith, insurable interest and subrogation. Liability rules and liability laws are also covered.

Think in other terms

Specialist Focus:	Life Insurance, Health Insurance, Pensions, Property Insurance, Liability Insurance, Investment, General Insurance, Reinsurance, Operational Risk Management and Enterprise Risk Management.
Orientation:	Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.
Distinctive Features:	The programme is tailored to provide students with analytical, investigative, entrepreneurial, technical and decision making skills.

Career Opportunities And Further Education

Employability:	The skills that students gain enable them to build careers in risk management, insurance profession or in the academia. Potential roles include risk analyst, risk manager, underwriter, claims manager, reinsurance manager, loss control specialist, claims adjuster, insurance agent/broker, Claims Investigator, Customer Service Representative, Marketing Representative, Personal Financial Planner, and Employee Benefits.
Further studies:	Master of Science and Doctoral studies in Risk Management as well as Professional Risk Management and Insurance Exams.

Programme Delivery

Teaching and Learning Methods:	Lectures, practicals, seminars, research project, group work and individual independent study.
Assessment Methods:	Written examinations, tests, assignments, oral presentations, dissertation and continuous assessment.

Programme Competencies

Generic:

Analysis and synthesis: Develops capacity for analytical and critical thinking.

Discipline specific:

Skills: Equips students with analytical, investigative, entrepreneurial, technical and decision making skills required in the risk and insurance profession

Exit Level Outcomes

Problem Solving and Analytical Skills
The ability to apply analytical skills in the day to day operations of business and ability to solve problems in a logical and manner especially in claims investigations.
Communication and Negotiation
Ability to adapt communication style in order to explain complex and sometimes technical information to various internal and external stakeholders. Students are expected to be able to negotiate policy terms with clients, brokers and reinsurers.
Decision Making Skills
Apply numerical and analytical skills to make sound decisions in underwriting insurance policies.

4.0   Duration of Programme
  Candidates shall pursue the programme of study for a period of not less than four years on a full-time or block-release basis, with each academic year constituting a part of the degree programme.
  In Part III of the study programme candidates will be required to undertake an attachment programme for at least 30 weeks with an identified industrial organisation.
  In Part IV of the programme candidates will be required to complete a research project under the supervision of the Department of Insurance and Actuarial Science staff.

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PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
CAC 1107	Accounting IA	10
CIN 1109	Commercial Law	10
CIN 1106	Quantitative Analysis for Business	10
CBA 1104	Principles of Micro Economics	10
CIN 1108	Principles of Management	10
CTL 1101	Peace, Leadership and Conflict Management	10
CAC 1208	Accounting IB	10
CBA 1205	Macro-economics	10
CIN 1208	Insurance Law	10
CIN 1207	Quantitative Analysis for Business II	10
CIN 1202	Risk and Insurance	10
CIN 1209	Business Communication and Information Technology	10

PART II

Module Code	Module Description	Credits
CIN 2117	Liability Insurance	10
CIN 2118	Property and Transportation Insurance	10
CIN 2119	Enterprise Risk Management	10
CIN 2120	Life Insurance	10
CIN 2121	Financial Management	10
CIN 2116	Research Methods in Insurance	10
CIN 2216	Computer Packages & Applications in Insurance	10
CIN 2217	Reinsurance	10
CIN 2218	Retirement Funding	10
CIN 2219	Health and Disability Insurance	10
CIN 2220	Micro insurance	10
CIN 2221	Insurance Broking & Client Services	10

PART III

CIN 3001	Industrial Attachment	120

PART IV

CIN 4101	Insurance and the Commercial Environment	15

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CIN 4102	Corporate Strategy and Decision Making	15
CIN 4117	Financial Markets, Institutions and Regulation	15
CIN 4118	Operational Risk Management	15
CIN 4203	Investment and Portfolio Management	15
CIN 4217	Strategic Marketing of Insurance Services	15
CIN 4205	Financial Risk Management	15
CIN 4218	Accounting and Financial Analysis for Insurance	15
CIN 4001	Project	30

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MODULE SYNOPSES

PART I

CIN 1109 Commercial Law   **10 Credits**

The aim of this module is to introduce students to the basic legal principles governing the business environment. Focus will be placed on: definition of contracts, requirements of a contract, breach of contract, remedies for breach of contracts, law of agency, contract of sale, law of business organizations and insurance contract.

CIN 1106 Quantitative Analysis for Business I   **10 Credits**

CIN1106 is a quantitative reasoning module for students in the Faculty of Commerce. It covers the techniques business students are most likely to use in future modules and in business related research. The topics covered are useful in economics, finance, accounting, risk, marketing and personnel management and in tandem with international developments in these areas. Students will learn a variety of problem-solving strategies that are applicable in a wide range of business environments. Specific topics include matrix algebra, linear programming, index numbers, calculus, decision making in business and an introduction to financial mathematics.

CTL 1101 Conflict Transformation & Leadership   **10 Credits**

The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development

CAC 1107 Accounting IA   **10 Credits**

The module is designed for students without "A" level Accounting. It introduces students to basic principles, concepts and techniques of accounting in general. The module focuses on the use of accounting information by managers. The module covers the following areas accounting cycle, Accounting as an Information system, trial balance, preparation of financial statements for individual companies, non-profit making organisations as well as Accounting ratios.

CBA 1206 Macroeconomics   **10 Credits**

The module is designed to address how economists model the relationships between aggregate economic variables and examine how various fiscal and monetary policies can affect the results. The main goal is to improve students' economic literacy and ability to apply economic models to analyse real world events. This module will be taught from an equilibrium perspective. This means the module will work with economic agents that

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Think in other terms

optimize and with aggregate consistency conditions. Along with building basic economics intuition, the module will be centred on constructing and understanding macroeconomic models. These models will be used to discuss the theory of long-run economic growth and short-run economic fluctuations and to analyse macroeconomic policy, in particular fiscal policy.

CIN 1108 Introduction to Risk Management   **10 Credits**
The aim of this module is to introduce students to an early appreciation of basic concepts of risk and risk management. It deals with the concepts of risk and uncertainty, risk definitions and classifications, and the application of principles of management to risk management. Emphasis is placed in the generic risk management model with special focus in risk identification/awareness, risk measurement and techniques for dealing with risk. This module provides a foundation for the rest of the risk management and insurance modules to be taken later in the study programme.

CIN 1202 Risk and Insurance   **10 Credits**
The aim of the module is to familiarise students with risk financing with special emphasis placed on insurance and self-insurance. It deals with guidelines for insurable risks, risk assessment and measurement of insurable risks, principles and practice of insurance and self-insurance, the insurance industry, including the role of the government. It introduces the students to international insurance markets and provides an overview of short terms and long term insurance policies, claims management and the marketing of insurance services.

CIN 1208 Insurance Law   **10 Credits**
This module reviews the development of insurance as an introduction to Insurance Law. It explores the relationships between the insurer, agent and insured as created by the insurance contract. It also discusses other agency legal issues while providing a basic understanding of the principles of contract law and how they relate to insurance. It also looks into the interpretation of insurance contracts; conditions precedent; representations; warranties; terms; conditions; insurable interest; rights of beneficiaries; exemptions; excess liabilities; waiver and estoppel; subrogation; controls on the insurance industry. The module also examines principles governing insurance claims and their application.

CIN 1209 Business Communication and Information Technology   **10 Credits**
The aim of this module is to introduce students to the use of information and communication technology in a business environment and builds a foundation of digital literacy skills necessary for successful practical, written and oral communication skills in a technologically driven society. This module will impact on students' knowledge and skills to function cohesively and communicate as a team through delivering persuasive group presentations. Throughout the module, there is an emphasis on digital literacy, effective electronic research and communication skills and other current risk management and insurance issues related to the impact of information and communication technology.

CIN 1207 Quantitative Analysis for Business II   10 Credits

CIN 1207 is an introductory module in business statistics designed especially for students majoring in Commerce. It covers the techniques business students are most likely to use in their future modules. The module covers descriptive and inferential statistics with business applications to analyse management and organisational problems. Students will learn to apply statistical analysis techniques to practical problems that firms in the real world face. Specific topics include: measures of central tendency and dispersion, probability theory and distributions, estimation, hypothesis testing, regression analysis and correlation analysis.

CAC 1208 Accounting IB   10 Credits

The module aims at equipping students with basic Management Accounting techniques in planning, control and decision making. It is intended for non-accounting professionals and covers the following areas: relationship of Cost and Management Accounting to other branches of Accounting, cost classification, stock valuation, material and labour costing, cash budgets etc.

CBA 1206 Macroeconomics   10 Credits

The module is designed to address how economists model the relationships between aggregate economic variables and examine how various fiscal and monetary policies can affect the results. The main goal is to improve students' economic literacy and ability to apply economic models to analyse real world events. This module will be taught from an equilibrium perspective. This means the module will work with economic agents that optimize and with aggregate consistency conditions. Along with building basic economics intuition, the module will be centred on constructing and understanding macroeconomic models. These models will be used to discuss the theory of long-run economic growth and short-run economic fluctuations and to analyse macroeconomic policy, in particular fiscal policy.

PART II

CIN 2117 Property and Transportation Insurance   10 Credits

The aim of this module is to provide students with the key concepts, principles and underwriting criteria applicable to property and transportation portfolios handled by the majority of insurers domestically and internationally. Particular emphasis will be placed on the practical application of the concepts through case studies and group assignments wherever appropriate

CIN 2118 Liability Insurance   10 Credits

The aim of this module is to familiarise students with concepts, principles and practices for dealing with risks connected to legal liability. The module also examines the latest enactments and insurance products arising out of social and economic, specimen wordings of

policy, insurance proposals, risk assessment and rating and claims management. Different types public liability, professional liability, product liability, and environmental liabilities insurances form part of the module content.

CIN 2119 Life Insurance   **10 Credits**
The module seeks to develop in the student: knowledge and understanding of the scope of life assurance, different types of life insurance policies, appropriate uses and administration of life insurance; underwriting of life insurance policies including medical underwriting, financial underwriting, genetic underwriting and technological underwriting, claims management; legal and regulatory aspects of the conduct of life insurance business.

CIN 2120 Enterprise Risk Management   **10 Credits**
The aim of the module is to expand on the knowledge gained in CIN 1107 Introduction to Risk Management and CIN 1208 Risk and Insurance. The module deals with the evolution of risk management into enterprise risk management, benefits of enterprise risk management, corporate governance and the design and implementation of an enterprise risk management programme. Emphasis is placed on risk and risk taking as vehicles for opportunity and the growth of enterprises. The module will present key tenants of an enterprise wide risk management strategy and structure which include establishing the context, and understanding the internal and external influences that affect the implementation of a holistic enterprise wide risk management programme.

CIN 2121 Financial Management for Insurance   **10 Credits**
This module seeks to develop the financial skills and logical thought processes necessary to understand and make informed managerial decisions. Specific objectives include developing an understanding of the time value of money; using financial statements in decision making; and understanding the cost of capital, valuation of stocks and bonds, management of short-term assets, short-term and long-term financing and capital markets.

CIN 2116 Research Methods in Insurance   **10 Credits**
This module has been introduced to help students in their projects and internship reports. The objective of the module is to provide students with the skills necessary to carry out research work. The module will enable students to carryout applied research in insurance and actuarial science. This module covers following: principles of conducting research, types of approaches to research; qualitative and quantitative, selecting research topics, research proposal, literature search, methods of data collection, analysing research data, writing and presentation of a research project. The module will be assessed by coursework and a written examination.

CIN 2217 Reinsurance   **10 Credits**
The aim of this module is to give students an in-depth understanding of how reinsurance operates. Areas to be covered include reinsurance methods; life, non-life and liability reinsurance programmer design, legal issues relating to reinsurance, reinsurance contract

Think in other terms

wordings and other key issues associated with this business in today's world insurance markets. Attention will also be paid to financial reinsurance.

CIN 2218 Retirement Funding   **10 Credits**
The aim of this module is to equip students with knowledge and skills of designing retirement plans. Emphasis will be placed on the development of analytical and critical abilities in relation to retirement rules, appropriate packages for different stages of life preparation for retirement, different strategies for funding retirement, taxation, regulations and techniques for assessing, measuring and managing risks, and costs that can affect the provision of financial security at retirement.

CIN 2219 Health and Disability Insurance   **12 Credits**
The aim of this module is to equip students with the knowledge and skills of designing, marketing and managing health insurance, disability insurance and managed care plans provided under private sector, non-profit making and government programs. Emphasis will be placed on funding of the different schemes, regulations, tax, fraud and costs.

CIN 2210 Microinsurance   **10 Credits**
The module seeks to give students an understanding of key issues in micro insurance. It examines traditional and innovative financial strategies low-income people and companies use to protect their assets, manage risks and grow their incomes. The module includes the principles of micro insurance product development, product types and distribution models, financial and social performance analysis, index-based insurance, impact studies on micro insurance, consumer protection and regulation of micro insurance business.

CIN 2221 Insurance Broking and Client Services   **10 Credits**
The aim of this module is to equip students with knowledge of the role played by intermediaries in the provision of risk management and insurance services. Emphasis will be placed on the functions, roles, duties, and regulations of insurance brokers. The module will also include marketing and competition in the risk management and insurance intermediaries sector.

CIN 2216 Computer Packages and Applications in Insurance   **10 Credits**
Computer Packages and Applications in Insurance will provide students with an opportunity to write programs for statistical models used in statistics, insurance and actuarial modelling. It will also explore statistical reporting using software packages for statistical calculations, numerical and graphical summaries, contingency tables, significance tests, confidence intervals and regression methods as well as analysing data from comparative studies. Students will gain skills from the use of statistical packages such as SPSS, R, Excel and MATLAB. This module will be assessed by coursework and a practical examination.

PART III
CIN 3001 Industrial Attachment   **120 Credits**

PART IV
CIN 4101 Insurance and Commercial Environment   **15 Credits**
The aim of this module is to provide an understanding of the environments which influence the structure and development of insurance markets. The module appraises the impact of the economic, socio-political, legal, commercial and technological environments. The module also covers the role that insurance plays within financial markets, the economic and social system.

CIN 4102   Corporate Strategy and Decision Making   **15 Credits**
The module equips students with the knowledge on how to determine corporate boundaries at a general level on one hand and with specific reference to insurance on the other. The module will also impart skills on Strategy to enable students to identify those elements of strategy which apply universally and those which are specific to the insurance industry. Students will be introduced to key issues that impact on strategic decision making.

CIN 4117 Financial Markets, Institutions and Regulation   **15 Credits**
This module examines the form and function of various financial markets and the manner in which financial managers use these markets to accomplish strategic corporate objectives. The objective of this module is to prepare students for successful interaction with financial markets and institutions. Focus will be placed on the behaviour of major financial institutions and their role in the intermediation process as suppliers of funds as well as the form and function of specific financial markets. The module also looks at regulation of these markets in order to give students a deep appreciation of the profound influence of governmental intervention on the evolution of financial markets.

CIN 4118 Operational Risk Management   **15 Credits**
The aim of this module is to equip students with basic knowledge and skills on the design and implementation of an operational risk management strategy. Focus is placed on risk assessment in connection with systems, processes, people, the effect of external events, risk capacity, risk appetite risk adjusted performance measurements, control measures, business continuity and change management. An extensive use of cases studies relating to a variety of commercial enterprises will ensure that students gain practical knowledge of the subject area.

CIN 4203   Investment and Portfolio Management   **15 Credits**
This module will focus on financial markets in particular, the equity markets from an investment decision making perspective. Students will be equipped with skills of developing conceptual frameworks and analytical tools, and applying them to investment models. The

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module explores the competitive dynamics of investment organisations, products and markets.

CIN 4205   Financial Risk Management   **15 Credits**

The module aims at developing a broad understanding of the drivers of risk and to provide a framework for financial risk management from which applications to particular situations will be made. Specifically the module will focus on equipping students with skills in developing a systematic framework for handling risk situations, understanding how people in general and managers in particular behave in risky situations and recognizing inconsistent behaviour, identifying sources of risk and evaluating exposures, and developing expertise in the issue of market mechanisms available for mitigation of risk using financial risk management models and techniques

CIN 4217 Strategic Marketing of Insurance Services   **15 Credits**

This module seeks to equip students with an understanding of strategic marketing and its implications to insurance. The module covers issues such as the unique characteristics of insurance services, the behaviour and segmentation of buyers, competition, the role and effects of distribution channels, the dynamics of direct marketing, designing, implementation and monitoring a strategic marketing plan for insurance. Emphasis will be placed on relationship marketing.

CIN 4218 Accounting and Financial Analysis for Insurance   **15 Credits**

The module looks at analysing insurance accounting and financial statement for insurance companies is very different from analysing those of other companies and thus presents unique challenges and industry specific issues. This module is therefore designed to provide an excellent foundation for evaluating insurance company financial statements, industry ratios, capital adequacy, regulatory issues, rating agency assessments, valuations and early warning signs of financial distress. Students will be equipped to recognise the impact of differing accounting standards, reserving policies and changes in external variables such as interest rates and asset prices on the financial statements. Attention will be paid to the risks inherent in the main products offered by life, non-life and reinsurance companies to help students recognise how these are reflected in the financial statements.

CIN 4001 Project   **30 Credits**

Students will be expected to complete a research project on a topic of their choice but limited to the taught modules. The project is a consolidation of the theoretical knowledge gained in the taught modules and the practical experience gained from Industrial Attachment.

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BACHELOR OF COMMERCE HONOURS DEGREE IN ACTUARIAL SCIENCE

1.0 PREAMBLE

1.1 Actuaries are professionals who use their mathematical, statistical and financial skills to solve financial problems involving future uncertainty. They put price tags on future risks. Due to their versatility, actuaries enjoy a wide variety of challenging and rewarding careers. The local actuarial science profession is still in its infancy level of development and there is a serious shortage of actuarial personnel working in Zimbabwe.

1.2 The Bachelor of Commerce Honours Degree in Actuarial Science is aimed at equipping students with expertise in the following areas of actuarial science: life assurance, health insurance, pensions, short-term insurance, finance and investments, and risk management. Students graduating from this programme will be able to find employment in the insurance industry, actuarial consulting firms, government agencies, investment companies, banks, universities and other large corporations.

2.0 PROGRAMME PROFILE

Degree profile for Bachelor of Commerce Honours Degree in Actuarial Science	
Institution:	**National University of Science and Technology**
Type of Degree:	**Undergraduate**
Credit Load:	**510 CREDITS**
Level:	**SADC-QF - Level 8**
Programme Duration:	**4 years**

Purpose of the Programme

This programme aims to impart on students the technical and analytical skills required in the actuarial profession.

Objectives of the Programme

- To equip students with the skills they need to shorten the time required to obtain certification in becoming qualified actuaries.
- To empower students with skills and competencies to spearhead research, development and innovation.

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Programme Characteristics

Areas of study:	**Actuarial Science**
	The assessment and management of financial and other measurable risks faced by various organisations, primarily in the financial services sector.
	Statistics
	Entails the analysis and modelling of random variables using probability distribution functions as well as statistical inference.
	Finance
	Provides corporate analytical skills critical to the management of investments and use of financial instruments.
	Economics
	Focuses on micro- and macro-economic concepts, economic policies and how economies work.
	Stochastic models
	How to model processes allowing for the random variation of both inputs and outputs.
Specialist Focus:	Life Insurance, Health Insurance, Pensions, Investment, General Insurance and Enterprise Risk Management.
Distinctive Features:	The programme is tailored to provide students with technical and analytical actuarial skills.

Career Opportunities And Further Education

Employability:	The skills that students gain enable them to build careers in risk management, investment management, financial analysis, or in the academia. Potential roles include actuarial analyst, reserving actuary, pricing actuary, pensions actuary, investment analyst and asset modelling analyst.
Further studies:	Master of Science and Doctoral studies in Actuarial Science or Actuarial Management as well as Professional Actuarial Exams.

Think in other terms

Programme Delivery

Teaching and Learning Methods:	Lectures, practicals, seminars, research project, group work and individual independent study.
Assessment Methods:	Written examinations, tests, assignments, oral presentations, dissertation and continuous assessment.

Programme Competencies

Generic:

Analysis and synthesis: Develops capacity for analytical and critical thinking.

Discipline specific:

Skills: Equips students with technical and analytical actuarial skills required to assess and manage measurable risks in the financial services sector, with particular focus on the insurance sector.

Exit Level Outcomes

Problem Solving

Craft solutions to actuarial problems in financial institutions and manage measurable risks.

Modelling

Apply data analytics, model building and implementation skills which are vital in today's actuarial profession.

Financial Management

Apply actuarial theory to craft financial and investment solutions for business in the most economic ways.

3.0 DURATION OF PROGRAMME AND DELIVERY SYSTEMS
3.1 Candidates shall pursue the programme of study for a period of not less than four years on a full-time basis, with each academic year constituting a part of the degree programme.
In Part III of the study programme candidates will be required to undertake an industrial attachment programme for at least 30 weeks.
In Part IV of the programme candidates will be required to complete a research project under the supervision of the Department of Insurance and Actuarial Science staff.

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3.2 Delivery System

Year of Study	Semester	Number of modules
First Year	First Semester	7 Modules
	Second Semester	5 Modules
Second Year	First Semester	6 Modules
	Second Semester	6 Modules
Third Year	Industrial Attachment	
Fourth Year	First Semester	5 Modules
	Second Semester	4 Modules + Research Project

4.0 ENTRY QUALIFICATIONS

4.1 Applicants for the Bachelor of Commerce Honours Degree in Actuarial Science must have the following qualifications or their equivalent:

- Five (5) Ordinary Level passes, including English and Mathematics (with at least a grade C or better)
- At least two passes at 'A' level.
- The applicant should have passed Mathematics, Statistics or Economics.
- Further Mathematics will be an added advantage.

4.2 **Special entry**

Applicants without the appropriate 'A' Level qualifications for entry but who have passed exams from any actuarial professional body as well as relevant working experience and who satisfy the University and the Department of their ability to complete the degree study programme satisfactorily will be considered for study.

5.0 ASSESSMENT REGULATIONS

The students will be assessed on the basis of coursework from assignments and the final examination. The mark allocation will be as follows:

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Continuous Assessment 30%
Final Examination 70%

Mark Weighting PART III

6.0 DEGREE CLASSIFICATION

75% and above	- 1	(Distinction)
65 - 74%	- 2.1	(Upper Second Class)
60 - 64%	- 2.2	(Lower Second Class)
50 - 59%	- PASS	(Pass)
Below 50%	- FAIL	(Fail)

7.0 STRUCTURE OF THE PROGRAMME

In accordance with the General Regulations, the degree requires the study of a range of modules over four years (8 semesters). This includes one academic year of Industrial attachment.

PROGRAMME SUMMARY

Part	Semester	Module Code	Module Name	Credits
		CAC1107	Accounting 1A	10
		CIN1109	Commercial Law	10
		SMA1101	Calculus	10
		CBA1104	Principles of Micro-Economics	10
I	I	CBU1108	Principles of Management	10
		CBU1102	Business Communication	10
		CTL1101	Conflict Transformation and Leadership	10
		CIN1108	Introduction to Risk Management (Elective)	10
Total Credits Part I Semester I (minimum)				**70**
		CAC1208	Accounting 1B	10
		CBA1205	Principles of Macro-Economics	10
I	II	CBU1209	Principles of Marketing	10
		CIN1202	Risk and Insurance	10
		SMA1201	Calculus of several variables	10
Total Credits Part I Semester II				**50**
Total Credits Part I (minimum)				**120**
		Module Code	**Module Name**	**Credits**
		CIN2116	Research Methods in Insurance	10
II	I	CFI2101	Corporate Finance I	10
		CIN2122	Actuarial Financial Mathematics	12
		CIN2111	Actuarial Statistics I	12
		CIN2114	Visual Basic for Applications	12
Total Credits Part II Semester I				**67**
		Module Code	**Module Name**	**Credits**
II	II	CIN2211	Actuarial Statistics II	12
		CIN2222	Life Contingencies I	12
		CIN2215	Topics in Applied Mathematics	12

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		CIN2224	Pension and Benefits	11
		CIN2216	Computer Packages and Application in Insurance	11
Total Credits Part II Semester II				**68**
Total Credits Part II				**135**

| **III** | **I & II** | **3001** | Industrial Attachment | |

		Module Code	**Module Name**	**Credits**
		CIN4117	General Insurance Mathematics I	12
		CIN4118	Stochastic Modelling	12
IV	**I**	CIN4115	Financial Economics	12
		CIN4116	Investment and Asset Management	11
		CIN4119	Survival Models	11
Total Credits Part IV Semester I				58
		CIN4222	Life Contingencies II	12
		CIN4219	General Insurance Mathematics II	12
IV	II	CIN4221	Theory and Valuation of Derivatives	12
		CIN4220	General Insurance	11
		CIN4001	Research Project	30
Total Credits Part IV Semester II				77
Total Credits Part IV				135
Overall Credits for the Programme (Minimum)				510

Think in other terms

MODULE SYNOPSES

PART I
Semester I

CIN 1109 Commercial Law   **10 Credits**
The aim of this module is to introduce students to the basic legal principles governing the business environment. Focus will be placed on definition of contracts, requirements of a contract, breach of a contract, remedies for breach of contracts, law of agency, contract of sale, law of business organisations and insurance contract.

SMA 1101 Calculus   **10 Credits**
The aspects covered in this module are: Limit of functions, One-sided and infinite limits, Continuity, Differentiation, Rolle's Theorem, mean value theorem, Cauchy's mean value theorem, Leibniz' rule, Taylor series, Integration, Definite integrals, Anti-derivatives, Fundamental theorem of calculus, Improper integrals, Gamma and Beta functions, Natural Logarithms, revolution, Parametric equations, Polar coordinates, Graph sketching, Complex numbers, De Moivre's theorem and the exponential form.

CBA 1104 Principles of Micro-Economics   **10 Credits**
The module provides a basic foundation for the subject matter of Economics to enable students to prepare themselves to use the concept of rationality to analysing behaviour at a micro level. The module includes: Definitions of Economics, Evaluation and Development of Socio-Economic systems, Factor Prices, Pricing and Production Certainty and Uncertainty in Economic theory, Markets and Economic Decision-making.

CAC 1107 Accounting IA   **10 Credits**
The module is designed for students without "A" level Accounting. It introduces students to basic principles, concepts and techniques of accounting in general. The module focuses on the use of accounting information by managers. The module covers the following areas: Accounting cycle, Accounting as an Information system, trial balance, preparation of financial statements for individual companies, non-profit making organisations as well as Accounting ratios.

CBU 1108 Principles of Management   **10 Credits**
The module explores the history and development of management thought, functions of management, organisational structures, decision making, communication, centralisation and decentralisation, delegation, leadership and motivation, controlling budgeting and non-budgetary controls.

Think in other terms

CIN 1108 Introduction to Risk Management (Elective)   **10 Credits**

The aim of this module is to introduce students to an early appreciation of basic concepts of risk and risk management. It deals with the concepts of risk and uncertainty, risk definitions and classifications, and the application of principles of management to risk management. Emphasis is placed in the generic risk management model with special focus on risk identification/ awareness, risk measurement and techniques for dealing with risk. This module provides a foundation for the rest of the modules to be taken later in the study programme.

CBU 1102 Business Communication   **10 Credits**

The module examines a general comprehension and expression, report writing, comprehension of ideas, development of different styles and the use of English in a business setting, communicating skills, letter-writing, committee documents, use of questionnaires, note taking and summarising.

PART I
Semester II

CIN1202 Risk and Insurance   **10 Credits**

The aim of this module is to familiarize students with risk financing with special emphasis placed on insurance and self-insurance. It deals with guidelines for insurable risks, risk assessment and measurement of insurable risks, principles and practice of insurance and self-insurance, the insurance industry, including the role of the government. It introduces the students to international insurance markets and provides an overview of short term and long term insurance policies, claims management and the marketing of insurance services.

CAC 1208 Accounting IB   **10 Credits**

The module aims at equipping students with basic Management Accounting techniques in planning, control and decision making. It is intended for non-accounting professionals and covers the following areas: relationship of Cost and Management Accounting to other branches of Accounting, cost classification, stock valuation, material and labour costing, cash budgets etc.

CBA 1205 Principles of Macro-Economics   **10 Credits**

Having done Principles of Micro Economics, it is a well-known fact that what is true with regard to individual parts of the whole may not be true with the whole. The module on Principles of Macro-economics builds on that of Principles of Micro Economics. It seeks to introduce students on how economic aggregates such as national income, investment, savings, taxation, imports, exports, government expenditure, fiscal and monetary policies, employment/unemployment and inflation are related to micro economic behaviour. Emphasis is put on the definition,

measurement and inter-linkages of these so that students can be prepared for more advanced policy formulation and implementation.

CBU 1209 Principles of Marketing 10 Credits

This module examines marketing functions; the environment of marketing; marketing information systems and marketing research; the marketing mix; consumer behaviour; the social responsibility of marketing and public policy with respect to marketing practices.

SMA 1201 Calculus Of Several Variables 10 Credits

The aspects covered are: Cartesian coordinates in 3 dimensions, Functions of several variables, Quadric surfaces, Curves, Partial derivatives, Tangent planes, Derivatives and differentials, Directional derivatives, Chain rules, Div, grad and curl, Maxima and minima, Lagrange multipliers, Double and triple integrals, Change of order, Change of variable, Polar and spherical coordinates, Line and surface integrals, Green's theorem in the plane, Divergence theorem and Stokes theorem.

PART II
Semester I

CIN 2123 Life, Health and Care Insurance 11 Credits

The module seeks to equip students with knowledge and understanding of actuarial techniques in life insurance. It covers the operation of the following types of group and individual products: whole life assurance, term assurance, pure endowment, endowment assurance, life annuity products, critical illness insurance, long-term care insurance and income protection insurance as well as Private Medical Insurance and related products. It also covers product design, stakeholder needs, state healthcare provision methods and approaches to funding, modelling, data considerations, assumptions used, pricing considerations, reserving, risk management, underwriting and policy data checks.

CIN 2116 Research Methods in Insurance 10 Credits

The objective of the module is to provide students with the skills investment necessary to carry out research work. The module will enable students to carry out applied research in insurance and actuarial science. This module covers following: principles of conducting research, types of approaches to research; qualitative and quantitative, selecting research topics, research proposal, literature search, methods of data collection, analysing research data, writing and presentation of a research project. The module will be assessed by coursework and a written examination.

CFI 2101 Corporate Finance I 10 Credits

The aim of the module is to identify the objective that Corporate Finance managers pursue or ought to pursue in order to satisfy the needs of corporate stakeholders and to develop, in students, concepts and corporate analytical tools that will enable them to meet this objective. To this end, the module will cover the following critical areas: Goals of a firm and the agency

theory; Time value concepts and valuation of bonds and shares; Capital Budgeting under certainty; Operating and financial leverage; Introduction to portfolio theory and capital asset pricing; the stock market and other sources of long-term capital and innovations in Corporate Finance.

CIN 2122 Actuarial Financial Mathematics   **12 Credits**
The module aims to provide a solid grounding in Financial Mathematics and its applications, covering: cash flow models, time value of money, equations of value, loan schedules, investment project appraisal, bond valuation, forward contracts and term structure of interest rates and stochastic interest rates.

CIN 2111 Actuarial Statistics I   **12 Credits**
The module aims to equip students with skills of analysing data and applying probability theory to practical problems. The main aspects covered are introduction to probability, random variables, probability distributions, generating functions, joint distributions, conditional expectation, the central limit theorem, sampling and statistical inference.

CIN 2114 Visual Basic for Applications   **12 Credits**
The objective of this module is to provide students with computer skills which are essential in this ever changing business environment. This module introduces students to the world of computer programming using Microsoft Excel Visual Basic for Applications (VBA). This module covers introduction to VBA, how VBA works with Excel, programming concepts, developing custom dialog boxes, creating custom toolbar and menus. The module will be assessed by coursework only.

PART II
Semester II
CFI2201 Corporate Finance II   **10 Credits**
The aim of the module is to develop, further, in students, concepts and corporate financial analytical tools. The areas covered will include the following: Introduction to capital structure theory and practice; Cost of capital and valuation; Introduction to capital budgeting under uncertainty; Dividend policy theory and practice; corporate working capital management; and innovations in corporate finance.

CIN 2211 Actuarial Statistics II   **12 Credits**
The module aims to equip students with skills of analysing data and applying probability theory to practical problems. The main aspects covered are methods of estimation, confidence intervals, hypothesis testing, correlation, regression analysis and analysis of variance (ANOVA).

Think in other terms

CIN 2215 Topics in Applied Mathematics   **12 Credits**

A highly mathematical module which aims to equip the trainee actuary with both mathematical and computer methods used in actuarial problem solving. The main objective of the module is to give students a deeper understanding of the fundamental mathematical techniques used actuarial science. The module builds ground for higher modules which require requisite knowledge and application of matrices, differential equations, difference equations, differential-difference equations, demographic projections, linear algebra, discrete maths, real analysis and topology.

CIN 2222 Life Contingencies I   **12 Credits**

By the end of the module, students should be able to use standard actuarial techniques to calculate premiums, contributions and reserves for the full range of life assurance, health care and retirement benefits. The following aspects are covered: annuities and assurance, select mortality, long term care contracts, life insurance contracts, gross premium and reserve, discounted emerging costs techniques and pricing of life insurance options and guarantees.

CIN2216 Computer Packages and Applications in Insurance   **11 Credits**

Computer Packages and Applications in Insurance (CIN 2216) will provide students with an opportunity to write programs for statistical models used in statistics, insurance and actuarial modelling. It also covers statistical reporting using software packages for statistical calculations; numerical and graphical summaries; contingency tables; hypothesis testing; confidence intervals; regression methods; analysis of data from comparative studies as well as data mining concepts such as predictive modelling and causal inference. Students will gain skills from the use of statistical packages such as SAS, SPSS, R, Excel and MATLAB. The module will be assessed by coursework only.

CIN 2224 Pension and Benefits   **11 Credits**

The aim of the module is to equip students with the technical knowledge required in managing benefit schemes such as Defined Benefit and Defined Contribution schemes. It focuses on benefit providers, stakeholder needs, disclosure requirements, scheme design, risks and uncertainties, financing methods, use of models, the need for valuation, valuation data, sources of surplus and discontinuance.

PART III
3001 Industrial Attachment   **Credits**

PART IV
Semester I
CIN 4117 General Insurance Mathematics I   **12 Credits**

The module aims to cover the following aspects under risk theory: Decision theory, Bayesian statistics, Loss Distributions, Reinsurance, Credibility Theory, and Empirical Bayes Credibility Theory. Software packages such as R shall be utilised for exercises such as fitting loss distributions and reserving.

CIN 4118 Stochastic Modelling　　　　　　　　　　　　　　　**12 Credits**
The module aims to cover principles of stochastic modelling including the following aspects: principles of actuarial modelling, stochastic processes, markov chains, the two-state Markov model, the general Markov model, Markov jump processes, stochastic integrals, Ito processes, martingales and the Brownian motion.

CIN 4115 Financial Economics　　　　　　　　　　　　　　　**12 Credits**
This module equips students with the skills required in modelling security prices and returns by covering the following topics: utility theory, Absolute and Stochastic Dominance, behavioural finance, investment risk measures, portfolio theory, models of asset returns, asset pricing models, and the Efficient Markets Hypothesis.

CIN 4116 Investment and Asset Management　　　　　　　　　**11 Credits**
The aim of this module is to introduce students to investment management principles which encompass: investment markets and their economic influences (money markets, bond markets, equity markets, property markets, derivative markets, Collective investment schemes and overseas markets), asset classes and their characteristics, relationships between returns on asset classes, valuation of individual investments and asset classes, as well as investment strategy.

CIN 4119 Survival Models　　　　　　　　　　　　　　　　**11 Credits**
The module aims to define and estimate the future lifetime distribution of an individual. The main aspects covered are the future lifetime distribution, Kaplan-Meier and Nelson-Aalen estimators, the Cox Regression model, Markov Models, Binomial model, Poisson Model, exposed to risk and graduation techniques.

PART IV
Semester II

CIN 4222 Life Contingencies II　　　　　　　　　　　　　　**12 Credits**
By the end of the module, students should be able to use standard actuarial techniques to calculate premiums, contributions and reserves for a range of life assurance, health care and retirement benefits. The following aspects are covered: pricing of joint life annuities and assurances, contingent and reversionary benefits, pension fund benefits, Multiple Decrement Tables, profit testing, reserving, selection and standardisation.

CIN 4220 General Insurance　　　　　　　　　　　　　　　**11 Credits**
The module aims to cover the main types of general insurance products, rating methods, rating and underwriting considerations, how to price different types of reinsurance, application of the Individual and Collective Risk Models as well as the Aggregate Claim Distribution, the major

actuarial investigations and analyses of experience with regard to reserving and capital modelling, analytic and simulation-based methods of reserving, the key considerations in deriving and applying capital modelling techniques, the approaches to the assessment of capital requirements for different risk types, selection of reinsurance programmes and accounting for general insurance business and regulation of general insurance business.

CIN 4219 General Insurance Mathematics Ii   **12 Credits**
The module aims to cover the following aspects under risk theory: Risk Models, Ruin theory, Reserving, Generalized Linear Models, Time Series Analysis and Monte Carlo Simulation. Software packages such as SAS, R, Eviews and Excel shall be utilised particularly in Reserving, Time Series Analysis and Monte Carlo Simulation.

CIN 4221 Theory and Valuation of Derivatives   **12 Credits**
This module covers the stochastic modelling of financial assets under the following aspects: pricing of equity and related derivatives such as futures, forwards and options, stochastic models of security prices, the Binomial (one step and multi-period) Models, Black – Scholes Model, the Greeks, the 5-step method (discrete and continuous time), term structure of interest rates and credit risk.

CIN 4001 Research Project   **30 Credits**
Students will be expected to complete a research project on a topic of their choice but limited to the taught modules. The project is a consolidation of the theoretical knowledge gained in the taught modules and the practical experience gained from Industrial Attachment.

Think in other terms

MASTERS DEGREE PROGRAMME

SPECIAL REGULATIONS

MASTER OF SCIENCE DEGREE IN RISK MANAGEMENT AND INSURANCE

1.0 PREAMBLE

The programme is aimed at imparting comprehensive knowledge and skills on the risk management and insurance science to the people employed in this industry at various levels of responsibility and those intending to carve a career in this field but lack the requisite tertiary level training. Candidates will be taught advanced risk management and insurance principles and the program has a natural base in the study of those disciplines that are generally accepted as contributing to the various activities of an all-round risk management and insurance practitioner. Specifically, it aims to blend practical work experience with the theoretical aspects underpinning the risk management and insurance science.

2.0 ENTRY REGULATIONS

For entry into the programme, a candidate must:

2.1 Hold a good honours degree or equivalent, preferably Lower Second Class (2.2) or better from a recognised university in any business related field. In addition, the candidate must have thorough knowledge of insurance and/or risk management disciplines.

2.2 Hold a general degree or equivalent, preferably Lower Second Class (2.2) or better, from a recognised university coupled with a professional qualification in insurance and/or risk management from a recognised institution. Associates or holders of advanced diplomas from internationally recognised institutions e.g. The Insurance Institute of Zimbabwe (IIZ) and The Insurance Institute of South Africa (IISA) with at least three (3) years of working experience at supervisory or management level will also be considered. Applicants holding these professional qualifications must show proof of having the final level of the qualification's examination(s) to be admitted into the MSc Risk Management and Insurance programme.

3.0 ASSESSMENT OF CANDIDATES

3.1   Candidates to be admitted to the examination must have satisfactorily attended approved modules of study including submission of required continuous assessment

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coursework. They are normally expected to have attended at least 80% of lectures in each module.

3.1.1 Coursework shall account for 30% of the overall assessment while the formal examinations shall account for 70% of the overall assessment.

3.1.2 The pass mark shall be 50%.

3.1.3 In the taught segment of the programme, students can proceed to the next stage provided they have passed 75% of the modules from the preceding stages. However, students will not be allowed to proceed to Stage IV (Dissertation Stage) carrying any module from the preceding stages.

3.2 **Failure to Satisfy Examiners**

A candidate who is not allowed to proceed to the subsequent part of the programme and has failed the same part of the programme twice will be required to withdraw from the programme.

3.3 **Grading**

The following marking scheme shall be adopted:

80%+   Distinction (D)
70% - 79%   Merit   (M)
60% - 69%   Credit   (C)
50% - 59%   Pass   (P)
Below 50%   Fail   (F)

3.3.1 To be eligible for the award of the MSc Risk Management and Insurance degree, a student must pass all the modules constituting the programme inclusive of the Dissertation.

3.3.2 Candidates who pass all the taught modules of the programme, but fail the Dissertation twice, shall be awarded the Postgraduate Diploma in Risk Management and Insurance.

3.3.3 The determination of the overall degree programme aggregate with a dissertation component will be:

Taught Component   75%   240credits
Research Component (Dissertation)   25%   80 credits

4.0   DURATION OF PROGRAMME AND DELIVERY SYSTEMS

4.1   **Delivery of the Programme**

The Programme shall be taught on a block basis over three parts, with students taking four modules in each part. The fourth part of the programme shall comprise the Dissertation.

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Delivery time shall be allocated as follows:

Stage	Number of Modules
1	4
2	4
3	4
4	*(Dissertation after completing stage 1, 2 and 3)*
Dissertation	1
Total Number of Modules	**12**

5.0 PROGRAMME PROFILE

Master of Science in Risk Management and Insurance	
Institution:	**National University of Science and Technology**
Type of Degree:	**Masters**
Credit Load:	**320 CREDITS**
Level:	**SADC-QF - Level 9**
Programme Duration:	**2 years**
Accreditation Organisation(s):	

Purpose of the Programme

This programme aims to impart on students the technical and analytical skills required in the risk management profession as well as in research.

Programme Characteristics
Areas of study: **Insurance economics**

Analyse and describe the mechanics of ideal and real insurance markets, their organisation, function and role in the economy and society. Focuses on the economics of uncertainty, risk perception and risk aversion. Also cover micro- and macro-economic concepts and their application to risk management and insurance. Issues of supply

and demand in insurance markets are also covered.

Insurance

Covers theory of insurance, principles of premium calculation, underwriting and claims management as they are applied to property insurance, life insurance, liability insurance, health insurance and reinsurance.

Financial Management of Insurance Companies

Provides corporate and financial analytical skills critical to the management of insurance companies. Students also gain skills in managing other types of investments.

Risk Management and Risk Modelling

Focuses on the modelling, assessment and management of various types of risks such as insurance, operational risks, enterprise and financial risks. Also covers the concepts theories of risk management and how risk management creates value.

Law

Covers international aspects of insurance contracts and insurance business, regulation of insurance markets and public policy issues. It also focuses on principles of utmost good faith, insurable interest and subrogation. Liability rules and liability laws are also covered.

Specialist Focus:	Life Insurance, Health Insurance, Pensions, Property Insurance, Liability Insurance, Investment, Reinsurance, Operational Risk Management and Enterprise Risk Management.
Orientation:	Research and innovation oriented. Teaching and learning are professionally oriented and focused on practical aspects.
Distinctive Features:	The programme is tailored to provide students with technical and analytical risk management skills.

Career Opportunities And Further Education

Employability: The skills that students gain enable them to build careers in risk management, insurance and investment management. Students can be employed in the financial services industry, mining industry, government, academia and any other institution with a risk management function. Potential roles include risk analyst, risk manager, underwriting manager, claims manager, reinsurance manager, loss control specialist, Claims Investigator, Product Development Manager.

Further studies: Doctoral studies in Risk Management or Economics, as well as Professional Risk Management and Insurance Exams.

Programme Delivery

Teaching and Learning Methods: Lectures, seminars, research project, group work and individual independent study.

Assessment Methods: Written examinations, tests, assignments, oral presentations, dissertation and continuous assessment.

Programme Competencies

Generic:

Analysis and synthesis: Develops capacity for analytical and critical thinking using logical arguments and proven facts.

Discipline specific:

Skills: Equips students with technical and analytical skills required to assess and manage risks in the financial services sector, with particular focus on the insurance sector.

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Exit Level Outcomes

Problem Solving

Craft risk management solutions for financial institutions and other industries.

Risk Modelling

Apply data analytics, model building and implementation skills which are vital in today's risk management profession.

Financial Management for the financial services sector

Craft financial and investment solutions for the insurance sector in the most economic ways.

Product Design

Design risk management products mainly for insurance companies, with sound terms and conditions.

Professional and technical communication

Demonstrate competence to communicate effectively, both orally and in writing, with financial audiences and the community at large.

Individual, team and multidisciplinary working

Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments.

Independent learning ability

Demonstrate competence to engage in independent learning through well-developed learning skills.

Insurance professionalism

Demonstrate critical awareness of the need to act professionally and ethically in the insurance sector.

PROGRAMME SUMMARY

PART I (*Four Core Modules*)

Module Code	Module Description	Credits
CIN 5101	Theory of Risk and Insurance Markets	20
CIN 5102	Investment and Financial Analysis	20
CIN 5103	Research Methods in Insurance	20
CIN 5104	Risk Analysis and Modelling	20

PART II (*Three Core Modules and One Elective*)

CIN 5201	Insurance Law and Regulation of Financial Markets	20
CIN 5202	International Reinsurance Practice	20
CIN 5203	Operational Risk Management	20

Elective Modules: *To choose one* (1)

CIN 5204	Alternative Risk Transfer (ART) and Risk Securitisation	20
CIN 5205	Financial Risk Management	20
CIN 5206	Asset Liability Management in Insurance	20
CIN 5207	Business Ethics and Corporate Governance	20

PART III (*Two Core Modules and Two Electives*)

Core Modules

CIN 5301	Strategic Management for Insurance and Financial Service	20
CIN 5302	Accounting and Financial Management in Insurance	20

Elective Modules: *To choose any group of two* (2) *to enhance specialisation*

Option 1

CIN 5303	Property Insurance	20
CIN 5304	Liability Insurance	20

Option II

CIN 5305	Life and Health Insurance	20
CIN 5306	Pensions Management	20

PART IV Year 2 (after passing Stages I- III)

CIN 5300	Dissertation	80

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MODULE SYNOPSES

CIN 5101 Theory of Risk and Insurance Markets   **20 Credits**

The module provides a sound understanding of the basic principles of risk and insurance, and the characteristics of the main types of insurance, both life and general. It offers an introduction to the structure and operation of international insurance markets and the function of insurance firms within the financial system. It covers the general principles of insurance underwriting and claims management as well as provides a good foundation for the more specialised elective subjects.

CIN 5102 Investment and Financial Analysis   **20 Credits**

This module enables students to understand and apply the fundamentals of investment and financial analysis, developing and enhancing their ability to analyse and value securities and corporations. It provides a thorough understanding of areas of investment, financial and risk management, along with the necessary theoretical knowledge and statistical tools to interpret financial information. All these are brought together in a unified framework to analyse the strategies, techniques and tools for analysing and interpreting financial information. The module is highly participative, with practical case studies in cash flow, investment and financial analysis.

CIN 5103 Research Methods in Insurance   **20 Credits**

This module trains students to undertake independence either in the context of a single organisation or by using third-party sources. It provides the necessary tools and skills to initiate, research and write up a business project and includes training in research methodology, availability of data sources, project writing, time-management and presentation skills. These skills will be invaluable to students in their future career.

CIN 5104 Risk Analysis and Modelling   **20 Credits**

A highly interactive computer based module which explores the statistical methods that are used in finance, risk analysis and risk management. The main objective of the module is to give students an understanding of the fundamentals of these techniques. The module offers a refresher in the underlying principles of probability and statistics, exposure to the under-lying theory and methods, and comprehensive coverage of the tools and techniques that are used in risk modelling.

CIN 5201 Insurance Law and Regulation of Financial Markets   **20 Credits**

The module provides a framework for the principles of contract and business law and their application to insurance, together with an understanding of the special legal principles that apply in insurance. It places emphasis on Roman-Dutch/English common law but where appropriate, draws comparison with other legal systems. The module also provides knowledge

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of how different regulatory systems affect the operation of insurers in the major insurance markets of the world.

CIN 5202 International Reinsurance Practice 20 Credits

The module examines the main global reinsurance markets and how reinsurance is practiced, regulatory measures and taxation; reinsurance accounting methods and the fundamental aspects of reinsurance programming.

CIN 5203 Operational Risk Management 20 Credits

The module equips participants with a working knowledge of operational Risk Management and covers: Introduction to Operational Risk Management; Identifying Operational Risks; Calculating Operational Risk Capital; Operational Case Studies; Assessment of the impact of the latest regulatory rules. The module goes on to offer a framework for an integrated approach to risk management within a corporation i.e. an Enterprise-wide Risk Management system (ERM) which covers the management of Strategic, Reputational, Legal and Compliance risks.

CIN 5204 Alternative Risk Transfer (Art) and Risk Securitisation 20 Credits

The module encompasses newer forms of risk protection forming the Alternative Risk Transfer (ART) market. This module covers the ART market; its functions, participants and products; its advantages and disadvantages, and its future prospects, together with a thorough coverage of the following: Capital markets Issues, Securitisation, Contingent Capital Structures, Insurance Derivates and the future prospects for growth of the ART market.

CIN 5205 Financial Risk Management 20 Credits

This module focuses on the development of sound financial risk management practices for financial institutions and encompasses the management of credit, market, liquidity and foreign exchange risks. It equips participants with a working knowledge of Financial Risks; Mitigation, Monitoring and Controlling Financial Risks; Financial Risk Case Studies Assessment of the impact of the latest regulatory rules. The module emphasises the key pillars of a robust risk management framework which include Adequate board and senior management oversight; Sound risk management policies and procedures; Adequate management information systems; Strong risk measurement, monitoring and control capabilities and Adequate internal controls. Extends to study the creation of instruments that enable institutions to transfer risk and enhance liquidity and will also cover risk management strategies using derivatives.

CIN 5206 Asset Liability Management in Insurance 20 Credits

The module has been designed to discuss concepts and case studies on Asset Liability management (ALM) for the insurance industry. The module discusses and reviews ALM concepts such as cash flows and risks of insurance products (assets and liabilities), applicable regulatory and capital guidelines, actual case studies and current trends and developments. The

module helps students define, measure, monitor and manage a financial institution's exposure to Foreign Exchange, Interest rate and Liquidity Risks on a coordinated and consistent basis.

CIN 5207 Business Ethics and Corporate Governance   **20 Credits**

This module creates an awareness of the laws and the legal, political and social institutions which impact upon business activity. The module emphasises public law, governmental regulation, ethics and corporate governance. Landmark legislation and judicial decisions will be examined.

CIN 5301 Strategic Management for Insurance and Financial Services   **20 Credits**

The module covers analytic tools of strategic management. It illustrates how ideas drawn from a number of disciplines, such as marketing, microeconomics, financial theory and organisational behaviour can be employed to address the central concerns of strategy. The module also aims to provide a sound understanding of the application of principles of strategic management within insurance and other financial enterprises. It seeks to identify the strategic issues that currently face insurance and financial services firms and to position these issues in their wider economic and regulatory context.

CIN 5302 Accounting and Financial Management in Insurance   **20 Credits**

The module provides students with an understanding of financial management approaches in insurance companies. It equips them with techniques of finance planning and control employed by insurance enterprises and further provides an understanding of treasury management and investment management issues within insurance companies. The module also covers: Accounting for life insurance and non-life insurance companies, Analysing financial performance of insurance companies, Solvency analysis as well as Reserving methods.

CIN 5303 Property Insurance   **20 Credits**

The module seeks to acquaint students with functions of property and business interruption insurance and the main lines thereof; underwriting considerations applicable to each. This module will analyse property insurance contracts, including commercial auto and farm policies.

CIN 5304 Liability Insurance   **20 Credits**

The module is an analysis of international laws and regulations and their implications on liability insurance; the law of delict/tort; strict liability; vicious liability; types of liability insurance covers; liability insurance wordings and the interpretation thereof as well as the assessment of liability damages and the quantification thereof.

CIN 5305 Life and Health Insurance   **20 Credits**

The module will analyse concepts of Life and Health insurance including; Demographical bases, Life products, Single premiums, single recurrent and periodic premium insurance products, Mathematical provisions, Life insurance products; Endowment, Life annuity, unit and

index linked, pension funds; Life insurance with benefits linked to investment performance; The valuation of the life insurance business; Portfolio Evaluation tools, Risks and Solvency Life Reinsurance.

CIN 5306 Pensions Management   **20 Credits**

This module provides in-depth coverage of employee benefit plans such as group insurance and pensions with special consideration given to funding instruments and variety among plans as well as important legal employee benefits issues including discrimination, benefit limitations, and tax treatment.

CIN 5300 Dissertation   **80 Credits**

This represents the final part of the programme where students embark on an independent piece of research leading to the production of a 15 000 to 20 000-word quality dissertation. The topic of the research will have to be approved by the Departmental Board and each candidate will be assigned an academic supervisor appointed by the same. This dissertation is expected to provide the students with the development of substantial individualised field of study research or an analysis of a more general issue or question arising out of coursework or professional product, either of which must integrate and extend skills and competencies developed in previous coursework on the programme. Each candidate shall lodge with the Department of Insurance and Actuarial Science two hard copies and a soft copy of the dissertation.

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DEPARTMENT OF BUSINESS MANAGEMENT

Lecturer and Chairperson
M. Nyathi, MBA, Glasgow UK, BSc. Economics (Hons), UZ Z'bwe, MIAC SA, MIPM (Z)

Secretary
L. Paulos, BCom (Hons) HRM, LSU Z'bwe, HND (Office Management), Bulawayo Polytechnic, Z'bwe,

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J. Ranganai, MBA, NUST Z'bwe, PDHTE, NUST Z'bwe, BCom Mgt, MSU Z'bwe

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Thandiwe Gwatsvaira, MBA NUST, Z'bwe, PDHTE, NUST Z'bwe, BCom (Hons) Mgt, NUST Z'bwe

C. Baya, MBA, NUST Z'bwe, BCom (Hons) Mgt, NUST Z'bwe

UNDERGRADUATE DEGREE PROGRAMME

SPECIAL REGULATIONS

1.0 PREAMBLE
1.1 The regulations should be read in conjunction with the General Academic Regulations for undergraduate degrees hereinafter referred to as the General Regulations.
1.2 The degree will be awarded to candidates who have successfully accumulated a minimum of 480 credits and passed the examination in accordance with the regulations set out below.

2.0 ENTRY REGULATIONS
2.1 Students must satisfy conditions for entry to undergraduate degree programmes stipulated in the General Regulations.
2.1.1   For entry into the Faculty of Commerce, students must have passed five (5) subjects at Ordinary Level (or its equivalent).
2.1.2   The five (5) subjects should include English and Mathematics with at least a C grade or better.
2.1.3 Apart from five (5) subjects at Ordinary Level a student must have passed at least two (2) subjects at the Advanced Level. The Department does not stipulate passes in specific subjects at 'A' level as a pre- requisite for entry to the Bachelor of Commerce Honours Degree in Management. Preference will generally be given to applicants who have a good grounding in Commercial subjects such as Management of Business, Economics, Accounting as well as Mathematics.
2.1.4   In approved cases a student may be exempted from Part I modules on condition the student does not complete the full-time programme in less than three full academic years. Holders of the Zimbabwe Higher National Diploma from the Polytechnic colleges or the Technical colleges (or their equivalent) who have passed the Diploma with merit (credits and distinctions) in half of the programme modules may qualify for entry into Part II of the Bachelor of Commerce Honours Degree in Management Programme.
2.1.5   There is also provision for mature entry for persons who may not have the appropriate academic qualifications for entry but who have suitable or relevant post-school experience and who satisfy the University and the Department of their ability to complete a degree module satisfactorily.
2.2   The following persons may apply for Special Entry and for permission to proceed to a first degree with exemption from the whole or part of the normal entry requirements:
2.2.1   A person who has obtained a degree of this or another University or degree awarding Institution.

2.2.2 A person who has obtained from a University or an Institution of similar status, academic qualifications (other than degrees) accept- able to the Senate;

2.2.3 A person who has obtained an appropriate number of subjects at an approved examination equivalent to the standard of the Ordinary Level of the General Certificate of Education examination and has subsequently passed an intermediate or equivalent examination at a University acceptable to the Senate;

2.2.4 Students who qualify under this regulation for Special Entry may apply to the Senate to be exempted from certain modules and examinations. Permission may be given to complete the programme for a Bachelor's degree in less than the normal required period provided that no student shall be allowed direct entry to the Final Part of any Programme;

2.2.5 Students who apply for admission under this regulation may be required to attend interviews and/or special tests at the University to determine their suitability for admission to Bachelor's degree studies.

2.3 Persons who are at least 25 years of age on the first day of the academic year in which admission is sought and who are not eligible for entry under the Normal or Special Entry Regulations may apply for Mature Entry provided that:

2.3.1 Applicants must have passed at least five approved 'O' level subjects including English Language and Mathematics (or equivalents) and must have demonstrated potential suitability for university studies by virtue of their attainments and/or relevant work experience.

2.3.2 Normally, applicants should have completed their full-time school or college education at least five years before the start of the academic year in which admission is sought.

2.3.3 Applicants who wish to be considered under the Mature Entry provisions may be required to attend interviews and/or special tests at the University designed to assess their command of the English Language, numeracy and reasoning ability and general suitability for admission to Bachelor's degree studies. Applicants who have previously attended.

2.3.4 Mature Entry tests and/or interviews without success will not be considered for admission under this form of entry unless in the intervening period they have acquired additional qualifications and/or experience.

3.0 ASSESSMENT OF CANDIDATES

3.1 A candidate shall be expected to sit for formal written examination at the end of each semester. For a candidate to be admitted to the examination, they must have satisfactorily completed all assignments for continuous assessments. In addition, they are expected to have attended a minimum of 80% of the lectures in each module.

3.2 The taught component shall be examined by both coursework and a formal written examination. Coursework shall account for 30% of the overall assessment while the formal written examination shall account for 70% of the overall assessment.

3.3 For the taught component, the pass mark shall be 50% for all the modules.

4.0 DETERMINATION OF RESULTS OF MODULES

4.1 The Departmental Panel of examiners shall:

Think in other terms

4.1.1   agree for each candidate, marks in terms of percentage of continuous assessment and examination marks and overall marks in modules;

4.1.2   recommend to the Faculty Board of Examiners whether a candidate should pass or fail the relevant module(s); and

4.1.3   where prizes are available for award, make recommendations for the award of these prizes.

5.0 EXAMINATIONS

5.1 Formal examinations will normally be held at the end of each semester. Students to be admitted to the examination must have:-

5.1.1   Satisfactory attendance of approved modules of study including submission of required written assignments. Class attendance is compulsory.

5.1.2   Participated in prescribed seminars, tutorials and practical classes.

5.1.3   Paid required fees in accordance with the General Regulations. Formal examinations will normally be by written papers, but in some circumstances the examiner may test the candidate orally.

5.1.4   Module work shall account for 30% of the overall assessment, while the formal examination will account for 70% of the overall assessment.

5.1.5   Pass mark shall be 50%.

5.1.6   When a candidate is permitted by the Board of Examiners he/she may carry forward into the subsequent PART not more than three modules which were not satisfactorily completed in the previous part, provided that the module(s) is (are) not pre- requisite(s) for the subsequent part.

5.1.7   In exceptional circumstances, a candidate may be allowed to re-write an examination without remaining in full-time study at the University or repeating the module of study.

5.1.8   All first semester results are provisional therefore subject to change.

6.0 REPEATING MODULES

6.1 A candidate who is not allowed to proceed to the subsequent Part of the Programme, but has passed at least 50% of the module in that Part of the Programme may be allowed to apply to repeat the part.

6.2 'Repeat' means that the student may apply for re-admission into the same Programme and his/her application will be considered through the normal procedures.

6.3 If a student is repeating a Module(s), he/she shall only be credited with the marks obtained during the 'repeat' Examination. Nevertheless, a repeat student may be exempted from re-attendance and re-examination in any Module(s) in which he/she previously passed at Grade 2.2 level or better or may take another approved Module or other approved modules instead of the Module(s) previously passed.

7.0 PROCEEDING AND DISCONTINUING

7.1 A candidate who fails more than half of the modules for any part of their programme and obtain an overall aggregate mark of less than 35% should discontinue. 'Discontinue'

Think in other terms

means that the student must discontinue the Programme in which he/she failed. Such students will be free to apply for admission/transfer into a different programme and his/her application will be considered through the normal admission procedures.

7.2 A candidate who is not allowed to proceed to the subsequent Part of the Programme, and) has passed less than 25% of the modules in that Part of the Programme.

<div align="center">OR</div>

   b)   has failed the same Part of the Programme twice

<div align="center">OR</div>

   c)   has failed two different Programmes, will be required to withdraw.

'Withdraw' means that the student must withdraw from the University. Once 'withdrawn' the student may not apply for admission until after a period of two years has elapsed.

7.3 **Pre-requisite**

7.3.1 A candidate must have passed Principles of Management before proceeding to any other Management module.

7.4 **Programme of study**

7.4.1 Candidates shall pursue studies for a period of not less than four years on a full-time basis, each year constituting a part of the degree programme.

7.4.2 For Part III of the degree, candidates will be required to undertake a one-year attachment programme with an identified industrial organisation as part of the degree requirement.

8.0 DEGREE CLASSIFICATION AND NOTIFICATION OF RESULTS

8.1 Candidates must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.

8.2 For the degree to be awarded, the minimum number of 480 credits must be accumulated.

8.3 For the purposes of degree classification, the parts of the degree programme will be weighted as follows:-

Part II	30%
Industrial Attachment	20%
Part IV	50%

8.4 For the purpose of degree classification Part I results will not be taken into consideration.

9.0 NOTIFICATION OF RESULTS

9.1 Results lists shall be published in accordance with the provision of the General Academic Regulations.

PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
CAC1107	Accounting 1A	10
CBU1102	Business Communication	10
CIN1103	Commercial Law	10
CBA1104	Principles of Micro-economics	10
CBU1108	Principles of Management	10
CIN1106	Quantitative Analysis for Business I	10
CTL1101	Conflict Transformation & Leadership	10
CAC1208	Accounting IB	10
CBU1209	Principles of Marketing	10
CIN1207	Quantitative Analysis for Business II	10
CBA1205	Principles of Macro-Economics	10
CBU1211	Entrepreneurship I	10

PART II

CBU2103	Human Resources Management	10
CBU2108	Operations Management	10
CBU2105	Organisational Behaviour	10
CBU2109	Management Information Systems	10
CBU2107	Industrial Relations	10
CFI2101	Corporate Finance I	10
CAC2106	Accounting IIA	10
CBU2211	Reward Management	10
CBU2212	Purchasing & Supply Chain Management	10
CBU2208	Business Research	10
CBU2210	Training and Development	10
CBU2207	Labour Law	10
CFI2202	Corporate Finance II	10
CAC2206	Accounting IIB	10

PART III

CBU3001	Industrial Attachment	120

PART IV

CBU4106	Public Sector Management	11
CBU4107	Strategic Management I	11
CBU4108	Marketing Management	11

Think in other terms

CBU4112	Entrepreneurship II	11
CBU4111	Strategic Organisational Design	11
CBU4203	Business Ethics and Corporate Governance	11
CBU4207	Strategic Management II	11
CBU4211	International Business Management	11
CBU4209	Project Management	11
CBU4212	Organisation Development and Learning	11
CBU4200	Research Project	22

TOTAL CREDITS FOR THE PROGRAMME

Part I	120
Part II	140
Part III	120
Part IV	132
Total minimum credits:	**512**

Think in other terms

MODULE SYNOPSES

CBU 1102 Business Communication　　　　　　　　　　**10 Credits**

The module explores general comprehension and expression, report writing, comprehension of ideas, development of different styles and the use of English in a business setting, communicating skills, letter writing, committee documents, use of questionnaires, note taking and summarising.

CBU 1108 Principles of Management　　　　　　　　　　**10 Credits**

The module looks into the history and development of management thought, functions of management, organisational structures, decision making, communication, centralisation and decentralisation, delegation, leadership and motivation, controlling budgeting and non-budgetary controls.

CBU 1211 Entrepreneurship I　　　　　　　　　　**10 Credits**

The module introduces students to the principles of entrepreneurship. It looks at the nature of entrepreneurship; the evolving field of entrepreneurship, understanding entrepreneurship in individuals, structuring and legal issues associated with new business ventures; the business environment of entrepreneurial ventures and business failure.

CTL 1101 Conflict Transformation & Leadership　　　　　　　　**10 Credits**

The thrust of the module is understanding peace and conflict; theories of conflict; conflict analysis and tools; economic roots of conflict; gender and conflict; leadership; leadership and conflict handling mechanisms; leadership and conflict handling mechanisms; women in leadership; leadership ethics; interplay: leadership, conflict and development

CBU 2103 Human Resources Management　　　　　　　　**10 Credits**

This module is a review of Human Resources Management; operative functions of human resources management; practical aspects of human resources management as well as current trends in human resources management in Zimbabwe.

CBU 2211 Reward Management　　　　　　　　　　**10 Credits**

The module looks into the nature of compensation considerations, establishing Internal Equity and External Equity; Job Evaluation Techniques, Determinants of pay, motivation and pay, role of Human Resources Manager in compensation management as well as a future pay check.

Think in other terms

CBU 2105 Organisational Behaviour   **10 Credits**

The module explores the behaviour theory as well as Models relevant to human productivity, satisfaction, retention human resources administration. It also looks into learning; group behaviour, Inter group relations and organization leadership styles.

CBU 2212 Purchasing and Supply Chain Management   **10 Credits**

The module examines the nature of purchasing function, purchasing principles, purchasing models, inventory (stores) management systems (dependent and independent) and also the role of purchasing in achieving a competitive edge.

CBU 2107 Industrial Relations I   **10 Credits**

This module is about the theoretical underpinnings of Industrial Relations; Parties in Industrial Relations; Trends in Collective Bargaining; Industrial Relations Policyand Evaluating industrial relations function of management.

CBU 2207 Labour Law   **10 Credits**

The module explores the nature of labour law; Labour Act. NSSA regulations, factories and works acts as well as labour regulations social contract feasibility.

CBU 2108 Operations Management   **10 Credits**

The module analyses the production function and basic characteristics of manufacturing and non-manufacturing operations; analysis of major business decisions in process design, equipment selection and replacement; Problems and solutions of allocating and capital resources of the form to product lines; Stocks and production facilities.

CBU 2208 Business Research   **10 Credits**

The module is about theory and Research Methods; Types of Research Designs; Ethnography in Research, Methodological Choices; Choosing Research Strategy and evaluating Research Proposals.

CBU 2109 Management Information Systems and E-Commerce   **10 Credits**

This is an introduction to Management Information Systems, types of management system, introduction to Management Information Systems, Introduction to Systems Technology; The value added by information systems, system strategy and planning; Personnel information systems, workgroup information systems as well as MIS development and management.

Think in other terms

CBU 2210 Training and Development   **10 Credits**

The module looks at the nature of training; Training Needs Identification; Systematic Training; Module Design; Training Monitoring and Evaluation; Management Development Techniques; Succession Planning; Training and Strategic Human Resources Management; Training and Business Strategy.

CBU 4106 Public Sector Management   **11 Credits**

This module explores the nature of public sector management; private and public sector contrasted; participation and involvement in public sector; public sector managers and pressure for more efficiency and effectiveness; coping with limited resources in face of increased public expectations for improved quality of services; issues of common interest to public sector managers; transforming the public sector and research in public sector management.

CBU 4107 Strategic Management I   **11 Credits**

The module is a study of strategy formulation and implementation with the particular emphasis on the functions and role of the general manager. It looks at concepts and issues in business policy and general management and has an emphasis on decision making in the face of changing conditions.

CBU 4108 Marketing Management   **11 Credits**

This module extends the knowledge gained in the Principles of Marketing module to look at the managerial implications of the concepts taught in the said first year module. Issues covered include environmental and customer analysis, segmentation and positioning, developing and managing marketing mix programmes, their implementation, evaluation and control.

CBU 4111 Strategic Organisational Design   **11 Credits**

The module`s thrust is on effective organizational structural configurations in organizations with special emphasis on innovative organizational forms that can provide strategic advantage. Further, the focus is on decisions that have to be made on the most appropriate organisational structure(s) to ensure organizational efficiency and effectiveness as well as enhanced adaptive capacity. The module also focuses on how an organisation's culture, values and environment support and enhance organisational performance and adaptability. Special emphasis will also be placed innovative organizational forms that haven't yet been proven but that may, in the future, provide significant competitive advantages.

CBU 4112 Entrepreneurship II   **11 Credits**

The module focuses on the nature of entrepreneurship; The evolving nature of entrepreneurship, understanding entrepreneurship in individuals, environmental assessment; preparation for a new venture; marketing research for new ventures, financial preparation for entrepreneurship ventures; developing effective business plans; sources of capital for entrepreneurs; assessment and evaluation of entrepreneurial opportunities; structuring and legal issues associated with new

business ventures; strategic planning for emerging ventures as well as entrepreneurship and the global environment.

CBU 4203 Business Ethics and Corporate Governance   **11 Credits**

The module is about ethical behaviour in marketing; Types of unethical behaviour; Social responsibility; High standards of professional integrity and fairness in dealing with a firm's stakeholders; Good corporate governance and the firm's image.

CBU 4207 Strategic Management II   **11 Credits**

This module is an evaluation of the organisational structures and relationship which should be designed for policy implementation. A view of the effective administration of organisational process affecting behaviour is also explored.

CBU 4211 International Business Management   **11 Credits**

This is a module on internationalization; internationalization by companies; MNEs and the strategy formulation; Theories of international business; Environment impact on MNEs and domestic companies, International Human Resources Management; corporate culture in MNEs; Impact of MNEs on host economies as well as the process of globalization beyond MNEs.

CBU 4209 Project Management   **11 Credits**

This module explores the stages of Project Life Cycle; Nature of Data Collection Tools; Project Management Tools, Monitoring and Evaluation; Computerization and Project Management; Project Management and Competitive Advantage.

CBU 4210 Organisational Development & Learning   **11 Credits**

This module focuses on organisational development interventions and consultation. It is a review of conditions necessary for successful organisational development.

CBU 4200 Research Project   **22 Credits**

A research project is done in the final year of study in order to give students an opportunity to apply the knowledge gained over the module period. Students undertake research in an area of their choice in liaison with their supervisors to produce a project in a research area that has theoretical significance while providing practical applications/solutions to societal challenges as encapsulated in the university `s mission statement.

Think in other terms

MASTERS DEGREE PROGRAMME

SPECIAL REGULATIONS

1.0 PREAMBLE
1.1 Strategic Management focuses on the aggregate of analysis, decisions and actions that are undertaken to ensure the achievement of a sustainable competitive advantage so that the long term objectives of a business are actualised. The Department of Business Management is reviewing the Master of Science in Strategic Management degree, a post-graduate programme which addresses the growing need for highly qualified managers in both the public and private sectors of Zimbabwe and beyond.
1.2 The review of the Master of Science in Strategic Management curriculum can be traced to changes that have taken place in the field of strategic management over the years as well as the imperativeness of offering a degree programme that is in alignment with the dynamic and turbulent global business environment. Thus, curriculum review seeks to make the programme very competitive in resonance with the National University of Science and Technology `s fundamental purpose, aspirations and guiding principles as encapsulated in its mission, vision and core values respectively.
1.3 The Master of Science in Strategic Management degree combines core modules in strategic management with other relevant business modules to create a comprehensive curriculum that is designed to develop competent, knowledgeable and highly skilled professionals for challenging and rewarding careers in industry, commerce and the public sector.

2.0 ENTRY REGULATIONS
2.1 To be considered for admission to the programme, a candidate should be a holder of an honours degree or equivalent from a recognized university in a business-related field.
2.2 Holders of non-business related degrees with business-related diplomas may also be considered.

3.0 ASSESSMENT OF CANDIDATES
3.1 Module delivery will be divided into two sections:-
3.1.1   The **Taught Section,** Stages I, II and III comprising 10 core modules and 2 electives.
3.1.2   The **Research Section**, Stage IV, resulting in a dissertation of 20 000 words excluding appendices and preliminaries.
3.2 The **Taught Section** shall be examined by both continuous assessment (40%)   and an examination (60%). The written examination shall be taken at the end of each semester.
3.3 A student shall not be allowed to proceed to the next Stage before they have passed all modules in the preceding Stage.

3.4 A student who fails Stage IV, the **Research Section**, but passes the **Taught Section** shall be awarded the Post-Graduate Diploma in Strategic Management.

3.5 The weighting between the **Taught Section** and the **Research Section** in the overall assessment shall be 75% and 25% respectively.

4.0 DETERMINATION OF RESULTS
4.1 The Departmental Panel of examiners shall agree for each candidate, marks in terms of percentage of continuous assessment and examination marks and overall marks in modules;

4.2 Recommend to the Faculty Board of Examiners whether a candidate should pass or fail the relevant module(s); and

4.3 Where prizes are available for award, make recommendations for the award of these prizes.

5.0 SUPPLEMENTARY EXAMINATIONS
5.1 There is no provision for supplementary results.

6.0 REPEATING MODULES
6.1 A candidate who fails more than 50% of the modules taken in a particular part may, on the recommendations of the Senate, be granted permission to repeat the failed modules but will not be allowed to proceed to the next stage. Nevertheless, a repeat candidate may be exempted from re-attendance and re-examination in any modules in which he/she previously passed.

6.2 A candidate who fails the Dissertation Stage with a mark below 40% shall be expected to apply to repeat the stage.

7.0 PROCEEDING AND DISCONTINUING
7.1 A candidate who is not allowed to proceed to the subsequent Stage of the Programme and has failed the same Stage of the Programme twice will be required to withdraw from the Programme.

7.2 A candidate who fails the dissertation stage with a mark in the range of 40-49% shall be given the option to re-submit within three months from the date of publication of results. The dissertation will only attain a maximum of 50%.

8.0 AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE
8.1 The degree classification for the programme is as follows:

SCORE	GRADE
80% and above	Distinction
70% - 79%	Merit
60% - 69%	Credit
50% - 59%	Pass
49%&below	Fail

Think in other terms

9.0 AWARD OF THE DEGREE

9.1 The MSc in Strategic Management degree shall be awarded in accordance with the General Academic Regulations of the National University of Science and Technology as well Zimbabwe Council for Higher Education (ZIMCHE) guidelines for Masters programmes.

10.0   NOTIFICATION OF RESULTS

10.1 Results lists shall be published in accordance with the provision of the General Academic Regulations.

10.2 The Master of Science in Strategic Management, a market driven programme is envisaged to be transformational to students while playing a pivotal role in the development of specialists who are expected to make an invaluable contribution to the long-term management of businesses.

Think in other terms

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
CBU 5108	Corporate Strategy and Decision Making	20
CBU 5109	Strategic Organisational Design	20
CBU 5110	International Strategic Management	20
CBU 5111	Strategic Leadership and Conflict Management	20
CBU 5208	Entrepreneurship and Innovation	20
CBU 5209	Strategy Implementation and Evaluation	20
CBU 5210	Business Ethics and Corporate Governance	20
CBU 5211	Managing Strategic Change	20

YEAR II

CBU 5302	Strategic Information Management	20
CBU 5303	Strategic Financial Management	20

Elective 1   20
Elective 2   20

YEAR III

CBU 5400	Dissertation	80

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	80
YEAR II	80
YEAR III	80

Total minimum credits: **240**

Think in other terms

MODULE SYNOPSES

CBU 5108 Corporate Strategy and Decision Making   **20 Credits**

The module addresses the fundamentals of strategic assessment with particular emphasis on cultural elements such the vision, mission and values. The module also focuses on internal and external analysis of the environment with techniques employed in both internal and external analysis. Further, the module will also focus on strategic decision making which will including the role of c-suite executives, the characteristic of strategic decisions, the role of the Board of Directors in strategic decision making as well as strategic planning. The module also focuses on corporate strategy in relation to grand/directional strategies (growth, retrenchment, stability and combination), portfolio strategies as well as the concept of a business model. Further, the module covers competitive/business level strategies encompassing Porter (1980)s generic strategies, combination strategies such as Blue Ocean Strategy , Miles and Snow (1978)`s adaptive strategies as well as other competitive strategies. The module will also cover the concept of competitive advantage.

CBU 5109 Strategic Organisational Design   **20 Credits**

The module`s thrust is on advanced knowledge and competencies in effective organizational structural configurations in organizations with special emphasis on innovative organizational forms that can provide sustainable competitive strategic advantage. Further, the focus is on decisions that have to be made on the most appropriate organisational structure(s) to ensure organizational efficiency and effectiveness as well as enhanced adaptive capacity.

CBU 5110 International Strategic Management   **20 Credits**

International Strategic Management complements other modules and disciplines related to strategic management, cross-cultural management and organizational behaviour, and the global environment of business (trade, finance, law, etc.). The focus is on the firm and the manager in an international context. International Strategic Management is about how firms become international and then exploit their international scope in order to achieve long term objectives. Focus is on firms of all sizes, from many countries, as they come to grips with an increasingly competitive global environment.

CBU5111 Strategic Leadership and Conflict Management   **20 Credits**

The module focuses on key leadership issues that include strategic roles of leaders, leadership effectiveness at strategic level, the levels, styles, theories of leadership as well as the role of leadership in motivating employees. Further, focus will be on competencies relating to conflict management that will include perspectives of conflict, conflict resolution, levels of conflict, and causes of conflict in organisation, conflict analysis and tools; economic roots of conflict;

Think in other terms

diversity and conflict in organisations, negotiating, leadership and conflict, impact of conflict on commitment as well managing organisational politics.

CBU 5208 Entrepreneurship and Innovation   **20 Credits**

Entrepreneurship: Creativity, Rigor and Risk - This section of the module focuses on entrepreneurship from three different perspectives: entrepreneurship as the special collection of skills possessed by an entrepreneur; entrepreneurship as an analytical and managerial process; and, entrepreneurship as the sharing of risk and reward between the entrepreneur and his/her financiers.

Innovation - The overall objectives of this section of the module are to evaluate new product success, to define and implement innovation strategies (product-process) and to design the organisation in order to foster innovation.

CBU 5209 Strategy Implementation and Evaluation   **20 Credits**

The module extends beyond strategic analysis and formulation to focus on key elements of the strategic management that includes implementation encompassing definitional perspectives, factors that affect strategy implementation, principal strategy implementation tasks, building execution into strategy, leadership and strategy implementation, structure and strategy implementation, corporate culture & strategy implementation as well as reward systems & strategy implementation. The module with also cover strategic evaluation and control encompassing strategic control systems, importance of strategic control, taxonomies of control systems, control and evaluation process, measuring corporate performance, corporate excellence and attributes of excellent companies, characteristics of an effective evaluation system, designing structure and control systems etc.

CBU 5210 Business Ethics and Corporate Governance   **20 Credits**

The module focuses on ethical issues in business, the role ethics in business, theories and models in business ethics, corporate social responsibility, stakeholder theory, citizenship, corporate accountability, social responsibility; the role of ethical theory; traditional ethical theories; contemporary ethical theories; models of ethical decision making, individual influences on ethical decision making, situational influences on decision making, what is business ethics management, setting standards of ethical behaviour, managing stakeholder relationships, accessing ethical performances, organizing for business ethics management, shareholders as stakeholders: understanding corporate governance; ethical issues in corporate governance; shareholders as citizens of the corporation; perceptions of value; the ethical limitations and danger of managerial roles; categories of responses to ethical issues; competing stances and the possibility of cognitive dissonance; influence on choice of stance; an overview of pressures on organisations; codes of conduct and codes of ethics; ethical culture and ethics and basic practice standards.

Think in other terms

CBU 5211 Managing Strategic Change   **20 Credits**

The module focuses on empowering students with skills in management of key transformative initiatives in organisations. Concepts to be covered will include the concept of strategic change, taxonomies of change, models of change, implementation of strategic change, evaluation of change initiatives, organisational development, impact of change on organisational sub-systems, leading the change processes, theories of strategic change etc Further, the module also covers a key aspect of strategic change which is corporate restructuring corporate restructuring in relation to the drivers of corporate restructuring, forms of corporate restructuring, impact of restructuring on organisational performance as well as problems associated with restructuring. Further, the concept of restructuring is discussed against a background of resource-based, agency and behavioural theories of the firm.

CBU 5302 Strategic Information Management   **20 Credits**

This module will focus management of information from a strategic perspective (strategic information systems) rather than an operational one and concentrate on linking information systems strategy with organisational strategy. It will also focus on introducing the topics areas such as knowledge management-business strategy as well as organisational leaning. Focus will also be on other information systems and how they support the strategic information systems.

CBU 5303 Strategic Financial Management   **20 Credits**

This module provides a working knowledge of the tools and analytical conventions used in the practice of corporate finance; establishes an understanding of the basic elements of financial theory to be used in application of analytical reasoning to business problems; and explores the interrelationship among corporate policies and decisions.

CBU 5304 Strategic Human Resource Management   **20 Credits**

This module focuses on Strategic Human Resource Management as a process within the organisation which is conceived, owned and executed by leaders and managers, rather than on the role of the HR function. It provides students with strategic frameworks and models for linking HR policies and practices to business performance management approaches, and examines HR implications of the 'resourced based view' of the firm. It looks at strategic and governance issues concerning the deployment of Human Capital, and at organisation form and structuring, including an exploration of HR impacts of globalization.

CBU 5305 Performance Management   **20 Credits**

The module focuses on the strategic role of performance management; distinction between performance management and performance appraisal; managing the performance of individuals, teams, departments, divisions and the whole organisation; measuring corporate performance (including traditional financial measures, shareholder measures as well as contemporary measures such as the balanced scorecard); the concept of productivity encompassing factors that

affect productivity at all levels, improving productivity at all levels, relationship between productivity and the other building blocks of competitive advantage, drivers of productivity in functional areas, relationship between productivity and business level strategy; the concept of corporate excellence as the relationship between performance management and sustainable competitive advantage.

CBU 5306 Corporate Communications   **20 Credits**

The module empowers students with competencies in corporate communications that includes on the role of corporate communications in contemporary organisations, developing, implementation and evaluation of a corporate communications strategy, managing media relations, key concepts and competencies corporate communications, managing corporate image, reputation management, crisis management, corporate social responsibility in relation to the image of the organisation as well as managing organisational stakeholders etc.

CBU 5306 Strategic Marketing Management   **20 Credits**

The module focuses on empowering students with skills on how to manage marketing processes and activities to effectively support achievement of strategic objectives while providing students with marketing tools and analytical skills necessary to apply key concepts to practical business situations. Concepts covered include strategic aspects of marketing management, the marketing environment, products and services strategies, new product development and product life cycle concept, pricing products and services, distribution strategies, marketing communication strategies, understanding the market, competitor analysis and competitive strategies as well as strategic marketing management.

CBU 5308 Strategic Supply Chain Management   **20 Credits**

This module aims at providing students with an understanding of purchasing as a strategic weapon, centred on its ability to create collaborative relationships for firm advantage. Strategic purchasing is, however, supported by associated supply management practices such as formal socialization processes, supplier integration and supply base flexibility. Focus will also be on supplier relations and procurement strategy; managing supplier relationships; supply chain partnerships for competitiveness; bargaining power of suppliers in the supply chain, networking and relationship building, objectives of negotiation, buying roles and negotiation, strategic sourcing, supplier relationship and negotiation ,formulating negotiation strategies (win-win and win-lose),implementing negotiating strategies, bargaining power of suppliers and negotiation, supplier performance evaluation and improvement and ethical issues in negotiation.

CBU 5309 Quality Management   **20 Credits**

The module focuses on an overview of the strategic role quality as a building block of competitive advantage, quality perspectives, organizing for quality; evolution of quality management approaches; principal contributors to quality management; quality assurance;

international standards certification, quality and competitiveness and costs of non-conformance. Further, the module will focus on emergence of total quality management as a concept, objectives of total quality management, total quality management as contemporary quality management best practice, essentials of total quality management, top management commitment, training and development, teamwork, employee empowerment; benchmarking, effective process management, knowledge and application of total quality management tools and techniques, benefits of total quality management and principal contributors to total quality management.

CBU 5310 Production and Operations Management   20 Credits
The module focuses on; the strategic role of production and operations functions in driving competitive advantage; knowledge and practical skills in relation to the production function; basic characteristics of manufacturing and non-manufacturing operations; analysis of major business decisions in process design, equipment selection and replacement; problems and solutions of allocating and capital resources of the form to product lines; stocks and production facilities; role of production and operations on the value chain and outsourcing the operation function etc.

CBU 5311 Project Management   20 Credits
This module aims to develop a comprehensive body of knowledge and understanding of the theoretical and practical aspects to project management, and to develop the essential transferable skills and competencies necessary to strategically plan, implement, monitor, control and deliver successful projects to time, cost, and quality as well as assuring project performance.

CBU 5312 Strategic Management Accounting   20 Credits
The module focuses and discusses the characteristics of Strategic Management Accounting decision including performance evaluation, control quantitative techniques and non-financial performance measures. These concepts will be taught in relation to their nexus to strategic management process concepts like corporate strategy, strategic implementation, evaluation and control.

CBU 5313 Managerial Economics   20 Credits
This module focuses on empowering students with knowledge and competencies in both microeconomics and macroeconomics in alignment with the strategic management which are specifically relevant to the programme. The microeconomic element of the module is designed to provide an understanding of the determinants of strategic choice by firms, combining traditional approaches to microeconomics with contemporary developments in the study of industrial organisations. This includes insights into the nature of competitive behaviour and the relationship with the concept of competitive advantage etc. The macroeconomic element is designed to provide an understanding of the behaviour of the economy and highlights the key macroeconomic policy issues which affect strategic management.

Think in other terms

CBU 5400 Dissertation   **80 Credits**

The dissertation is a compulsory component of the programme which helps students to consolidate theoretical knowledge gained in the Taught Section of the programme by completing a research project under the supervision of the Department of Business Management staff and/or professionals in the relevant areas of research.

DEPARTMENT OF MARKETING

Lecturer and Chairperson
Sothini Natalia Ngwenya, GMBA, NUST Z'bwe, BCom (Hons) Mgt, NUST Z'bwe, HND Marketing, Masvingo Tech Z'bwe.

Secretary

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Judith Charumbira, MSc Marketing, NUST Z'bwe, PGDM, NUST Z'bwe, BA General, UZ Z'bwe, Graduate Certificate in Education, UZ Z'bwe.

Temporary full-time lecturers
J. M. Habvane, MPA, University of South Carolina, USA, Bachelor of Administration, Western Michigan University USA

S. B Mlilo, MBA, UZ Z'bwe, BBS (Hons), UZ Z'bwe, Diploma AD, ED, UZ Z'bwe

Vimbai Chimhamhiwa, EMBA NUST Z'bwe, BSc. Business Marketing, Monash Australia, City and Guilds Higher Education Teacher's Diploma

Teaching Assistants
Mitchell Ndiweni, MSc Marketing, NUST Z'bwe, BCom Marketing, NUST Z'bwe

Sindiso Sibanda, MSc Marketing, NUST Z'bwe, BBA Marketing IMM

Think in other terms

BACHELOR OF COMMERCE HONOURS DEGREE IN MARKETING

1.0 PREAMBLE

1.1 The Department of Marketing focuses on teaching and research. The Department is obligated to spend at least 95% doing teaching, 5% on research for the undergraduate degree and at least 75% teaching, 20% research and 10% on community engagement. For teaching, the Department runs an undergraduate Honours programme on conventional, parallel and block –release basis concurrently, and one Masters Programme on a block-release basis only. The Department offers the following programmes of study;
- Bachelor of Commerce Honours Degree in Marketing
- Master of Science in Marketing

2.0 ENTRY REQUIREMENTS

2.1 To qualify for normal entry into the Bachelor of Commerce Honors Degree in Marketing Programme, a candidate, in addition to satisfy the minimum conditions prescribed under the General Regulation and the Faculty Regulations for English Language and Mathematics, must have passed Business Studies and any one subject at 'A' level
     OR
2.2 Relevant work experience in the field of Marketing or equivalent will be an added advantage.

3.0 STRUCTURE OF THE DEGREE PROGRAMME

3.1 The Programme, consisting of coursework, shall normally be completed over a maximum period of 4 years both on a full-time, part-time block-release basis or parallel basis. The academic year shall normally begin in July/August.

3.2 On both basis, delivery shall be allocated as follows:

	Semester	Number of Modules
First Year	I	7 Modules
	II	5 Modules
Second Year	I	6 Modules
	II	6 Modules
Third Year	Industrial Attachment	
Fourth Year	I	5 Modules
	II	5 Modules
	Dissertation	

Think in other terms

Total Number of Modules	Thirty four (34 Modules + Dissertation)

3.3 Module delivery will be divided into two components:
   a) The taught component (Stage I, II, III and IV) comprises of 34 core modules.
   b) The research component, in Stage IV, leading to a dissertation of approximately 20, 000 words excluding appendices.

3.4 The weighting of modules will be based on the Notional Study Hours (NSH) credit system which all learning activities of a student of average ability, taking place in and outside scheduled contact sessions, are taken into consideration (1 credit = 10 notional hours). A student must attain a prescribed minimum number of credits to qualify for the award of a degree or diploma.

3.5 Each module shall be taught for a total of 48 contact hours.

4.0 ASSESSMENT

4.1 A candidate will be expected to sit for formal written examination at the end of each Stage of the Programme. However, oral examinations may be provided under special circumstances.

4.2 For a candidate to be admitted to the examination, they must have satisfactorily completed all assignments for continuous assessments. In addition, they are expected to have attended a minimum of 80% of the lectures in each module.

4.3 The taught component shall be examined by both coursework and a formal written examination. Coursework shall account for 40% of the overall assessment while the formal written examination shall account for 60% of the overall assessment.

4.4 For the taught component, the pass mark shall be 50% based on the aggregate of the module work and the examination while for the research component the pass mark shall be 50%, based on the aggregate of the viva voce defence and the dissertation marks. The viva voce defence is compulsory and shall constitute 20% of the final dissertation mark.

4.5 The determination of the overall degree programme aggregate with a dissertation component will be:
   ● Taught component   95%   489 credits
   ● Research component   5%   22 credits

4.6 A candidate shall not be allowed to proceed to the research component of the Programme before passing all modules in the taught component.

5.0 REPEATING MODULES

5.1 In cases where the Programme is not fully semesterised, a candidate who fails a module or modules taken in a particular block may, on the recommendations of the Senate, be granted permission to repeat the failed modules when next offered.

Think in other terms

5.2 A candidate who fails more than 50% of the modules taken in a particular part may, on the recommendations of the Senate, be granted permission to repeat the failed modules. Nevertheless, a repeat candidate may be exempted from re-attendance and re-examination in any modules in which he/she previously passed.

5.3 A candidate who is not allowed to proceed to the subsequent Stage of the Programme and has failed the same Stage of the Programme twice will be required to withdraw from the Programme.

5.4 A candidate who fails the dissertation stage with a mark in the range of 40-49% shall be given the option to re-submit within three months from the date of publication of results. The dissertation will only attain a maximum of 50%.

5.5 A candidate who fails the Dissertation Stage with a mark below 40% shall be expected to apply to repeat the module.

5.6 A candidate who fails to complete the Dissertation Stage and does not submit the dissertation within the prescribed period shall be given the option to submit within three months from the date of publication of results. However, such a dissertation will be awarded a maximum of a Pass grade.

6.0 CLASSIFICATION OF THE DEGREE

6.1 Candidates must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.

6.2 For the degree to be awarded, the minimum number of credits of 288 credits must be satisfied.

6.3 The classification of the degree will be as in the General Regulations.

Think in other terms

PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
CAC 1108	Accounting IC	10
CBU 1102	Business Communication	10
CIN 1103	Commercial Law	10
CBA 1104	Principles of Microeconomics	10
CBU 1108	Principles of Management	10
CIN 1106	Quantitative Analysis for Business 1I	10
CTL 1101	Conflict Transformation and Leadership	10
CAC 1209	Accounting IB (New syllabus for marketing students)	10
CBA 1205	Principles of Macroeconomics	10
CIN 1207	Quantitative Analysis for Business II	10
CMK 1209	Principles of Marketing	10
CMK 1210	Events Management (with Practical project)	10

PART II

CMK 2101	Marketing Research	11
CMK 2102	Consumer Behaviour	11
CMK 2104	Marketing Information Systems	11
CMK 2106	Advertising and Sales Promotion	11
CMK 2105	Digital and Social Media Marketing	11
CFI 2101	Corporate Finance I	11
CMK 2201	Distribution and Logistics Management	11
CMK 2206	Retail Marketing Management	11
CMK 2204	Sales Management	11
CMK 2202	Customer Relationship Management	11
CMK 2203	Public Relations and Publicity	11
CFI 2202	Corporate Finance II	11

PART III

CBU 3001	Industrial attachment	120

PART IV

CMK 4101	Strategic Marketing Management I	11
CBU 4109	Entrepreneurship	11
CMK 4105	Services Marketing	11

Think in other terms

CMK 4103	Business to Business Marketing	11
CMK 4104	International Marketing Management	11
CMK 4203	Business Ethics and Corporate Governance	11
CMK 4201	Strategic Marketing Management II	11
CMK 4206	Agri-business Marketing	11
CMK 4204	Brand Management	11
CMK 4205	Hospitality and Tourism Marketing	11
CMK 4200	Research Project	22
Total credits		**504**

MODULE SYNOPSES

PART 1

CMK 1209 Principles of Marketing Management   **10 Credits**

The module focuses on principles of marketing management and marketing instruments, customer centricity, the process of marketing management, market segmentation, positioning and marketing information systems, environmental analysis, identification of target markets, value creation, positioning strategies, consumer behaviour, relationship marketing, relationship intention, application of product, price, marketing communication and distribution strategies.

CAC 1108 Accounting IC   **10 Credits**

The module looks at the nature and Scope of Financial Accounting; Accounting principles, concepts and conventions – historical cost, prudence, materiality, going concern, entity, monetary, revenue recognition, matching principles; Accounting Methods - Accrual basis, Cash basis; financial statements – components of the Statement of Financial Position (Balance Sheet), Statement of Comprehensive Income (Income Statement), Statement of Changes in Equity, Statement of Cash Flows and Notes to Financial Statements; Recording Financial Information; Accounting and Administrative Control Systems as well as Ratio Analysis.

CAC 1209 Accounting ID   **10 Credits**

This module is an introduction to Cost and Management Accounting; Cost and Management Accounting Vs. Financial Accounting; Manufacturing Account; Cost Classification; Cost Curves; Material Control; Inventory or Stock Valuation Methods; Economic Order Quantity; Overhead Costs; Principles and Methods of Calculating Costs; Job Costing; Activity based costing; Process costing; Marginal Costing and Absorption Costing; Standard Costing; variance analysis; Cost Volume Profit Analysis; Budgeting; Master Budget; Flexible budgeting; Capital Budgeting Techniques and Investment Decision Making.

CMK 1210 Events Management   **10 Credits**

The module will cover a range of inter-related subjects and topics which include: business operations cycle and processes in the context of events management; Promotion, merchandising and sales techniques; target marketing and segmentation, sponsorship and promotions, sponsorship proposals; Event Marketing; Sustainability for Events; Event communications; Budgeting for events; People management; Capacity management and crowd control for events; Facility location, design, layout and management; Risk assessment, health and safety and legal issues for events; Managing quality events; Key skills required in the Events industry as well as event evaluation and management techniques.

PART 2

CMK 2101 Marketing Research   **10 Credits**

This module deals with defining of the marketing problem; research design; exploratory research design for secondary data and qualitative research; surveys and observations as part of descriptive research; measurement of perceptions and attitude scaling; questionnaire design; sampling design and sampling procedures; fieldwork and data preparation; formulation of hypotheses and basic statistical tests. It also looks at basic data analysis, descriptive statistical analysis, interpretation and reporting of results and research report writing.

CMK 2102 Consumer Behaviour   **10 Credits**

The module explores the internal and external influencing factors of consumer behaviour, the consumer's decision process and application fields of consumer behaviour, consumerisms and social responsibility, buying behaviour of consumers in both product and service related industries, consumer psychology and the influence thereof on buying behaviour, psychology of pricing, influencing factors in consumer buying behaviour and the impact of various forms of marketing communication on buying behaviour.

CMK 2104 Marketing Information Systems   **10 Credits**

This module looks at definitions, functions, requirements for the marketing information systems (MKIS). Types and functions of the information systems, their usage for marketing purposes: operational, analytical, OLAP, expert, executive, decision-support systems. It also considers applying ERP, business intelligence, integrated software for marketing tasks, Cloud based and open source solutions. (Tools &software: Sugar CRM), Management processes of the marketing manager: analytical and control applications: pivot tools, dashboards, computational intelligence methods for marketing (Tools &software: MS Excel pivot module). The model also explores marketing planning, process modelling and decision making by using MKIS as well as creating MIS in the enterprise, the interrelationships with other computerized systems inside and outside the enterprise. The variety of concepts for structure and processes of the MIS models and ERP application for marketing are also looked at as well as tools &software: CESIM modelling solutions: OnService, SimBrand. An overview of the internet and WWW, use of internet technology for inter- and intra-organizational electronic business and a theory of networks; OSI model and TCP/IP as well as Application of networks in business are explores.

CMK 2105 Digital and Social Media Marketing   **10 Credits**

This module will look at digital marketing methods with the aim of ensuring students develop in-depth understanding of how digital marketing planning and e-promotion is used in achieving and maintaining market competitiveness. It also explores the fundamentals of Netnography, co-creation, communities and social media platforms, the role of social media and its relation to an e- commerce strategy, digital marketing trends and consumer culture as well as convergence of digital technology, Web Publishing Technologies, Creating and publishing Web Pages.

Think in other terms

CMK 2106 Advertising Management and Sales Promotion   **10 Credits**

The module looks at the definition, importance and functions of advertising, the importance of advertising in modern marketing, role of advertising in the national economy, types of advertising, pact and Dagmar approaches, setting of advertising objectives, advertising appeals, advertising message, advertising budget, advertising campaign and strategy, advertising film making, advertising media- types of media, media planning, selection of media category, factors influencing the choice of media, media scheduling, evaluation of advertising effectiveness, advertising agencies: their role, functions, organization and importance as well as social advertising and corporate social responsibility. It also explores the nature and importance of sales promotion, its role in marketing, forms of sales promotions- consumer oriented sales promotion; trade oriented sales promotion & sales force-oriented sales promotion, sales representatives as communicators, major tools of sales promotion- samples point of purchase, displays & demonstrations, exhibitions & fashion shows, sales contests & games of chance and skill, lotteries gifts offer, premium and free goods, price packs, rebates patronage rewards. Conventions, conference & trade shows, specialties and novelties, developing sales promotion programme, pre-testing implementing, evaluation of results and making necessary modifications.

CMK 2201 Distribution and Logistics Management   **10 Credits**

The module is about distribution strategies; the role of logistics in an enterprise; definition and scope of customer service; electronic and other logistics information systems; inventory management; materials management with special reference to Japanese systems; management of the supply chain. It also looks at the methods of transport and transport costs; types and costs of warehousing; electronic aids in materials handling; cost and price determination of purchases; organizing for logistics management; methods for improving logistics performance.

CMK 2202 Customer Relationship Management   **10 Credits**

The module is about CRM practices and quality services using CRM; CRM and firm strategies and CRM technologies used to manage and analyze customer interactions and data throughout the customer lifecycle; customer retention, loyalty and profitability.

CMK 2203 Public Relations and Publicity   **10 Credits**

The module focuses on defining Public Relation and the Growth of Public Relations, Communications as a PR Skill, Managing public opinion, Ethics in Public Relations, Publicity & the print media, Publicity & the electronic media, Multicultural community relations, Government Public Relations, Consumer relations, Investor relations, Public Relations and the Internet, Public Relations writing, Crisis Management.

CMK 2204 Sales Management   **10 Credits**

The purpose of this module is to introduce the student to basic principles of direct selling. On a practical level, the student will have attained the necessary experience to identify environmental trends and understand all the functions of direct selling. Also, the student will be evaluated on his/her practical ability of selling by reaching a set sales target.

CMK 2206 Retail Marketing Management   **10 Credits**

This module is about retail environment; Retail formats; Retail strategy and the retailing mix; Location decisions; Merchandise decisions; Price decisions; Communication decisions; Consumer services and information; Technology and systems; Point of purchase displays as well as franchise agreements.

PART 4

CMK 4101 Strategic Marketing Management I   **11 Credits**

In this module, strategic issues in marketing, strategic marketing, strategic analysis (market analysis, customer analysis, competitor analysis and internal analysis), market strategies (competitive strategies, strategies in the product life cycle and relationship building strategies) and strategy implementation and control are examined.

CMK 4103 Business To Business Marketing   **11 Credits**

This module examines the nature of business markets, their needs and strategies used to meet their needs; Marketing Mix in a Business to Business Context: Developing and managing products, managing the business marketing channel, managing pricing and negotiating to provide customer value, understanding the key elements of the communications mix for business marketers, managing Sales. Organizational Buyer decisions as well as industrial consumer behaviour.

CMK 4104 International Marketing Management   **11 Credits**

This module is about international marketing; the process of internationalization; growth in international trade and investment; the evolution of multinational enterprises; management perspectives on international trade and international trade theories; international trade regulation; economic integration; the formation of trading blocks, and free-trade areas. The international marketing environment; the cultural, political and legal environments as well as the economic environment of international business, the international trade concept and theory; the international monetary system; the foreign exchange market; and international capital markets are also explores.

CMK 4105 Services Marketing   **11 Credits**

This module focuses on the unique characteristics of services; nature and process of service delivery; differences between product and service evaluations; development, communication and delivery of services; service quality and measurement thereof; the role of service providers and the environment of service delivery as well as the implementation of service-marketing strategies.

CMK 4201 Strategic Marketing Management II   **11 Credits**

This module is about a strategic management analysis and formulation Basic concepts; formulation of mission; policy and objectives; external evaluation of the business environment; internal evaluation of the enterprise; including intellectual assets; the formulation and

Think in other terms

development of a strategic plan. Strategic management implementation: The role of management in strategy implementation; budgets as instrument in the implementation process; leading processes of change within enterprises; supporting policies, procedures and information systems for implementation in the various functional areas; evaluation and control of implementation is highlighted.

CMK 4203 Business Ethics and Corporate Governance   **11 Credits**
The module is concerned with ethical behaviour in marketing; types of unethical behaviour; Ethical dimensions of marketing management, governance, and responsible management practice; modes of governance and corporate social responsibility in the global economy; good cooperate governance and firms image.

CMK 4206 Agri-Business Marketing   **11 Credits**
This module focuses on the application of marketing and economic principles to decision making in contemporary agribusiness firms. Marketing strategies, marketing research and information, segmentation and targeting, marketing mix, and market plans within food, fiber, natural resource, and production input industries are explored. An analysis of agribusiness marketing environment; National/international agricultural commodity marketing and pricing; supply, demand, costs, time value of money, futures/options market, and price forecasting is made. Agricultural Policy effects on agribusiness marketing; and International agricultural marketing are also highlighted.

CMK 4204 Brand Management   **11 Credits**
This module is about the importance of creating powerful brands; Nature of brands; the branding process; Brands and corporate culture; Retailer issues in branding; Service brands; Business to Business branding; Brands on the Internet. Brand planning, evaluation and sustaining; Segmentation and differentiation through branding as well as how powerful brands beat competitors.

CMK 4205 Hospitality and Tourism Marketing   **11 Credits**
The module examines the nature of hospitality industry; Hospitality marketing mix; Hospitality and Events marketing; nature of tourism marketing; Marketing tourism products; destination marketing, image-creation and branding; Consumers and consumption in tourism; marketing communications strategies in tourism; opportunities and also challenges and constraints of tourism marketing.

Think in other terms

MASTER OF SCIENCE IN MARKETING

1.0 PREAMBLE

1.1 The regulations for the Master of Science Degree hereinafter referred to as the Master of Science in Marketing complement but are subordinate to the University General Academic Regulations for Master's Degree by Coursework, hereinafter referred to as the General Academic Regulations.

2.0 ENTRY REQUIREMENTS

2.1 Applicants should normally hold an Honours Degree in Marketing or equivalent from a recognized university.

2.2 A relevant Higher National Diploma in Marketing or any other discipline from a recognized Institution.

2.3 Relevant work experience in the field of marketing or equivalent will be an added advantage.

2.4 Shortlisted candidates for admission may be interviewed as part of the selection process.

3.0 STRUCTURE OF DEGREE PROGRAMME AND DELIVERY SYSTEMS

3.1 The Programme consisting of coursework shall normally be completed over a maximum period of 24 months on a part-time block-release basis. The academic year shall normally begin in July/August.

3.2 On a block release basis, delivery shall be allocated as follows:

	Semester	**Number of Modules**
First Year	I	3 Modules
	II	3 Modules
Second Year	I	4 Modules
	II	Dissertation *(after passing Part 1and II)*
Total Number of Modules	**12 (10 Modules + Dissertation)**	

3.3 Module delivery will be divided into two components:

a) The taught component (Part I, II and III) comprises of 10 core modules.

b) The research component, in Stage IV, leading to a dissertation of approximately 20, 000 words excluding appendices.

3.4 The weighting of modules will be based on the Notional Study Hours (NSH) credit system which all learning activities of a student of average ability, taking place in and outside scheduled contact sessions, are taken into consideration (1 credit = 10 notional

hours). A student must attain a prescribed minimum number of credits to qualify for the award of a degree or diploma.

3.5 Each module shall be taught for a total of not less than 56 contact hours.

4.0 ASSESSMENT

4.1 A candidate will be expected to sit for formal written examination at the end of each Stage of the Programme. However, oral examinations may be provided under special circumstances.

4.2 For a candidate to be admitted to the examination, they must have satisfactorily completed all assignments for continuous assessments. In addition, they are expected to have attended a minimum of 80% of the lectures in each module.

4.3 The taught component shall be examined by both coursework and a formal written examination. Coursework shall account for 40% of the overall assessment while the formal written examination shall account for 60% of the overall assessment.

4.4 For the taught component, the pass mark shall be 50% based on the aggregate of the module work and the examination while for the research component the pass mark shall be 50%, based on the aggregate of the viva voce defence and the dissertation marks. The viva voce defence is compulsory and shall constitute 20% of the final dissertation mark.

4.5 The determination of the overall degree programme aggregate with a dissertation component will be:
- Taught component   78%   260 credits
- Research component   22%   70 credits

4.6 A candidate shall not be allowed to proceed to the research component of the Programme before passing all modules in the taught component.

5.0 REPEATING MODULES

5.1 In cases where the Programme is not fully semesterised, a candidate who fails a module or modules taken in a particular block may, on the recommendations of the Senate, be granted permission to repeat the failed modules when next offered.

5.2 A candidate who fails more than 50% of the modules taken in a particular part may, on the recommendations of the Senate, be granted permission to repeat the failed modules. Nevertheless, a repeat candidate may be exempted from re-attendance and re-examination in any modules in which he/she previously passed.

5.3 A candidate who is not allowed to proceed to the subsequent Stage of the Programme and has failed the same Stage of the Programme twice will be required to withdraw from the Programme.

5.4 A candidate who fails the dissertation stage with a mark in the range of 40-49% shall be given the option to re-submit within three months from the date of publication of results. The dissertation will only attain a maximum of 50%.

Think in other terms

5.5 A candidate who fails the Dissertation Stage with a mark below 40% shall be expected to apply to repeat the module.

5.6 A candidate who fails to complete the Dissertation Stage and does not submit the dissertation within the prescribed period shall be given the option to submit within three months from the date of publication of results. However, such a dissertation will be awarded a maximum of a Pass grade.

6.0 AWARDING OF DEGREE AND CLASSIFICATION OF THE DEGREE

6.1 Candidates must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.

6.2 For the degree to be awarded, the minimum number of credits of 288 credits must be satisfied.

6.3 The classification of the degree will be as in the General Regulations.

Think in other terms

PROGRAMME SUMMARY

STAGE I

Module Code	Module Description	Credits
CBU 5101	Strategic Marketing	20
CBU 5103	Marketing Research	20
CBU 5201	Marketing Information Systems and E-Commerce	20
CBU 5104	Industrial and Consumer Behaviour	20
CBU 5102	Financial Aspects of Marketing	20

Electives

CBU 5105	Marketing of Financial Services	20
CBU 5106	Marketing of Non-Profit Organisations	20
CBU 5107	International Marketing Management	20

STAGE II

CBU 5202	Supply Chain Management	20
CBU 5203	Strategic Brand Management	20

Electives

CBU 5205	Agri-Business Marketing	20
CBU 5206	Professional Selling	20

Electives

CBU 5204	Retail and Services Marketing	20
CBU 5207	Marketing Communications and Applied Ethics	20

STAGE III

CBU 5301	Dissertation	80
	TOTAL CREDITS	**280**

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MODULE SYNOPSES

STAGE 1

CBU 5101 Strategic Marketing   **20 Credits**

The module explores the process of strategy development and marketing planning as well as the development of strategic options. The scope of marketing decisions in areas of product management, pricing, promotion and distribution is examined.

CBU 5103 Marketing Research   **20 Credits**

This module examines the importance of research in marketing decisions as well as the techniques and procedures of acquisition, analysis and presentation of data. Areas of interest will include aspects of sampling, questionnaire design, and analysis and survey administration.

CBU 5201 Marketing Information Systems and E-Commerce   **20 Credits**

This module looks at the types of marketing information and its role in decision making and examines the development of e-commerce and its impact on marketing. Data base marketing issues are also examined.

CBU 5104 Industrial and Consumer Buyer Behaviour   **20 Credits**

The module develops an understanding of the concepts of consumer buying as well as business buying behaviour. The module will analyze how the understanding of buyer behaviour can facilitate the development of relationships and networks and provide a basis for developing effective marketing strategies.

CBU 5102 Financial Aspects of Marketing   **20 Credits**

This is a quantitative module which deals with costing issues, income statements and balance sheet analysis as well as analyzing product profit performance.

ELECTIVES

CBU 5105 International Marketing Management   **20 Credits**

The world as a global village entails that organizations must avoid economic isolation. Hence this module explores the challenges and opportunities provided by international markets and how to respond to them. Issues of export management and documentation are also analyzed.

CBU 5107 MARKETING OF NON-PROFIT ORGANIZATIONS   **20 CREDITS**

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STAGE II
CORE MODULES

CBU 5202 Supply Chain Management   **20 Credits**
The module is designed to develop participant's buying skills. It covers purchasing principles and techniques, buying methods, negotiation philosophies, supplier selection, expediting, legal aspects, international buying, corporate purchasing, performance measurement, effective storekeeping, inventory management and materials management.

CBU 5203 Strategic Brand Management   **20 Credits**
The module examines the nature of brands and their strategic importance to an organization. Issues include analyzing corporate culture, brand naming and stretching, added value, brand vision etc.

ELECTIVE MODULES (To select 2)

CBU 5204 Marketing Communications and Ethics in Marketing   **20 Credits**
The module examines the method of communication between a business and its customers. Focus will be on effective use of advertising, personal selling, sales promotions, publicity and other tools of communication well as their method of implementation and evaluation.

CBU 5207 Retail and Services Marketing   **20 Credits**
The module explores the major issues facing the retail industry and the functions and importance of retailing. It develops an understanding of the nature of the retail mix and the unique marketing emphasis for retailers and other service organizations. Issues on the unique characteristics of services and the role of people in service delivery are also looked at.

CBU 5205 Agri-Business Marketing Management   **20 Credits**
The module is designed to give a thorough grounding in the principles of agro-marketing. The unit will look at the peculiarities of commodity pricing in world markets, negotiation strategies, logistics, the regulatory environment, derivative markets among other issues.

CBU 5206 Professional Selling Management   **20 Credits**
The module covers the nature and scope of selling, purpose of selling, importance of selling, types of sales positions; the personal selling process - prospecting and preparation; presentation and closing; post sale follow-up; role of the Salesforce; types of salespersons, Salesforce objectives, determining sales force size.

Think in other terms

STAGE III

CBU 5301 Dissertation   **80 Credits**

The dissertation, which is compulsory, helps students to consolidate theoretical knowledge gained in the Taught Section of the programme by completing a research project under the supervision of the Department of Business Management staff and/or professionals in the marketing sector.

GRADUATE SCHOOL OF BUSINESS

Director
Ambassador M. Ngulani, MBA Management, *Morgan State University USA*; BSc Business Administration, *Morgan State University, USA*

Secretary

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T. Nyoni PhD African Leadership, *NUST Z'bwe*, MBA,*NUST Z'bwe*, BA Arts, *UNISA SA*, HDip. Human Resources, *IPMZ*, Dip. Pers. Mgt, *IPMZ*, Cert. Edu. *UZ Z'bwe*

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V. Sibanda, PhD Business Administration, *North West University RSA*, MBA,*NUST Z'bwe*, Grad. Cert. in Education, *UZ Z'bwe*, BSc Hons Economics, *UZ Z'bwe*

Think in other terms

A. Dube, MSc Finance and Investment, *NUST Z'bwe*, BTech. Accountancy, *UZ Z'bwe*

Oneile Gwate-Hall, MComm *Fort Hare SA*, BCom (Fort Hare), BBS, *UZ Z'bwe*

F. Chinjova, MBA, *NUST Z'bwe*, BCom Accounting, *ZOU Z'bwe*

Research Fellow
S. Mtisi, MBA, *Stirling University UK*, Bachelor of Technology Honours, *UZ Z'bwe*

EXECUTIVE MASTER OF BUSINESS ADMINISTRATION DEGREE PROGRAMME

1.0 PREAMBLE

1.1 The Faculty of Commerce regulations for the Executive Master of Business Administration degree, hereinafter referred to as the Master of Business Administration Regulations, compliment the University General Academic Regulations for the Master's degrees by Coursework, hereinafter referred to as the General Academic Regulations.

1.2 The Faculty of Commerce offers the Master of Business Administration degree under the aegis of the NUST Graduate School of Business, hereinafter referred to as the School of Business.

1.3 In addition to the various items as defined in Section 1.7 of the General Academic Regulations the following additional terms used in these regulations may be described:

"Part"   Part is a defined portion of the programme with several modules.

"Audit"   An audit is a registration status, which allows a student to attend a module for a regular grade or information without receiving credit hours for the module.

"Module"   A module is a systematic plan of study, which may utilize lectures, discussions, laboratory, recitations, workshops, studios, independent study, internship, or other similar teaching formats to facilitate learning for the student. A module is counted in credit hours.

"Grade"   A grade is the instructor's official estimate of the student's achievement in a module as reflected in examinations and assignments, and class participation. At the close of the semester students receive a final grade in a module. The final grades are recorded on the student's permanent record at the Office of the University Registrar. The grade may not be changed from the record.

"Semester"   A term used to identify formally designated periods during which classes are scheduled.

Think in other terms

"Dissertation" A major research-based project undertaken by an MBA student in his/her area of specialization/operational interest, demonstrating a comprehensive and qualitative understanding of the area of study.

"Board of Studies" Means the School of Business Board of Studies. It shall comprise the chairmen of all Departments in the Faculty of Commerce, Director of Graduate School of Business and all its lecturers and will be chaired by the Dean of the Faculty of Commerce.

"Pronoun" The use of the pronoun "he and she" in these regulations applies to both sexes.

1.4 The Master of Business Administration may be studied on a block release basis or on a full-time basis.

2.0 DURATION OF PROGRAMME

2.1 The MBA Programme may be studied over a minimum period of 24 months and a maximum of 36 months.

2.2 The Executive Master of Business Administration may be studied on a block release or full time basis as shown below:

YEAR	NUMBER OF MODULES	NUMBER OF CREDIT HOURS
I	4	80
II	4	80
III	4	80
IV	DISSERTATION	94

Duration of the Programme (hours) = 337

2.3 The minimum notional study hours and credits shall comply with the Zimbabwe Credit Accumulation and Transfer System (ZIMCATS) of 270-340 credits.

3.0 ENTRY REQUIREMENTS

3.1 To be considered for admission into the MBA Programme, an applicant should normally:
● be at least 30 years of age;
● hold a Bachelor's degree of this University or any other approved university;

Think in other terms

- have at least five years' practical experience in a managerial capacity.

3.2 All applicants for admission into any MBA programme must be short-listed and interviewed before the commencement of the session.

4.0 DEFERMENT OF STUDIES
4.1 An applicant who is offered a place but is not able to take up the offer in that particular year shall apply for deferment of studies. Such application shall be made within one month from the date of offer.
4.2 Application for deferment should be made before commencement of the semester.
4.3 A student who applies for deferment after having attended some of the modules, shall forfeit the fees paid for the module attended.
4.4 Deferment of studies shall be valid for one academic year. Should a student fail to resume studies at the expiration of the deferment period, such a student shall be withdrawn from the programme.
4.5 To be readmitted into the programme after deferment, a student must apply in writing at least two months before registration.

5.0 ASSESSMENT
5.1 There shall be a Graduate School of Business panel of examiners, comprising of the Director of the Graduate School of Business, who shall be the Chairperson, all lecturers in the MBA programmes and the External Examiner (s).
5.2 Examinations shall comprise a written examination and Coursework (Assignments, projects etc.)
5.3 Students must have attended at least 80% of the lectures for each of the taught modules in order to qualify to sit for the examination.
5.4 Students must pass at least 50% of the modules taken in a given stage. The pass mark in each module shall be a weighted average of 50%.
5.5 Students must pass all modules in one Part before proceeding to the next. The pass mark in each module shall be 50%.
5.6 Passing module work/continuous assessment and the written examination shall be compulsory. Weighting of module work/continuous assessment and written examination in each module shall be 40% and 60%, respectively.
5.7 If a student fails a module examination or module work, he may, with the approval of Senate, be allowed to supplement the failed component.
5.8 A student may be allowed to supplement a module component only if the weighted mark for that module is in the range of 40 – 49 %. Should the weighted mark be less than 40%, then a candidate shall be required to repeat the failed module(s) and should not proceed to the next stage.

Think in other terms

5.9 The determination of the overall degree programme aggregate with a dissertation component shall be as follows:

Taught component   80%   267 Credits
Dissertation   20%   67 Credits

6.0 DISSERTATION

6.1 The Dissertation shall constitute the final part of the programme and must be passed with a mark of 50%. Each candidate is required to submit a dissertation of approximately 20000 words on a topic relating to his/her area of specialization and approved in writing by the supervisor.

6.2 A student shall proceed to Stage IV (Dissertation) only if all the taught modules have been passed.

6.3 A student who fails the dissertation with a mark in the range of 45-49% shall be given the option to resubmit within three months from the date of publication of results. The resubmitted dissertation shall attain a maximum of 50%.

6.4 A student who fails on resubmission shall apply to repeat the module.

6.5 A student who writes a dissertation will be required to participate in the compulsory oral examination (VIVA VOCE) and it shall constitute 20% of the final dissertation mark.

6.6 A student who fails to exercise the options of submitting within three months from the date of publication of results will repeat the Dissertation Part.

7.0 WEIGHTING OF THE PROGRAMMES

The minimum total credits for the Programme shall be broken down as per the table below:

Programme	Total Credits per stage				Total Credits
	STAGE I	STAGE II	STAGE III	STAGE IV	
General Master of Business Administration	100	100	94	-	294
Executive Master of Business Administration	80	80	80	94	334
Master of Business Administration in Strategic Management	80	80	80	94	334

Think in other terms

In determining a candidate's degree classification, the parts of the degree programme shall be weighted as follows:

	STAGE I	STAGE II	STAGE III	STAGE IV
GMBA	34%	34%	32%	-
EMBA	24%	24%	24%	28%
SMBA	24%	24%	24%	28%

8.0 GRADING SYSTEM

The Grading shall be as follows:

Marks	Description	Grade
80 – 100	Distinction	(D)
70 – 79	Merit	(M)
60 – 69	Credit	(C)
50 – 59	Pass	(P)
0 – 49	Fail	(F)

9.0 REPEATING OF MODULES

9.1 If a student fails the repeat module(s), such a student shall be withdrawn from the National University of Science and Technology MBA programme and can only be re-admitted after an elapse of two years.

10.0   TRANSFER OF GRADUATE WORK OR CREDITS FROM OTHER INSTITUTIONS

10.1 A student may receive exemptions for work accomplished in recognized institutions upon the recommendation of the Graduate School Board of Studies and the approval of the Academic Board and in compliance with the Zimbabwe Credit Accumulation System (ZIMCATS)

10.2 Only modules for which the student received a grade of a Merit or higher maybe transferred.

10.3 Grades from other institutions may not be substituted for unsatisfactory grades already earned at the National University of Science and Technology; nor may the class grade A and / or B earned at another institution be used to offset a lower grade earned at the National University of Science and Technology.

Think in other terms

10.4 All transfer graduate work or credits are subject to the following conditions:

10.4.1   The other Graduate School of Business must offer a graduate degree in the field in which the work has been completed.

10.4.2   The other Graduate School must be accredited for graduate study in the field in which the student is seeking transfer by an appropriate accreditation body.

10.4.3   The credit must be recommended by the NUST Graduate School of Business as specifically applicable to the MBA degree programme.

11.0   SYLLABI

11.1 Details of each module shall be maintained in accordance with the provisions of the General Academic Regulations for Master of Business Administration.

12.0 PROGRAMME PROFILE

DEGREE PROFILE FOR EXECUTIVE MASTER OF BUSINESS ADMINISTRATION	
Institution	National University of Science and Technology
Type of Degree	Masters
Credit Load	334 Credits
Level	SADC-QF-Level 8
Accrediting Authority	Zimbabwe Council for Higher Education (ZIMCHE)
Period of Reference	2017

12.1   Career Opportunities and Further Studies

Employability	Managers, Leaders in both Private and Public Sector
Further studies	PhD

12.2   Programme Delivery

Teaching and learning methods	Lectures, Power Point Presentation
Assessment methods	Tests. Examinations, Group Presentation, Assignments

MODULE SYNOPSES

STAGE I

EMB 5101: Managerial Economics   **20 Credits**

The module aims to enhance the students' understanding of Microeconomic theory and concepts; the relation of economics reasoning to managerial decision-making as well as to business questions of public policy. The module focuses on the examination of economic principles and their applications in management. Areas covered include definition of goals; concepts of optimization, marginalisation and opportunity cost; theory of demand; production cost; market structure and the basic elements of welfare economics. Questions of wage-price guideline; pollution; and the social responsibility of firms from an economic point of view are discussed. Economic models and quantitative applications are demonstrated as aid to optimizing scarce or limited resources.

EMB 5102: Human Resources Management   **20 Credits**

The module aims to outline the origins and development of Human Resource Management, compare alternative models and explore its relationship to strategy, assess the role of human resource planning and to examine the methods and process involved in recruitment, selection and appraisal, study the changing nature of learning, training and development in contemporary organizations, examine the theoretical foundations of motivation and remuneration strategies and how organizations put these into practice. The module provides an overview of Human Resource Management and has been designed with the needs of the non-specialist in mind. The emphasis in the lectures and related activities will be on how the various activities involved in Human Resource Management - recruitment, selection, appraisal, training, development and remuneration - can deliver benefits for organizations rather than on imparting practitioners' skills.

EMB 5103: Financial and Management Accounting   **20 Credits**

The module aims to provide module participants with an understanding of the theory and practical application of accounting in (a) the preparation of external financial accounts and (b) internally generated management accounting information for decision-making and control within organizations. The module attempts to develop skills in the analysis of accounting data, as well as a good understanding of the underlying assumption on which the figures are based. To this end, lectures are interspersed with exercises and case study sessions. Reading and practical exercises are provided to consolidate the topics covered during the day.

EMB 5105: Marketing Management   **20 Credits**

This module aims at providing module participants with a sound understanding of the main concepts and theories of marketing and helps them develop the ability to apply knowledge to

Think in other terms

practical marketing decision-making. Theoretical concepts are presented using lectures and seminars and participants are expected to follow the recommended readings from key text books and professional journals to augment the learning process. The module includes the use of case-studies and discussion of current marketing issues to ensure its application to the business environment.

STAGE II

EMB 5202: Entrepreneurship   20 Credits
The module aims at helping students develop an understanding of issues, possibilities and challenges in the field of entrepreneurship. Its objectives are to describe the nature and significance of entrepreneurship; evaluate the paths to entrepreneurship; prepare and critique business plans; distinguish and evaluate the different sources of financing small businesses and assess the risks facing small businesses and their mitigation. The areas covered include: the role of small businesses in an economy; characteristics of entrepreneurs and the myths about entrepreneurs; entrepreneurship, and traditional management; forms of business ownership; ways of going into business; business plan structure , uses and preparation; sources of finance; business growth models; causes of small business failure; risk analysis for small businesses as well as Women and entrepreneurship.

EMB 5206: Corporate Governance and Business Ethics   20 Credits
The main objective of this module is to provide candidates with a comprehensive knowledge of theories, principles and practice of Corporate Governance. It focuses on ethical issues in the conduct and regulation of business. The module equips candidates with a good knowledge of Corporate Governance which should enable them to develop a clear understanding of corporate structures, processes, policies, roles, and responsibilities, crucial for proper direction and control of business and organizations not only for their immediate but also greater stakeholders. The areas covered include: Ethical Theories and Principles; Corporate Governance issues relating to: Risk Management, Dealings and Securities, Internal Audit, Reporting of Financial and nonfinancial information, Communication with other corporate stakeholders; corporate best practices; Organization Integrity/Code of Ethics and Corporate governance systems and strategies.

EMB 5204: Strategic Management   20 Credits
The objectives of the module include: inculcate a deep understanding of the analysis necessary to undertake strategic management decision making; to provide an appreciation of the complex, competitive and general environment of businesses; to allow refinement of the students' analytical decision making skills in complex business situations; to lead to an understanding of the complex human, organizational and ethical problems often involved in strategic decision-making. The major topics covered include: The role of Analysis and Planning; Mission; Objectives; Values; Ethics and Goals; External Analysis - Markets, Industries, Competitors and Stakeholders, Internal Audit; Capabilities, Value Chains, Resources and Portfolios, Core and

Think in other terms

Generic Strategies; Structure, Culture and Organizational Design, Strategy Evaluation, Implementation and Control, Strategic Group Mapping; Collaborating to Compete; Leadership Strategic Procurement, Market Orientation and Performance, Commitment: the Dynamics of Strategy, Corporate Social Responsibility, Differentiating Products with Services, Strategic Role of Brand Management as well as Strategic Management.

EMB 5208: Operations Management   20 Credits
The objective of this module is to explore what constitutes world class operations and information management. The module will therefore cover top level issues such as developing a focused operations and information strategy that is congruent with the company's business and marketing strategies.   To this will be added understanding and practice of key operational techniques to enable delivery of the strategy.   The learning process is facilitated through module readings, lectures, worked exercises and contemporary case studies. The major topics covered include developing a competitive operations strategy; product and service design; facilities layout; location planning; design of work systems; strategic value of information; roles and categories of information systems; supply chain management; productivity, project management, Japanese manufacturing techniques and operations linkages across the business.

STAGE III

EMB 5301: International Business Environment   20 Credits
The key objective of the module is to develop an appreciation of the inter-play of all the factors on regional economies and create awareness among the participants on how the economic forces can be harnessed to stimulate economic development in this part of the world. The major topics covered are the main developments in the international economy since the Second World War and the process of globalization which is now taking place; the instability of the international environment and the sense of insecurity among the established economic hegemonies made particularly evident by the rise of the Asia-Pacific region; the role of the major economic players such as the United States of America, Japan, China and the Asian Tiger economies as well as the dynamic role of the key driving forces of the world economy and establishment of the World Trade Organization and its impact on the developing economies.

EMB 5303: International Management and Trade Policy   20 Credits
This module is designed to unlock the power of global business on the individual firm manager. It provides analytical and practical skills to face international business issues as well as assisting learners appreciate the structures, strategies, trade and economic policy instruments at their disposal for effective international management. The module considers the international competitiveness of nations, regions of the world, the role of foreign direct investment, firm clusters and competitiveness, international strategy at national level and at firm level, the relationship between politics and international business, negotiating developing markets, cross-cultural management, macroeconomic and microeconomic policy analysis, the dynamic of

Think in other terms

globalization, international finance, investments and global financial markets, negotiation strategy and ethical dilemmas in cross-cultural negotiations, managing international mergers and acquisitions, trade policy analysis and multilateral institutional policy frameworks and programmes related to international business, regional trade frameworks and policy instruments related to international business, trade policy advocacy, global marketing, production and operations management, human resource strategy, supply chain management and corporate governance.

EMB 5304 Change Management   **20 Credits**
The speed at which change is occurring is faster now than it has ever been in the entire existence of humankind and corporate history. Successful organizations are those that both create and respond positively to change and cultivate a culture of corporate entrepreneurship. The module examines reasons why so many business strategies fail and why some firms are so successful while others are slowly dying; it also looks at the systems thinking and systems dynamics modelling frameworks; in addition, the traditional strategy theoretical frameworks, technological discontinuities, new requirements of doing business, changing customers and changing faces of competition; options to anticipate and manage change, business process re-engineering, implementation failure analysis, decision modelling and tools for integrating strategy across the entire organization. The module also addresses the question of black economic empowerment, diversity policy and women's participation in organizations as well as current debates and evidence surrounding these issues.

EMB 5310: Financial Management and Policy   **20 Credits**
The module provides a set of tools for analysing financial data and making decisions as well as increasing students' understanding of the principles, concepts and techniques of financial management and financial markets for successful acquisition of funds and allocation of these funds among various asset categories so that goals can be achieved. This module focuses on corporate financial management and investment, and provides the framework, concepts, and tools for making financial decisions. It examines approaches to determining the value of a firm and for determining the organisation's optimal capital structure. The Principles of modern financial theory are used to explain decision-making frameworks such as NPV (Net Present Value); IRR (Internal Rate of Return); EVA (Economic Value Added); MVA (Market Value Added); and Payback. Financial strategies on the firm's cost of capital structures are also discussed. The module is designed to provide the theoretical framework and some practical problems of financial administration. With this is mind, the module is taught mainly by the case method and supplemented by formal lectures.

Think in other terms

STAGE IV

EMB 5400: Dissertation   **20 Credits**
The dissertation is a final component of the programme which requires the student to undertake a research-based project in his/her area of specialisation. Students are required to undergo a one-week research methods module before commencement of the project.

GENERAL MASTER OF BUSINESS ADMINISTRATION

RULES AND REGULATIONS

1.0 PREAMBLE

The Faculty of Commerce regulations for the Master of Business Administration [MBA] degree hereinafter referred to as the Master of Business Administration Regulations, complement the   University General Academic Regulations for Master's degree by module work, hereinafter referred to as the General Academic Regulations.

2.0 RULES AND REGULATIONS

2.1 The Master of Business Administration Degree is offered under the following programmes:

2.1.1 The part-time modular MBA degree programme hereinafter referred to as the "Executive MBA".

2.1.2 The full-time semester-based MBA degree programme, hereinafter referred to as the 'General MBA".

2.1.3 The part-time modular MBA degree programme, hereinafter referred as the "MBA in Strategic Management". All three-degree programmes are offered under the aegis of the NUST Graduate School of Business, hereinafter referred to as the Graduate School.

2.1.4 In addition to the various terms as defined in the General Academic Regulations the following additional terms used in these regulations maybe described:

"Part" Part is a defined portion of the programme with several modules.

"Audit" An audit is a registration status, which allows a student to attend a module for a regular grade or information without receiving credit hours for the module.

"Module" A module is a systematic plan of study, which may utilise lectures, discussions, laboratory, recitations, seminars, workshops, studios, independent study, internship, or other similar teaching formats to facilitate learning for the student. A module is counted in credit hours.

"Semester Hours "These are alternative designations for Units of credit, i.e. one semester hour is equivalent to one credit hour

"Grade" A grade is the instructor's official estimate of the student's achievement in a module as reflected in examinations and assignments, and class participation. At the close of the semester students receive a final grade in each module. The final grades are recorded on the student's permanent record at the Office of the University Registrar. The grade may not be changed or removed from the record.

"Programme" A programme is a structured set of learning experiences designed to enable learners to achieve the desired qualification and the requisite knowledge, skills and abilities

"Grade-Point Average (GPA)"
The grade-point average is the numerical calculation of the mean cumulative average of the grades received in all modules taken at the Graduate School of Business for creditor by Special Examination for Grade. Grade point average is determined by dividing the total number of grade points (quality points) earned by the number of credits attempted. Grade points are computed by multiplying the credit value of each module by the numerical value of the grade. Only the grades of modules taken for credit are used in calculating the grade-point average.

"Grade Point Deficiency (GPD)"
A Grade Point Deficiency is generally used to determine what a *student on probation* will need in order to be removed from probation. It can also be used to determine how many Distinctions (Ds), Merits (Ms), or Pass (Ps) a student needs to obtain a specific GPA. Grade point deficiency exists when a student's total grade points are less than the total credits scheduled times 2.5. In other words, deficiencies are accumulated whenever a student's cumulative grade point average falls below 2.50. Therefore, before calculating a student's GPD, an estimate of the desired *Grade Point Average* is required.

"Quality Points" Quality points are the product of the letter grade (converted into a number) earned in a particular module and the number of credits for the module. Thus, the number of Quality points earned for a particular module depends on the grade earned and on the number of credit hours that the module is worth.

"Quality Point Deficiency"
Quality Points Deficiency is the amount by which a student's total quality points fall below the total that would result in a GPA of 2.50. It is calculated by multiplying the total designated number of credits attempted by 2.50 and subtracting the total quality points actually earned by the student. For example, a student with 46.22 quality points after attempting 30 credits has a quality point deficiency of 30 x 2.50 - 46.22 = 28.78.

Think in other terms

"Semester" A term used to identify a formally designated periods during which classes are scheduled.

"Dissertation"
A major research based project undertaken by an MBA student in his/her area of specialization / operational interest, demonstrating a comprehensive and qualitative understanding of the area of study.

"Board of Studies"
It means the School of Business Board of Studies. It shall comprise the chairmen of all Departments in the Faculty of Commerce, Director of Graduate School of Business and all its lecturers and will be chaired by the Dean of the Faculty of Commerce.

"Pronoun" The use of pronoun "he and she" in these regulations applies to both sexes.

"Credit" A single credit (1) is equal to 10 notional study hours (ten hours of study).

3.0   REGULATIONS FOR THE MASTER OF BUSINESS ADMINISTRATION (GENERAL) DEGREE PROGRAMME

3.1   These regulations should be read in conjunction with the General Academic Regulations for Postgraduate (masters) degrees.

3.2   The Master of Business Administration degree may be studied on fulltime or part-time basis.

3.3   The fulltime MBA student may, for good reasons and subject to approval by the Senate on the

recommendation of Senate, transfer to the part-time programme or vice versa provided the student meets the requirements of the stage of the programme he/she is transferring to.

4.0   ENTRY REQUIREMENTS

4.1   To be considered for admission to the MBA programme an applicant candidate should normally:

- be at least 25 years of age;
- hold a Bachelor's degree of this University or any other approved university or its equivalent.
- Have had at least two years' post qualification practical experience gained at a managerial/supervisory capacity.
- All applicants for admission to the MBA must be short-listed and interviewed before the commencement of the session.

Think in other terms

5.0 DURATION OF PROGRAMME

5.1 On a full time basis the General MBA programme may be studied over a minimum period of 12 months and a maximum of 24 months.

5.2 On part time basis the General MBA programme may be studied over a minimum period of 24 months to a maximum period of 48 months.

5.3 The minimum national study hours and credits shall comply with the Zimbabwe Credit Accumulation and Transfer System (ZIMCATS) of 270 -340 credits.

6.0 ASSESSMENT

6.1 Examinations shall comprise written and Module work (Assignments, projects, etc.)

6.2 With the exception of the Dissertation, a formal 3 -3 1/2-hour examination shall be conducted in all prescribed modules. The pass mark in each module shall be 50%. Weighting of both the module work (Assignment) and written examination in each module shall be 40% and 60% respectively.

6.3 If a student fails a module examination or module work, he/she shall not be allowed to supplement (module examination) or resubmit (coursework) as provided for in the Scholastic Grade Point Average Regulation.

6.4 In the overall degree classification, the Dissertation shall carry a weighting of 20% and the rest of the modules shall be equally weighted to constitute 80%.

6.5 The determination of the overall degree programme aggregate with a dissertation component shall be as follows:

   Taught component   80%
   Dissertation   20%

6.6 A student will be allowed to proceed from Stage I to Stage II carrying a maximum of two failed subjects, but a student shall not be allowed to proceed to Stage III (Dissertation) before passing all modules in the taught component.

6.7 A student who writes a dissertation will be required to participate in the compulsory oral examination (VIVA VOCE) and it shall constitute 20% of the final dissertation mark.

6.8 The MBA degree will be divided into 3 Years as follows:

   STAGE I   – 100 credit hours
   STAGE II – 100 credit hours
   STAGE III – 94 credit hours (Dissertation)

7.0 DISSERTATION

7.1 The Dissertation shall constitute the final part of the programme. Each student is required to submit a Dissertation of approximately 20,000wordsonatopicrelating to his/her area of managerial interest and approved in writing by the dissertation supervisor.

7.2 A student who fails more than 50% of the modules taken in a particular part may, on the recommendations of the Senate, be granted permission to repeat the failed modules.

Think in other terms

Nevertheless, a repeat student may be exempted from re-attendance and re-examination in any modules in which he/she previously passed with a Merit or better.

7.3 A student who is allowed to proceed to the subsequent Year of the Programme and has failed the same Year of the Programme twice will be required to withdraw from the Programme.

7.4 A student who fails a Dissertation Stage with a mark in the range of 45-49% shall be given the option to re-submit within three months from the date of publication of results. The dissertation will only attain a maximum of 50%.

7.5 A student who fails to exercise the option of submitting within three months from the date of publication of results will repeat the Dissertation Stage.

8.0 WEIGHTING OF THE PROGRAMMES

The minimum total credits for the Programme shall be broken down as per the table below:

Programme	Total Credits per stage				Total Credits
	STAGE I	STAGE II	STAGE III	STAGE IV	
General Master of Business Administration	100	100	94	-	**294**
Executive Master of Business Administration	80	80	80	94	**334**
Master of Business Administration in Strategic Management	80	80	80	94	**334**

In determining a candidate's degree classification, the parts of the degree programme shall be weighted as follows:

Think in other terms

	STAGE I	STAGE II	STAGE III	STAGE IV
GMBA	34%	34%	32%	-
EMBA	24%	24%	24%	28%
SMBA	24%	24%	24%	28%

9.0 GRADE POINT AVERAGE (GPA)

The minimum grade point average (GPA) required by the Graduate School of Business for graduation is 2.50.

9.1 Grading System

The grades at the NUST Graduate School of Business are as follows:

Marks	**Description**	**Grade**
80 – 100	Distinction	(D)
70 – 79	Merit	(M)
60 – 69	Credit	(C)
50 – 59	Pass	(P)
0 - 49	Fail	(F)

To convert the grade system to a Grade Point Average system, using a 4- point scale, a numerical weight is assigned to each grade showing the number of points each of them carry per credit hour earned (D =4.00; M =3.50; C = 3.00; P =2.00 -2.50; F=0.00).

9.2 Calculating Grade Point Average–GPA

A student's grade point average is determined by dividing the number of grade points earned by the number of credits attempted. Grade points are computed by multi-plying the credit value of each module by the numerical value of the grade in points (i.e., D =4.00, M = 3.50-3.50; C = 3.00; P=2.00 -2.50; F=0.00) earned in that module.

For example: If a student earns a "D" in a module, the grade points equal12=4 (D= 4.00) x 3 (for a three-credit hour module), meaning a grade "D" earns 4 grade points per credit hour. All grade points earned in each module are added together to obtain total grade points (total quality points). An illustration is given below:

Think in other terms

Module Code	Credit Hours	Grade Points	Calculate	Quality Points
GMB5264	3	P= (2.00)	3 x2.00	6.00
GMB5265	3	P= (2.00)	3 x2.00	6.00
GMB5266	3	M = (3.00)	3 x3.00	9.00
GMB5268	3	D = (4.00)	3 x4.00	12.00
GMB5269	4	M = (3.00)	4 x3.00	12.00

Total (Attempted)	Total Grade/Credits (Total Quality Points)	16	Points Earned 49.00

To complete the Grade Point Average computation process, divide the total number of grade points earned by a student to date by the total number of cumulative credit hours attempted so far.

$$GPA = \frac{49}{16} = 3.06$$

Therefore, a GPA is calculated by dividing the Number of quality points earned by the credit hours attempted. Grades used in computing the GPA are:

D =4.00; M =3.00 -3.50; P=2.00-2.50 and F=00.

Degrees however, shall be classified as "Distinction", "Merit" and "Pass" based on the Overall GPA scored as indicated in the table below:

Degree Class	Overall GPA	
Distinction	3.86	–4.00
Merit	3.00	– 3.85
Credit	3.00	– 3.49
Pass	2.50	– 2.99
Fail	0.00	– 2.49

9.3   Grades not included in the Grade Point Average computation

Grades 'IN','IP', 'W', and 'AU', are not assigned grade point values and not used in the computation of the grade point average.

Incomplete	IN	0
In Progress	IP	0
Withdraw	W	0
Audit	AU	0

9.4 Grade Point Deficiency (GPD)

Grade Point Deficiency (GPD) can be used to determine how many D's, M's or P's a student at the Graduate School of Business needs to obtain a specific GPA. Alternatively, the Grade Point Deficiency (GPD) is generally used to determine what a student on probation will need in order to be removed from probation category.

9.5 Scholastic Grade Point Average Policy

9.5.1 Each module is treated individually and must be passed at the level of P = 2.00 (letter Grade P). If a student fails a module, such a module(s) should be re-taken when next offered provided not more than two such modules are carried forward.

9.5.2 If a student fails more than two modules in a Stage such a student shall not be allowed to proceed to the next Stage but shall be required to repeat all the failed modules. For a student who has passed only one module, such a student shall be required to repeat all the modules unless the passed module was at grade 'D'.

9.5.3 A minimum cumulative overall average of 2.50 on a 4.00 scale is required of all graduate students, and this average shall be based on all modules so far attempted.

9.5.4 The record of any student who does not earn a 2.50 in any Stage will be reviewed and the individual may be placed on probation for one Stage, during which time he/she must regain a "2.50" average status.

9.5.5 If at the end of Stage II, a student has not maintained a cumulative overall GPA of 2.50, such a student will not proceed to Stage III but will seek to select a module apart from the passed modules to bring his/her GPA to 2.50. Such module(s) can be selected from any Postgraduate Programme, subject to approval from the Gradual School of Business.

9.5.6 If a graduate student has exhausted the allowed duration for the programme and having passed all module at P=2.00 (Letter Grade P) but has failed to maintain his/her GPA at 2.50 or better, such a student shall be discontinued from the MBA and shall be awarded a Postgraduate Diploma in Management.

9.5.7 If extenuating circumstances prevail, any student discontinued under the scholastic probation policy provisions may appeal to the University Termination of Studies Appeal Committee. If re-admitted, the candidate's scholastic record will be re-examined and a decision made as to whether the record justifies continuation in the programme.

9.5.8 If the student is re-admitted into the Programme, it is for one Stage only and if the student fails to bring the total cumulative average to date up to a minimum of 2.50 during that Stage, the student is withdrawn from the Graduate School of Business and is no longer eligible for the MBA of this University.

9.5.9 No student will be allowed to proceed to Stage III (Dissertation) without clearing all modules in Stages I and II and with a GPA of less than 2.50

10.0 REPEATING OF MODULES

10.1 If a student fails the repeat module(s), such a student shall be withdrawn from the National University of Science and Technology MBA programme and can only be re-admitted after an elapse of two semesters.

11.0 TRANSFER OF GRADUATE WORK OR CREDITS FROM OTHER INSTITUTIONS

11.1 A student may receive exemptions for work accomplished in recognized institutions upon the recommendation of the Graduate School Board of Studies and the approval of the Academic Board and in compliance with the Zimbabwe Credit Accumulation and Transfer System (ZIMCATS).

11.2 Only modules for which the student received a grade of Merit or higher maybe transferred.

11.3 Grades from other institutions may not be substituted for unsatisfactory grades already earned at the National University of Science and Technology; nor may the class grade A and or B earned at another institution be used to offset a lower grade earned at the National University of Science and Technology.

11.4 All transfer graduate work or credits are subject to the following conditions:

11.4.1 The other Graduate School of Business must offer a graduate degree in the field in which the work has been completed.

11.4.2 The other graduate school must be accredited for graduate study in the field in which the student is seeking transfer by an appropriate accreditation body.

11.4.3 The credit must be recommended by the NUST Graduate School of Business as specifically applicable to the MBA degree programme.

12.0 SYLLABI

Details of each module shall be maintained in accordance with the provisions of the General Academic Regulations for Master of Business Administration.

13.0 AWARD OF THE MBA DEGREE

The MBA degree shall be awarded in accordance with the General Regulations on the marking scheme and classification as distinction, merit or pass.

Think in other terms

14.0 PROGRAMME PROFILE

DEGREE PROFILE FOR EXECUTIVE MASTER OF BUSINESS ADMINISTRATION	
Institution	National University of Science and Technology
Type of Degree	Masters
Credit Load	294 Credits
Level	SADC-QF-Level 8
Accrediting Authority	Zimbabwe Council for Higher Education (ZIMCHE)
Period of Reference	2017

14.1 Career Opportunities and Further Studies

Employability	Managers, Leaders in both Private and Public Sector
Further studies	PhD

14.2 Programme Delivery

Teaching and learning methods	Lectures, Power Point Presentation
Assessment methods	Tests. Examinations, Group Presentation, Assignments

CALCULATING GRADE POINT

Before calculating a student's GPD, you will need the student's desired grade point average.

Grade Point Deficiency exists when a student's total grade points are less than the total cumulative credit hours scheduled times 2.50. In other words, deficiencies are accumulated whenever a student's cumulative grade-point average falls below 2.50.

Example: Calculating GPD.

Step 1 Multiply the hours attempted at NUST Graduate School of Business by the desired GPA. This equals the number of grade points or quality points the student wishes to have had.
35 x2.50 =87.5

Step 2 Take the number of Grade Points the student should have earned (step 1) and subtract the number of grade points the student actually earned:
87.5 -75.0 =12.5
This student therefore has a grade point deficiency of12.5.

Step 3 Using GPD to determine what grades a student needs to have in order to achievea2.50. GPD is a deficiency, so it may help to look at the numerical value

Think in other terms

as a negative number, or in this case–12.5. To achieve2.50 overall average grades in 3– hour credit modules, a student's GPA is affected in the following way:

A   =   +4.5   [total points added less points needed to maintain

In other words, the following holds with regard to a grade in a specific module.
"F" adds 2.50 deficiencies per credit hour "C" adds 1.50 deficiencies per credit hour "C+" adds 0.00 deficiencies per credit hour "B" removes 1.50 deficiencies per credit hour
"B+" removes 3.00 deficiencies per credit hour

"A" removes 4.50 deficiencies per credit hour

So, a student with a 12.5 GPD would need three A's and one B to achieve a 2.5 GPA (-12.5+3 x4.5+1.5 =2.5). The goal is to get the GPD to zero or higher.

Using the GPD Table:

(a)   Find the desired GPA in the left-hand column.

(b)   To determine how many A's a student needs, divide their GPD by the number located under the "A" in the row with the desired GPA i.e. a student with deficiency points equal to 7 would be1.555. (7/ 4.5) or 2 A's in order to get a 2.50

A table based on 3-hour modules

Desired	A	B+	B	C+		P		F

GPA

To determine how many B's a student needs, divide the GPD by the number located under the "B" in the row with the desired GPA.12.5 1.5=8.333 or9 B's in order to get a 2.50 Since a "C" is worth 2.0 points, any C's the student receives will not maintain the student's GPA at 2.50. In fact anything below a "55%2.50" will lower the student's GPA.

Think in other terms

PROGRAMME SUMMARY

STAGE I

Module Code	Module Description	Credits
GMB 5161	Legal Environment of Business	20
GMB 5163	Managerial Economics	20
GMB 5166	Financial and Management Accounting	20
GMB 5165	Strategic Marketing Management	20
GMB 5167	Operations Management	20

STAGE II

GMB 5268	Financial Management and Policy	20
GMB 5266	Human Resources Management	20
GMB 5264	Corporate Governance and Ethics	20
GMB 5265	Entrepreneurship	20
GMB 5269	Strategic management/Business Policy	20

STAGE III

GMB 5270	Dissertation (20000words)	**94**

Total Credits		**294**

Elective Modules

(Available for Auditing, Electives and or Special Interests only)

GMB 551	International Finance and Trade	20
GMB 552	Organisational Behaviour and Theory	20
GMB 553	Public Sector Management	20
GMB 556	International Business	20

Think in other terms

MODULE SYNOPSES

STAGE I
GMB 5165 Strategic Marketing Management   **20 Credits**
The marketing module of the GMBA aims to provide module participants with a sound understanding of the main concepts and theories of marketing and ability to apply this knowledge to practical marketing decision-making. Theoretical concepts are presented using lectures, cases and presentations; participants are expected to follow the recommended readings from key texts and articles to augment this learning process. Emphasis will also be placed on how to prepare a Strategic Marketing Plan, a Blue Print of the marketing department and participants will be expected to develop and/critique marketing plans. The use of case studies and discussion of current marketing issues ensures the relevance of the module material and its application to business.

GMB 5163 Managerial Economics   **20 Credits**
Managerial Economics is a discipline that borrows from Management Sciences and Economics. It makes use of analytical tools for analysing, explaining and solving organizational problems in business. The objective of the module is to help students develop an analytical economic approach to decision-making using mainly principles of microeconomics and quantitative methods. At the end of this module, students should be able to make optimal business decisions and critically evaluate business alternatives that may not necessarily optimize profits and other objectives of the firm.

GMB 5164 Operations Management   **20 Credits**
The objective of this module is: to explore what constitutes world class operations management. The module will therefore cover top level issues such as developing a focused operations management strategy that is congruent with the company's business and marketing strategies. To this will be added understanding and practice of key operational techniques to enable delivery of the strategy. The objectives of the module are to: stimulate an awareness of the characteristics of operations systems and the various approaches that may be adopted in their design; equip individuals with an appreciation of techniques and technologies available for the control of operations and too provide an insight to both conventional quality control and modern approaches to quality management based upon the principle of continuous improvement and total quality management. By the end of the module, students should be able to use those frameworks and techniques presented to develop strategies, design, plan and control manufacturing and service operations.

GMB 5161 Legal Environment Of Business   **20 Credits**
The module aims to provide a conceptual framework for understanding the broader context in which business decisions are made. The module focuses on understanding the legal frameworks governing contracts, property and business relationships, and covers those principles of commercial law which are relevant to business transactions. The module will also explore the general principles of the law of contract, a detailed analysis of the major principles e.g. definition, contracts, breach of contracts, remedies for breach, etc; Special types of contracts: (a) agency, (b) lease, (c) sales, (d) surety, (e) partnership; the law relating to negotiable instruments; consumer protection law; emphasis to be placed on both commercial law and the statute law; the legal aspects of companies and other similar commercial bodies and the legal aspects of banking and of insurance.

STAGE II
Key Areas Covered Include:

   i.   *Models of firm behaviour*
   ii.   *Theory of demand and supply*
   iii. *Application of the concept of elasticity*
   iv.   *Decision making under conditions of risk and uncertainty*
   v.   *Theory of cost and production*
   vi.   *Market structure and pricing strategies*
   vii. *Investment appraisal*

GMB 5265 Entrepreneurship   **20 Credits**
The module aims to expose students to the effective management of small to medium enterprises (SMEs), entrepreneurship and the SME environment; start-up issues; managing the SME; marketing research; marketing and credit; sources of finance; financial and administration controls; governmental assistance to SMEs; legal and governmental controls; operations of major types of SMEs. The module is intended to enable the student to comprehensively describe and illustrate entrepreneurship and apply the concepts to a typical Zimbabwean context.

GMB 5264 Corporate Governance and Business Ethics   **20 Credits**
The main objective of this module is to provide candidates with a comprehensive knowledge of theories, principles and practice of Corporate Governance. It focuses on ethical issues in the conduct and regulation of business. The module equips candidates with a good knowledge of Corporate Governance which should enable them to develop a clear understanding of corporate structures, processes, policies, roles and responsibilities, crucial for proper direction and control of business and organizations. Areas covered in the module include: Ethical Theories and Principles; Corporate Governance issues relating to: Risk Management, Dealings and Securities, Internal Audit, Reporting of Financial and nonfinancial information, Communication with other corporate stakeholders; Corporate best practices; Organisational Integrity/Code of Ethics as well as Corporate governance systems and strategies.

Think in other terms

GMB 5269 Strategic Management and Business Policy   **20 Credits**

The module intends to offer participants a general overview of the basic concepts, principles as well as the application of major analytical approaches that are utilized in strategic management decision-making.   This module is concerned with the formulation, implementation and evaluation of long-run strategies by business organizations in the context of their particular competitive environment, and their ever-changing, uncertain general environment for business. The module involves the application of strategic management analysis to case studies, at one level, and at another level, the module goes into further refinements and involves more extensive deployment of the case study approach. The major thrust here is to provide an appreciation of the complex competitive and general environments of business situations, and to lead to an understanding of the complex human, organizational and ethical problems often involved in strategic decision-making.

GMB 5268 Financial Management and Policy   **20 Credits**

This module intends to provide students with an understanding of the principles, concepts and techniques used in making financial management decisions; ensure that the students understand the concepts behind available theoretical models and can assess the relevance of developments in financial management theory to an enterprise; provide an ability to select the techniques most appropriate to optimize the employment of resources, ensure that students understand the workings of the financial system and evaluate alternative sources of finance and assess investment possibilities as well as to appreciate the treasury management function and the working capital aspects. At the end of the module students should be able to communicate the consequences of financial management decisions to accountants and non-accountants. The major topics covered include: Goals and functions of finance; Financial sector of the Zimbabwean economy; evaluation; market risk and returns; Capital investment decisions; Dividend Policy; working capital management as well as tools of analysis and forecasting; mergers and acquisitions.

GMB 5266 Human Resources Management   **20 Credits**

The module intends to provide focus and coherence to a range of organizational activities which are essentially concerned with managing people and improving their effectiveness. The central proposition of the module is that these activities, when properly integrated and related to the strategic goals of the organization, can have a significant positive impact on its overall performance. The keys to understanding HRM lies within the social, economic, political and cultural context and the lectures will aim to make links between context, activities and theory.
The major topics covered include: The nature of Human Resources; History and evolution of Human Resources Management; Human Resources and competitive advantage; understanding the legal environment of Human Resources Management; Human Resources planning; Analysing jobs; Recruitment and selection; Training and developing employees; Appraisal and performance; Compensation management; Employee healthcare and Managing terminations.

Think in other terms

STAGE III
GMB 5270 Research Methods   **94 Credits**
This is a final component of the programme which requires the student to undertake a research-based project in his/her area of specialization. Students are required to undergo a one-week research methods module before commencement of the project.

MASTER OF BUSINESS ADMINISTRATION DEGREE IN STRATEGIC MANAGEMENT PROGRAMME

1.0 PREAMBLE

1.1 The Faculty of Commerce regulations for the Master of Business Administration degree in Strategic Management, hereinafter referred to as the Master of Business Administration Regulations, compliment the University General Academic Regulations for the Master's degrees by coursework, hereinafter referred to as the General Academic Regulations.

1.2 The Faculty of Commerce offers the Master of Business Administration degree under the aegis of the NUST Graduate School of Business, hereinafter referred to as the School of Business.

1.3 In addition to the various items as defined in the General Academic Regulations the following additional terms used in these regulations may be described:

"Part" Part is a defined portion of the programme with several modules.

"Audit" An audit is a registration status, which allows a student to attend a module for a regular grade or information without receiving credit hours for the module.

"Module" A module is a systematic plan of study, which may utilize lectures, discussions, laboratory, recitations, workshops, studios, independent study, internship, or other similar teaching formats to facilitate learning for the student. A module is counted in credit hours.

"Grade" A grade is the instructor's official estimate of the student's achievement in a module as reflected in examinations and assignments, and class participation. At the close of the semester students receive a final grade in a module. The final grades are recorded on the student's permanent record at the Office of the University Registrar. The grade may not be changed from the record.

"Semester" A term used to identify formally designated periods during which classes are scheduled.

"Dissertation" A major research-based project undertaken by an MBA student in his/her area of specialization/operational interest, demonstrating a comprehensive and qualitative understanding of the area of study.

Think in other terms

"Board of Studies" Means the School of Business Board of Studies. It shall comprise the chairmen of all Departments in the Faculty of Commerce, Director of Graduate School of Business and all its lecturers and will be chaired by the Dean of the Faculty of Commerce.

"Pronoun" The use of the pronoun "he and she" in these regulations applies to both sexes.

1.4 The Master of Business Administration may be studied on a block release basis or on a full-time basis.

2.0 DURATION OF PROGRAMME

2.1 The MBA Programme may be studied over a minimum period of 24 months and a maximum of 36 months.

2.2 The Master of Business Administration in Strategic Management may be studied on a block release or full time basis as shown below:

STAGE	NO.OF MODULES	NO.OF CREDIT HOURS
I	4	80
II	4	80
III	4	80
IV	DISSERTATION	94

Duration of the Programme (hrs)   =334

2.3 The minimum notional study hours and credits shall comply with the Zimbabwe Credit Accumulation and Transfer System (ZIMCATS) of 270-340 credits.

3.0 ENTRY REQUIREMENTS

3.1 To be considered for admission into the MBA Programme, a candidate should normally:
- be at least 30 years of age;
- hold a Bachelor's degree of this University or any other approved university;
- have at least five years' practical experience in a managerial capacity.

3.2 All applicants for admission into any MBA programme must be short-listed and interviewed before the commencement of the session.

Think in other terms

4.0   DEFERMENT OF STUDIES
4.1   An applicant who is offered a place but is not able to take up the offer in that particular year shall apply for deferment of studies. Such application shall be made within one month from the date of offer.
4.2   Application for deferment should be made before commencement of the semester.
4.3   A student who applies for deferment after having attended some of the modules, shall forfeit the fees paid for the module attended.
4.4   Deferment of studies shall be valid for one academic year. Should a student fail to resume studies at the expiration of the deferment period, such a student shall be withdrawn from the programme
4.5   To be readmitted into the programme after deferment, a student must apply in writing at least two months before registration.

5.0   ASSESSMENT
5.1   Examinations shall comprise a written examination and Module work (Assignments, projects)
5.2   Students must have attended at least 80% of the lectures for each of the taught modules in order to qualify to sit for the examination.
5.3   Students must pass at least 50% of the modules taken in a given part. The pass mark in each module shall be a weighted average of 50%.
5.4   Students must pass all modules in one Part before proceeding to the next. The pass mark in each module shall be 50%.
5.5   Passing coursework/continuous assessment and the written examination shall be compulsory. Weighting of module work/continuous assessment and written examination in each module shall be 40% and 60%, respectively.
5.6   The determination of the overall degree programme aggregate with a dissertation component shall be as follows:
       Taught component   80%   267 Credits
       Dissertation   20%   67 Credits

6.0   DISSERTATION
6.1   The Dissertation shall constitute the final part of the programme and must be passed with a mark of 50%. Each candidate is required to submit a dissertation of approximately 20000 words on a topic relating to his/her area of specialization and approved in writing by the supervisor.
6.2   The Dissertation proposal shall be submitted not later than 2 months before the results of the last written examination are published.
6.3   A student shall proceed to Stage IV (Dissertation) only if all the taught modules have been passed.
6.4   A student who fails the Dissertation with a mark in the range of 40-49% shall be given the option to resubmit within three months from the date of publication of results. The resubmitted dissertation shall attain a maximum of 50%.

Think in other terms

6.5   A student who fails on resubmission shall apply to repeat the module.

6.6   A student who writes a dissertation will be required to participate in the compulsory oral examination (VIVA VOCE) and it shall constitute 20% of the final dissertation mark.

6.7   A student who fails to exercise the options of submitting within three months from the date of publication of results will repeat the Dissertation Stage.

7.0   WEIGHTING OF THE PROGRAMMES

The minimum total credits for the Programme shall be broken down as per the table below:

Programme	Total Credits per stage				Total Credits
	STAGE I	STAGE II	STAGE III	STAGE IV	
General Master of Business Administration	100	100	94	-	**294**
Executive Master of Business Administration	80	80	80	94	**334**
Master of Business Administration in Strategic Management	80	80	80	94	**334**

In determining a candidate's degree classification, the parts of the degree programme shall be weighted as follows:

	STAGE I	STAGE II	STAGE III	STAGE IV
GMBA	34%	34%	32%	-
EMBA	24%	24%	24%	28%
SMBA	24%	24%	24%	28%

Think in other terms

8.0 GRADING SYSTEM
The Grading system shall be as follows:

Marks	Description	Grade
80 – 100	Distinction	(D)
70 – 79	Merit	(M)
60 – 69	Credit	(C)
50 – 59	Pass	(P)
0 – 49	Fail	(F)

9.0 REPEATING OF MODULES

9.1 If a student fails the repeat module(s), such a student shall be withdrawn from the National University of Science and Technology MBA programme and can only be re-admitted after an elapse of two years.

10.0 TRANSFER OF GRADUATE WORK OR CREDITS FROM OTHER INSTITUTIONS

10.1 A student may receive exemptions for work accomplished in recognized institutions upon the recommendation of the Graduate School Board of Studies and the approval of the Academic Board and in compliance with the Zimbabwe Credit Accumulation System (ZIMCATS).

10.2 Only modules for which the student received a grade of Merit or higher maybe transferred.

10.3 Grades from other institutions may not be substituted for unsatisfactory grades already earned at the National University of Science and Technology; nor may the class grade A and / or B earned at another institution be used to offset a lower grade earned at the National University of Science and Technology.

10.4 All transfer graduate work or credits are subject to the following conditions:

10.4.1 The other Graduate School of Business must offer a graduate degree in the field in which the work has been completed.

10.4.2 The other Graduate School must be accredited for graduate study in the field in which the student is seeking transfer by an appropriate accreditation body.

10.4.3 The credit must be recommended by the NUST Graduate School of Business as specifically applicable to the MBA degree programme.

10.4.4 National University of Science and Technology Transcripts for postgraduate degree students at the Graduate School of Business may include statements as to specific modules and titles of graduate modules and grades completed at other institutions.

11.0 SYLLABI

11.1 Details of each module shall be maintained in accordance with the provisions of the General Academic Regulations Master of Business Administration.

Think in other terms

12.0   AWARD OF THE DEGREE

The MBA degree shall be awarded in accordance with the General Regulations of the marking scheme and classification as distinction, merit, credit or pass.

13.0   PROGRAMME PROFILE

DEGREE PROFILE FOR MASTER OF BUSINESS ADMINISTRATION IN STRATEGIC MANAGEMENT	
Institution	National University of Science and Technology
Type of Degree	Masters
Credit Load	334 Credits
Level	SADC-QF-Level 8
Accrediting Authority	Zimbabwe Council for Higher Education (ZIMCHE)
Period of Reference	2017

13.1   Career Opportunities and Further Studies

Employability	Managers, Leaders in both Private and Public Sector
Further studies	PhD

13.2   Programme Delivery

Teaching and learning methods	Lectures, Power Point Presentation
Assessment methods	Tests. Examinations, Group Presentation, Assignments

Think in other terms

MODULE SYNOPSES

STAGE I

SMB 5101: Managerial Economics   **20 Credits**

The module aims to enhance the students' understanding of Microeconomic theory and concepts and the relation of economics reasoning to managerial decision-making as well as to business questions of public policy. The module focuses on the examination of economic principles and their applications in management. Areas covered include definition of goals, concepts of optimization, marginalisation and opportunity cost; theory of demand; production cost; market structure and the basic elements of welfare economics. Questions of wage-price guideline; pollution; and the social responsibility of firms from an economic point of view are discussed. Economic models and quantitative applications are demonstrated as aid to optimizing scarce or limited resources.

SMB 5102: Human Resources Management   **20 Credits**

The module outlines the origins and development of Human Resource Management; compares alternative models and explores its relationship to strategy, assesses the role of human resource planning; examines the methods and process involved in recruitment, selection and appraisal, to study the changing nature of learning, training and development in contemporary organizations as well as examines the theoretical foundations of motivation and remuneration strategies and how organizations put these into practice The module provides an overview of Human Resource Management and has been designed with the needs of the non-specialist in mind. The emphasis in the lectures and related activities will be on how the various activities involved in Human Resource Management - recruitment, selection, appraisal, training, development and remuneration - can deliver benefits for organizations rather than on imparting practitioners' skills.

SMB 5103: Financial and Management Accounting   **20 Credits**

The module aims to provide module participants with an understanding of the theory and practical application of accounting in (a) the preparation of external financial accounts and (b) internally generated management accounting information for decision-making and control within organizations. The module attempts to develop skills in the analysis of accounting data, as well as a good understanding of the underlying assumption on which the figures are based. To this end, lectures are interspersed with exercises and case study sessions. Reading and practical exercises are provided each evening to consolidate the topics covered during the day.

SMB 5105: Marketing Management   **20 Credits**

This module aims at providing module participants with a sound understanding of the main concepts and theories of marketing and helps them develop the ability to apply knowledge to practical marketing decision-making. Theoretical concepts are presented using lectures and seminars and participants are expected to follow the recommended readings from key text books and professional journals to augment the learning process. The module includes the use of case-studies and discussion of current marketing issues to ensure its application to the business environment.

STAGE II

SMB 5202: Entrepreneurship   **20 Credits**

The module aims at helping students develop an understanding of issues, possibilities and challenges in the field of entrepreneurship. The objectives are to describe the nature and significance of entrepreneurship; evaluate the paths to entrepreneurship; prepare and critique business plans; distinguish and evaluate the different sources of financing small businesses and assess the risks facing small businesses and their mitigation. The areas covered include: the role of small businesses in an economy; characteristics of entrepreneurs and the myths about entrepreneurs; entrepreneurship and traditional management; forms of business ownership; ways of going into business; business plan structure, uses and preparation; sources of finance; business growth models; causes of small business failure; risk analysis for small businesses; women and entrepreneurship.

SMB 5206: Corporate Governance And Business Ethics   **20 Credits**

The main objective of this module is to provide candidates with a comprehensive knowledge of theories, principles and practice of corporate governance. It focuses on ethical issues in the conduct and regulation of business. The module equips candidates with a good knowledge of corporate governance which should enable them to develop a clear understanding of corporate structures, processes, policies, roles, and responsibilities, crucial for proper direction and control of business and organizations not only for their immediate but also greater stakeholders. The areas covered include: ethical theories and principles; corporate governance issues relating to: risk management, dealings and securities, internal audit, reporting of financial and nonfinancial information, communication with other corporate stakeholders; corporate best practices; organisation integrity/code of ethics; corporate governance systems and strategies.

SMB 5204: Strategic Management   **20 Credits**

The objectives of the module are to inculcate a deep understanding of the analysis necessary to undertake strategic management decision making.; to provide an appreciation of the complex, competitive and general environment of businesses; to allow refinement of the students' analytical decision making skills in complex business situations as well as to lead to an understanding of the complex human, organizational and ethical problems often involved in

Think in other terms

strategic decision-making. The major topics covered include: the role of analysis and planning; mission, objectives, values; ethics and goals; external analysis - markets, industries, competitors and stakeholders, internal audits; capabilities, value chains, resources and portfolios; core and generic strategies; structure, culture and organisational design; strategy evaluation, implementation and control; strategic group mapping; collaborating to compete; leadership strategic procurement; market orientation and performance; commitment: the dynamics of strategy, corporate social responsibility, differentiating products with services, strategic role of brand management, strategic management: some alternative views.

SMB 5208: Operations Management   20 Credits
The objective of this module is to explore what constitutes world class operations and information management. The module will therefore cover top level issues such as developing a focused operations and information strategy that is congruent with the company's business and marketing strategies.   To this will be added understanding and practice of key operational techniques to enable delivery of the strategy. The learning process is facilitated through module readings, lectures, worked exercises and contemporary case studies. The major topics covered: developing a competitive operations strategy, product and service design, facilities layout; location planning; design of work systems; strategic value of information; roles and categories of information systems; supply chain management; productivity, project management, Japanese manufacturing techniques, Operations linkages across the business.

STAGE III

SMB 5301: Competitive Strategy   20 Credits
The module begins with the application of a few well-known tools to understand the attractiveness and evolution of industries; the extent to which a company has a sustainable competitive advantage; the creation of innovative value propositions; and corporate advantage in multi-business firms. We build up and out from these sessions in order to consider strategy from the perspective of growth (diversification, vertical integration, internationalization) and then from the view of the board and top management. At the end of the module, the student should be able to apply these ideas to profit-making and to non-profit organizations. The module covers: Origins of strategy; Analysis of attractiveness of the industry; Value-based business strategies; Competitive advantage; Sustainability; Diversification and growth strategy; Strategies for vertical integration; How emerging market companies enter; Governance and strategy from the Boardroom; Modern game theory; models of competition strategy model options; resource mobilization and action plan development. Class sessions shall be a mixture of applications (cases and other examples), lectures and group presentations.

SMB 5302: Strategy Implementation and Change Management   20 Credits
The speed at which change is occurring is faster now than it has ever been in the entire existence of humankind and corporate history. Successful organizations are those that both create and respond positively to change and cultivate a culture of corporate entrepreneurship. The module

examines reasons why so many business strategies fail and why some firms are so successful while others are slowly dying; it also looks at the systems thinking and systems dynamics modelling frameworks; in addition, the traditional strategy theoretical frameworks, technological discontinuities, new requirements of doing business, changing customers and changing faces of competition, options to anticipate and manage change, business process re-engineering, implementation failure analysis, decision modelling and tools for integrating strategy across the entire organization. The module also addresses the question of black economic empowerment, diversity policy and women's participation in the organization as well as current debates and evidence surrounding these issues.

SMB 5303: Corporate Restructuring and Turnaround Management   20 Credits
The primary objectives of the module are to help students to: recognize symptoms (and early warning signals) associated with distressed divisions, subsidiaries, or diversified companies (or those on the way to trouble); diagnose the *root causes* of business trouble; prescribe effective corrective action appropriate to the resources available, in light of competitive intensity, general economic conditions, and other exogenous opportunities and constraints, e.g., technological, regulatory, social, demographic, political, et cetera. Turnaround management is about restructuring troubled companies. The module examines turnaround business situations, i.e., established firms experiencing operational, financial and managerial difficulties. It emphasizes the operating manager's perspective and considers strategy issues as well as financial ones. (in some sessions the creditor's viewpoint is of critical importance as it affects managerial autonomy.) Turnaround management integrates the functional disciplines of the core curriculum: a basic understanding of accounting and corporate finance is mandatory to do the class exercises that use cash flows and ongoing concern projections, debt restructuring and liquidation analysis. Experience in negotiations (to forge creditor relationships) is helpful. The final project requires the general manager's perspective to suggest operating changes as well as use of qualitative and quantitative tools to effect solutions. Turnaround management addresses all aspects of managing a corporation in trouble and (with some luck, in the turnaround process). Students will learn to distinguish between troubled firms (that can be repaired) and crisis companies that are unlikely to survive. The module looks at restructuring operations, assets and liabilities, capital structures, organizational issues and strategy.

SMB 5304: Global Corporate Strategy and Governance   20 Credits
This module brings together the different aspects of global business into a seamless strategy that creates a winning organization. This module deals with issues such as: strategy analysis, market and product research information solicitation and processing, product development strategy, manufacturing strategy, competitive advantage analysis: -national advantage, industry advantages, firm specific advantages (location advantage, firm capabilities), and how to develop firm-specific global advantages, marketing strategy, sales and customer service strategy, making and implementing strategy, balancing global coordination requirements with local responsiveness needs, global risk management, global business corporate governance issues. In general, it deals with an organization-wide strategy for global market engagement.

Think in other terms

STAGE IV
SMB 5400: Dissertation   **94 Credits**
This is a final component of the programme which requires the student to undertake a research-based project in his/her area of specialisation. Students are required to undergo a one-week research methods module before commencement of the project. The major topics covered include statistical data sources and collection; data presentation; exploratory data analysis; mathematics for business statistics; counting techniques; fundamental principles of counting; permutation and combination; probability theory; random variables and some special distributions of random variables; sampling distributions and estimations; business applications; hypothesis testing; time series analysis and forecasting, regression; correlation and linear programming.

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Z. L. Dube, PhD in Organisational Dynamics (Glamorgan Wales, UK), MA, Corporate Administration (Anglia Ruskin Univ. England)

Think in other terms

Grascious Maviza, MA Development Studies (Erasmus Rotterdam, Netherlands), BSc Hons Sociology (UZ)

N. Ndlovu, MComm in Development Economics (UCT, RSA), BComm (Hons) Economics (MSU).

MASTER OF SCIENCE IN DEVELOPMENT STUDIES

SPECIAL REGULATIONS

1.0 PREAMBLE

1.1 The regulations for the Master of Science Degree hereinafter referred to as the Master of Science in Development Studies (MScDS) complement but are subordinate to the University General Academic Regulations for Master's Degree by Coursework, hereinafter referred to as the General Academic Regulations.

2.0 ENTRY REGULATIONS

2.1 Applicants should normally hold an Honours Degree in Development Studies or equivalent from a recognised university.

<p align="center">OR</p>

2.2 A relevant Bachelor's degree in Social Science or any other discipline from a recognised university.

2.3 Relevant work experience in the field of development or equivalent will be an added advantage.

2.4 Shortlisted candidates for admission may be interviewed as part of the selection process.

3.0 STRUCTURE OF DEGREE PROGRAMME AND SELECTION OF MODULES

3.1 The Programme consisting of coursework shall normally be completed over a maximum period of 24 months on a part-time block-release basis. The academic year shall normally begin in July/August.

3.2 On a block release basis, delivery shall be allocated as follows:

	Stage	Number of Modules
First Year	I	4 Modules
	II	4 Modules
Second Year	III	4 Modules
	IV	Dissertation *(after passing Part 1and II)*
Total Number of Modules	**Twelve (12 Modules + Dissertation)**	

3.3 Module delivery will be divided into two components:
   a. The taught component (Stage I, II and III) comprises of 12 core modules.
   b. The research component, in Stage IV, leading to a dissertation of approximately 20, 000 words excluding appendices.

3.4 The weighting of modules will be based on the Notional Study Hours (NSH) credit system which all learning activities of a student of average ability, taking place in and outside scheduled contact sessions, are taken into consideration (1 credit = 10 notional hours). A student must attain a prescribed minimum number of credits to qualify for the award of a degree or diploma.

3.5 Each module shall be taught for a total of 48 contact hours.

4.0 ASSESSMENT OF CANDIDATES

4.1 A candidate will be expected to sit for formal written examination at the end of each Stage of the Programme. However, oral examinations may be provided under special circumstances.

4.2 For a candidate to be admitted to the examination, they must have satisfactorily completed all assignments for continuous assessments. In addition, they are expected to have attended a minimum of 80% of the lectures in each module.

4.3 The taught component shall be examined by both coursework and a formal written examination. Coursework shall account for 40% of the overall assessment while the formal written examination shall account for 60% of the overall assessment.

4.4 For the taught component, the pass mark shall be 50% based on the aggregate of the module work and the examination while for the research component the pass mark shall be 50%, based on the aggregate of the viva voce defence and the dissertation marks. The viva voce defence is compulsory and shall constitute 20% of the final dissertation mark.

4.5 The determination of the overall degree programme aggregate with a dissertation component will be:

Taught component	75%	216 credits
Research component (Dissertation)	25%	72 credits

4.6 A candidate shall not be allowed to proceed to the research component of the Programme before passing all modules in the taught component.

4.7 A student who fails to participate in the oral examination (viva voce) shall be considered to have failed the module.

5.0 DETERMINATION OF RESULTS OF MODULES

5.1 In cases where the Programme is not fully semesterised, a candidate who fails a module or modules taken in a particular block may, on the recommendations of the Senate, be granted permission to repeat the failed modules when next offered.

5.2 A candidate who fails more than 50% of the modules taken in a particular part may, on the recommendations of the Senate, be granted permission to repeat the failed modules. Nevertheless, a repeat candidate may be exempted from re-attendance and re-examination in any modules in which he/she previously passed.

5.3 A candidate who is not allowed to proceed to the subsequent Stage of the Programme and has failed the same Stage of the Programme twice will be required to withdraw from the Programme.

Think in other terms

5.4 A candidate who fails the dissertation stage with a mark in the range of 40-49% shall be given the option to re-submit within three months from the date of publication of results. The dissertation will only attain a maximum of 50%.

5.5 A candidate who fails the Dissertation Stage with a mark below 40% shall be expected to apply to repeat the module.

5.6 A candidate who fails to complete the Dissertation Stage and does not submit the dissertation within the prescribed period shall be given the option to submit within three months from the date of publication of results. However, such a dissertation will be awarded a maximum of a Pass grade.

6.0 AWARDING OF A DEGREEE CLASSIFICATION

6.1 Candidates must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.

6.2 For the degree to be awarded, the minimum number of credits of 288 credits must be satisfied.

6.3 A candidate who is withdrawn after failing Part II, the dissertation stage, but had passed the taught components may be awarded a Postgraduate Diploma in Development Studies.

6.4 The classification of the degree will be as in the General Academic Regulations.

Think in other terms

PROGRAMME SUMMARY

STAGE I

Module Code	Module Description	Credits
MDS 5101	Development Theory, Policy and Practice	18
MDS 5102	Development Economics	18
MDS 5103	Governance and Development	18
MDS 5104	The Natural Environment and Development	18

STAGE II

MDS 5201	Development Planning, Monitoring and Evaluation	18
MDS 5202	Rights Based Programming	18
MDS 5203	International Development Issues and Trends	18
MDS 5204	Research Methods	18

STAGE III

MDS 5301	Management of Development Institutions and Programme	18
MDS 5302	Dimensions of Poverty Reduction	18
MDS 5303	Civil Society and Development	18
MDS 5304	Social and Political Change in Developing Countries	18

STAGE IV

MDS 5400	Dissertation	72

TOTAL CREDITS FOR THE PROGRAMME

STAGE I	72
STAGE II	72
STAGE III	72
STAGE IV	72
Total minimum credits:	**288**

Think in other terms

MODULE SYNOPSES

MDS 5101 Development Theory, Policy and Practice   **18 Credits**

This module provides grounding in the sociology and politics of development. It focuses on the concept of development, development theories and aspects of practices in the real world. The interplay between theory and practice and the outcome of this relationship will be explored together with development policy issues. The module provides a comprehensive survey of development thinking from "classical" development ideas to alternative and post-development theories. It then attempts to critically review contemporary debates about development, including the link between modernity and development, participation, empowerment, gender, trade, food sovereignty, corporate social responsibility and the role of the development practitioner.

MDS 5102 Development Economics   **18 Credits**

The module will offer students an appreciation of how economics affects development, exploring the various strategies used to bring about economic growth and hence development. It provides insights for setting development programmes/initiatives with an appreciation of the economic fundamentals affecting the factors of production upon which the results of development are dependent. It also provides the student with enhanced knowledge on measures of development i.e. purely economic growth measures such as GNP, GDP, Gini co-efficient versus development indicators that also include a people's living standards, health, education, rights i.e. human development index, which are important in assessing programme impact. It will also look at the justifications for having development banks such as IMF, World Bank etc. This module is strongly linked to other modules on the programme such as Development Theory, Policy and Practice and Governance and Development.

MDS 5103 Governance and Development   **18 Credits**

This module explores the relationship between governance and development. It sensitizes candidates to the importance of the political – legal framework in complying with the ideals of good governance. The module looks at issues, concepts, and trends in the field of political development; the dynamics of the political environment; constitutional provisions for governance and development; local governance and community- based development; public management and aspects of international relations.

MDS 5104 The Natural Environment And Development   **18 Credits**

The module looks at the effects of the environment on human and economic development. It aims to equip candidates with skills of articulating how development activities can lead to environmental degradation and the strategies for mitigating degradation. It will examine the effect of the human-environment interaction such as land degradation, pollution, natural resource depletion, population settlements, and food security, environmental protection and issues around global climatic change, among others.

MDS 5201 Development Planning, Monitoring and Evaluation   18 Credits
The module focuses on the concepts and skills for planning development initiatives i.e. problem analysis and needs assessment, setting objectives, selecting among alternative methods, etc. It then looks at skills for monitoring and evaluating project/programme implementation. Standard planning and evaluation procedures are contrasted with the realities and needs of programs development at the grassroots level, exploring issues of participation, ownership, and accountability. The module will also explore aspects of Programme Accountability and Learning Systems (PALS).

MDS 5202 Rights Based Programming   18 Credits
This module enables students to gain an insight into current development paradigms and policies including, but not limited to The Human Rights Framework, from Needs Based to Rights Based Approaches, The Principles and Practice of Rights Based Programming, Debates and Dilemmas in Rights Based Programming, the UN convention on the Rights of the Child and other conventions. Students will deepen their knowledge about project and programme development from a human rights perspective and learn how to apply the principles of equity, empowerment, participation and accountability to various phases of project planning and implementation. They will also gain sensitivity to how programs can integrate non-discriminatory practice and give attention to vulnerable groups. The module will focus on practical tools for human rights situation assessment, programme planning, implementation and monitoring and evaluation within the rights based conceptual framework.

MDS 5203 International Development Issues and Trends   18 Credits
The module explores international issues and trends in the field of development. It introduces candidates to the larger context of international economics, politics, and policies so as to better understand the way these impact on grassroots reality and initiatives. Candidates will examine the requirements placed on national governments and analyze the impact of donor nation decisions about how much and what kinds of international aid will be made available in which regions of the south. The module will also examine contemporary issues to do with African Diaspora and international migration and their impact on development.

MDS 5204 Research Methods   18 Credits
This module covers how to undertake the typical research process, with particular emphasis on development issues. It includes an analysis of the application of key research tools and methods in attempting to seek practical answers/explanations to development scenarios. Both quantitative and qualitative methods are covered. This should guide students in preparing for their fieldwork for dissertations.

MDS 5301 Management of Development Institutions and Programme   18 Credits
This module is designed to offer candidates specific and unique skills required to manage in an NGO/not-for-profit context. The module covers: creating a vision for the development organization, strategic leadership and board composition, organizational structure and operation, marketing and fundraising, development partner expansion, financial management, financial analysis and reporting, training and motivation of volunteers, assessment of stakeholders

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satisfaction and overall operating effectiveness, sustainability strategy planning and design, capacity mapping, program objective setting, program implementation and program evaluation.

MDS 5302 Dimensions of Poverty Reduction   **18 Credits**
This module seeks to address issues of poverty reduction strategies which have to deal with many difficult and complex challenges. Theories of poverty and poverty cycle will be interrogated and ways to integrate poverty reduction strategies will be examined. The module would examine prominent views on the linkages between economic growth, inequality, and poverty reduction suggesting the proper definition and measurement of pro-poor growth. The module will also analyse pro-poor policies and legislative provisions which are focused on poverty reduction in Africa and the world. The module would explore different dimensions that are related to poverty reductions.

MDS 5303 Civil Society and Development   **18 Credits**
The module seeks to equip candidates with skills to critique the roles of civil society organizations. The module is expected to cover topical issues such as; the contemporary issues of civil society, the emergence of common challenges of civil society, the impact of globalization on development. The module will examine the roles of civil society organizations and their challenges and critique the value of civil society as a balance to the private sector and the state.

MDS 5304 Social and Political Change in Developing Countries   **18 Credits**
The module seeks to create an understanding on the dynamics that drive the developing countries. Candidates will examine the social and political changes and link these to development in this module. Issues such as political development, the economies of ideology in developing countries, anthropology and political development as well as issues related to World Trade Organization operations will also be discussed. Candidates will analyze the theories of change in international development, within the social, political and environmental realities of their particular context. The module also seeks to interrogate the roles of social, economic and environmental movements in their attempts to achieve desired social changes and harness the linkages in Peace, Conflict management and resolution.

MDS 5400 Dissertation   **72 Credits**
The final module on the MSc in Development Studies programme is the dissertation, researched and written over at least six months. In preparation for this research study, candidates are required to present a proposal for approval. This will equip the candidates with research techniques and analytical tools they will need for their dissertation.   The dissertation shall, on its own, constitute the final part of the programme. A candidate is required to submit a dissertation of approximately 20 000 words on a topic relating to his/her area of development interest and approved in writing by the dissertation supervisor. A candidate is required to participate in the final oral examination (viva voce) normally held after the submission of the

Think in other terms

dissertation. The oral defence contributes 20% towards the final dissertation mark. Two typed copies of the dissertation shall be submitted to the Institute. The format for the dissertation shall be as provided for the thesis of MPhil and PhD in the General Regulation.

Think in other terms

MASTER OF SCIENCE IN DISASTER MANAGEMENT

1.0 PREAMBLE
1.1 The regulations for the Master of Science Degree hereinafter referred to as the Master of Science in Disaster Management (MScDM) complement but are subordinate to the University General Academic Regulations for Master's Degree by Coursework, hereinafter referred to as the General Academic Regulations.

2.0 ENTRY REGULATIONS
2.1 Applicants should normally hold an Honours Degree in Disaster Management or equivalent from a recognised university.

<div align="center">OR</div>

2.2 A relevant Bachelor's degree in Social Science or any other discipline from a recognised university.

2.3 Relevant work experience in the field of disaster risk reduction or equivalent will be an added advantage.

2.4 Shortlisted candidates for admission may be interviewed as part of the selection process.

3.0 STRUCTURE OF DEGREE PROGRAMME AND SELECTION OF MODULES
3.1 The Programme consisting of coursework shall normally be completed over a maximum period of 24 months on a part-time block-release basis. The academic year shall normally begin in July/August.

3.2 On a block release basis, delivery shall be allocated as follows:

	Stage	Number of Modules
First Year	I	4 Modules
	II	4 Modules
Second Year	III	4 Modules
	IV	Dissertation *(after passing Part 1 and II)*
Total Number of Modules	**Twelve (12 Modules + Dissertation)**	

3.3 Module delivery will be divided into two components:
- The taught component (Stage I, II and III) comprises of 12 core modules.
- The research component, in Stage IV, leading to a dissertation of approximately 20, 000 words excluding appendices.

3.4 The weighting of modules will be based on the Notional Study Hours (NSH) credit system which all learning activities of a student of average ability, taking place in and outside scheduled contact sessions, are taken into consideration (1 credit = 10 notional hours). A

student must attain a prescribed minimum number of credits to qualify for the award of a degree or diploma.

3.5   Each module shall be taught for a total of 48 contact hours.

4.0   ASSESSMENT OF CANDIDATES

4.1   A candidate will be expected to sit for formal written examination at the end of each Stage of the Programme. However, oral examinations may be provided under special circumstances.

4.2   For a candidate to be admitted to the examination, they must have satisfactorily completed all assignments for continuous assessments. In addition, they are expected to have attended a minimum of 80% of the lectures in each module.

4.3   The taught component shall be examined by both coursework and a formal written examination.

4.4   Coursework shall account for 40% of the overall assessment while the formal written examination shall account for 60% of the overall assessment.

4.5   For the taught component, the pass mark shall be 50% based on the aggregate of the module work and the examination while for the research component the pass mark shall be 50%, based on the aggregate of the viva voce defence and the dissertation marks. The viva voce defence is compulsory and shall constitute 20% of the final dissertation mark.

4.6   The determination of the overall degree programme aggregate with a dissertation component will be:

Taught component	75%	216 credits
Research component (Dissertation)	25%	72 credits

4.7   A candidate shall not be allowed to proceed to the research component of the Programme before passing all modules in the taught component.

4.8   A student who fails to participate in the oral examination (viva voce) shall be considered to have failed the module.

5.0   DETERMINATION OF RESULTS OF MODULES

5.1   In cases where the Programme is not fully semesterised, a candidate who fails a module or modules taken in a particular block may, on the recommendations of the Senate, be granted permission to repeat the failed modules when next offered.

5.2   A candidate who fails more than 50% of the modules taken in a particular part may, on the recommendations of the Senate, be granted permission to repeat the failed modules. Nevertheless, a repeat candidate may be exempted from re-attendance and re-examination in any modules in which he/she previously passed.

5.3   A candidate who is not allowed to proceed to the subsequent Stage of the Programme and has failed the same Stage of the Programme twice will be required to withdraw from the Programme.

Think in other terms

5.4 A candidate who fails the dissertation stage with a mark in the range of 40-49% shall be given the option to re-submit within three months from the date of publication of results. The dissertation will only attain a maximum of 50%.

5.5 A candidate who fails the Dissertation Stage with a mark below 40% shall be expected to apply to repeat the module.

5.6 A candidate who fails to complete the Dissertation Stage and does not submit the dissertation within the prescribed period shall be given the option to submit within three months from the date of publication of results. However, such a dissertation will be awarded a maximum of a Pass grade.

6.0 AWARDING OF A DEGREEE CLASSIFICATION

6.1 Candidates must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.

6.2 For the degree to be awarded, the minimum number of credits of 288 credits must be satisfied.

6.3 A candidate who is withdrawn after failing Part II, the dissertation stage, but had passed the taught components may be awarded a Postgraduate Diploma in Development Studies.

6.4 The classification of the degree will be as in the General Academic Regulations.

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PROGRAMME SUMMARY

STAGE I

Module Code	Module Description	Credits
MDM 5101	Hazards, Disasters & the Zimbabwe Emergency Management System	18
MDM 5102	Disaster Vulnerability and Risk Management	18
MDM 5103	Disaster Education	18
MDM 5104	Media Management and Disaster Risk Communication	18

STAGE II

MDM 5201	Earth Sciences and Natural Disasters	18
MDM 5202	Technological Disasters	18
MDM 5203	Business Continuity Management	18
MDM 5204	Research Methods	18

STAGE III

MDM 5301	Geographical Information Systems for Disaster Risk Management	18
MDM 5302	Emergency Planning, Exercise Design & Evaluation	18
MDM 5303	Public Health Issues in Disaster Management	18
MDM 5304	Disaster Risk and Emergency Management Regulation	18

STAGE IV

MDM 5400	Dissertation	72

TOTAL CREDITS FOR THE PROGRAMME

STAGE I	72
STAGE II	72
STAGE III	72
STAGE IV	72
Total minimum credits:	**288**

Think in other terms

MODULE SYNOPSES

MDM 5101 Hazards, Disasters and the Zimbabwe Emergency Management System   18 Credits

This module provides an introduction to the phenomenon of hazards, disasters and the Zimbabwe Emergency Management system. The theories principles and practices underpinning disaster risk management will be explored. The module covers topics such as distinction between emergency and disaster, types of disasters and disaster management cycle, disaster policy and legislation. Major disasters locally and internationally and how these were dealt with and their overall impact on the populations involved will be discussed.

MDM 5102 Disaster Vulnerability and Risk Management   18 Credits

This module introduces and explains the concept of vulnerability assessment as the foundation for effective hazard mitigation. The module explains various methodologies to carry out the process of hazard and vulnerability assessment. Various risk management concepts, tools, and techniques in the global context will be discussed. The module emphasizes discussion on the design and implementation of risk management practices.

MDM 5103 Disaster Education   18 Credits

This module focuses on the need for and how to disseminate disaster awareness using various methods. Critical to all this is the need for use of local symbols and negotiated meanings of terms for optimal understanding of key concepts being taught. It also looks at how children can also take part in disseminating DRR education through various means in schools, e.g. drama, poetry, sport, art, etc. This should foster a high level of hazard/disaster awareness that will motivate people to take action to protect lives, livelihoods and infrastructure from the impact of hazard events.

MDM 5104 Media Management and Disaster Risk Communication   18 Credits

Emergency management personnel inevitably face situations in which they are called upon to help individuals and communities understand physical hazards, risks and/or crises and appropriate responses. This module is designed to familiarize candidates with the array of scholarship in crisis and risk communication and to help candidates gain skill in devising risk communication strategies that are supported by research findings. Candidates will examine challenges encountered by emergency, crisis and risk communicators, such as public information officers and first responders.

MDM 5201 Earth Sciences and Natural Disasters   **18 Credits**

This module focuses on the geological, hydrological and atmospheric processes that impact the human environment in catastrophic ways. The natural disasters section will focus on how normal earth processes can concentrate energy that can have devastating blows to humans and their structures. Topics covered include, energy cycles, plate tectonics, and focused studies on hazards such as: earthquakes, volcanic eruptions, tornadoes, hurricanes, tsunamis, wildfires, flooding, landslides, climate change and mass extinctions. Disaster mitigation and preparedness and prediction and forecasting will also be covered.

MDM 5202 Technological Disasters   **18 Credits**

This module introduces candidates to the scope and variety of technological (man-made) hazards that face today's society. The module covers concepts and mechanics of technological hazard threat and risk analysis, and the issues of readiness, response, and recovery from technological hazard event. The role of population's growth, demographics, and geography in exacerbating technological hazards will also be discussed.

MDM 5203 Business Continuity Management   **18 Credits**

The module provides an understanding of the nature of business and the value of BCM to organisations. The module offer insights into how organisations manage disaster risk and operate business continuity strategies in order to operate effectively and efficiently in an increasingly competitive and disastrous environment. Topics that will be studied include; Business Impact Analysis, Organisational Culture & Organisational Learning, Models of crisis generation, Drivers for BCM, BCM Exercise and BS25999. Candidates will have the opportunity to produce working plans that provide preventive measures to minimize the impact of disaster and provide an organized response and ensure business continuity during recovery.

MDM 5204 Research Methods   **18 Credits**

This module covers aspects on how to undertake research, with particular emphasis on hazard/disaster issues. It includes an analysis of the application of key research tools and methods in attempting to seek practical answers/explanations to disaster problems. Both quantitative and qualitative methods are covered. This should guide candidates in preparing them for their dissertations.

MDM 5301 Geographical Information Systems for Disaster Risk Management 18 Credits

This module covers the principles and applications of geographic information systems (GIS). The module explores how geographic reality is modelled in a GIS and what kinds of data are already defined, collected and available. Principles covered include those underlying the capturing, editing, manipulating, searching, analysing and integrating spatial data along with the presentation and understanding of spatial data for decision support.

Think in other terms

MDM 5302 Emergency Planning, Exercise Design and Evaluation   18 Credits

This module provides an introduction to the multiple facets of emergency planning and the fundamentals of emergency exercise design, development and implementation. The fundamentals of planning as they apply to the four phases of emergency management and how these phases overlap, interrelate, and complement each other, as well as other disciplines, will be discussed. Candidates will be given a plan, what it should contain, who should participate in its construction and implementation, and discover the fundamental importance of the emergency operations plan as a basis for effective emergency preparedness. Furthermore, the module focuses on different types of emergency exercises, how they are used, and how they are conducted. It provides candidates with the knowledge and skills necessary to develop and conduct disaster exercises that test a community's emergency response plan and capabilities.

MDM 5303 Public Health Issues In Disaster Management   18 Credits

This module examines the role and capability of public health and health care systems. It addresses the expectations of public health in disaster preparedness and response to all types of disasters. The module examines the growing threat and potential public health consequences of disasters. The module covers theory and practice of various public health issues in emergency preparedness and considers the implications for policy makers.

MDM 5304 Disaster Risk and Emergency Management Regulation   18 Credits

This module aims to present and analyse, in a comparative and international perspective, the role of Zimbabwe's legislation and institutions in the context of disaster risk prevention, mitigation, response and recovery. Topics to be covered include: identification of the main institutional actors; the impact of law on catastrophic risk management in Zimbabwe and across the world; international principles, standards, directives and guidelines developed in the recent years; legal and policy implications of disaster risk financing for governments; public-private initiatives to cover the cost of extreme risks and catastrophe insurance schemes implemented in different jurisdictions.

MDM 5400 Dissertation   18 Credits

The dissertation shall, on its own, constitute the final part of the programme researched and written over at least six months. In preparation for this research study, candidates are required to present a proposal for approval. Each candidate is required to submit a dissertation of approximately 20 000 words on a topic relating to his/her area of disaster management interest and approved in writing by the dissertation supervisor. Two typed copies of the dissertation shall be submitted to the Institute. A candidate is required to participate in the final oral examination (viva voce) normally held after the submission of the dissertation. The oral defence contributes 20% towards the final dissertation mark. The format for the dissertation shall be as provided for the thesis of MPhil and PhD in the General Regulation.

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FACULTY OF ENGINEERING

Dean
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Secretary
Lydia Nyathi, HND Secretarial Studies, Bcom Human Resources

FACULTY REGULATIONS FOR UNDERGRADUATE AND POSTGRADUATE DEGREE PROGRAMMES

1.0 PREAMBLE

1.1 The Faculty of Engineering was established to provide undergraduate teaching in the following :-
- Bachelor of Engineering – Chemical Engineering
- Bachelor of Engineering – Civil and Water Engineering
- Bachelor of Engineering – Electronic Engineering
- Bachelor of Engineering – Industrial and Manufacturing Engineering
- Bachelor of Engineering – Fibre and Polymer Materials Engineering

1.2 The Bachelor of Engineering degree is a five year full time honours degree programme. The programmes are designed to cater for the requirements of those wishing to pursue a career in Engineering with a strong practical orientation.

2.0 REGULATIONS
(Applicable to those who entered the Faculty in July 2017 or after)

2.1 GENERAL REGULATIONS
These regulations should be read in conjunction with the General Academic Regulations for undergraduate degrees.

2.2 ENTRY REGULATIONS
To be admitted to any of the Programmes in the Faculty, a candidate must have satisfied the minimum conditions for entry prescribed under the General Regulations. In addition he\she must satisfy the following entry requirements:

2.2.1 For admission to the Programme in Chemical Engineering
(*Conventional and Parallel*)

NORMAL ENTRY

a) At least 3 'A' level passes in Pure Mathematics, Physics and Chemistry

Or

b) At least 3 'A' level passes in Additional Mathematics, Chemistry and a third approved subject such as Physics, or Biology with an 'O' level passes in Chemistry and Physics with 'C' grade or better.

Or

c) At least 3 'A' level passes in Pure Mathematics, Mechanical Mathematics, Chemistry and a third approved subject such as Physics, or Biology with 'O' level passes in Chemistry and Physics with 'C' grade or better.

Think in other terms

SPECIAL ENTRY

a)   ND in Chemical Engineering, Chemical Technology, Metallurgy, Mineral Processing and Metallurgy and any other equivalent qualification plus 2 years post ND working experience Or

b)   HND in Chemical Engineering, Chemical Technology, Metallurgy, Mineral Processing and Metallurgy plus 1 year post HND working experience.

MATURE ENTRY

Candidates should be at least 25 years of age with relevant work experience or other attainments.

2.2.2 For admission to the Programme in Civil and Water Engineering
(Conventional and Parallel)

NORMAL ENTRY

At least three `A' level passes in Pure/Additional/Mechanical Mathematics, Physics and Chemistry with either Computer Science or Engineering Drawing.

SPECIAL ENTRY

a)   ND in Civil Engineering or ND Water resources Engineering plus 2 years post ND working experience

Or

b)   HND in Civil Engineering or Water resources engineering plus 1 year post HND working Experience.

MATURE ENTRY

Candidates should be at least 25 years of age with relevant work experience or other attainments.

2.2.3 For admission to the Programme in Electronic Engineering
(Conventional and Parallel)

NORMAL ENTRY

At least three `A' level passes in Pure/Additional/Mechanical Mathematics, Physics and Chemistry.

SPECIAL ENTRY

a)   National Diploma in Electronic Engineering **or** Telecommunication Engineering **or** Instrumentation and Control **or** Computer Engineering plus 2 years post ND   working experience.

Think in other terms

b) Higher National Diploma in Electronic Engineering **or** Telecommunication Engineering **or** Instrumentation and Control **or Computer** Engineering plus 1 year post HND working experience.

MATURE ENTRY
Candidates should be at least 25 years of age with relevant work experience or other attainments.

2.2.4 **For admission to the Programme in Fibre and Polymer Materials Engineering**
(*Conventional and Parallel)*

NORMAL ENTRY
At least three `A' passes in Chemistry, Pure/Additional/Mechanical Mathematics and Physics.

SPECIAL ENTRY
a) ND in Materials Engineering (Polymer, Chemical & other relevant Materials) plus 2 years post ND working experience
   Or
b) HND in Materials Engineering (Polymer, Chemical & other relevant Materials) plus 1 year post HND working experience.

MATURE ENTRY
Candidates should be at least 25 years of age with relevant work experience or other attainments.

2.2.5 **For admission to the Programme in Industrial and Manufacturing Engineering**
(*Conventional and Parallel)*

NORMAL ENTRY
At least three `A' level passes in Pure/Additional/Mechanical Mathematics and Physics plus Chemistry/Computer Science/Engineering Drawing, Design Technology, with 'O' level pass in Chemistry.

SPECIAL ENTRY
a) ND in Mechanical, Production, Plant Engineering, Draughting & Design and Refrigeration plus 2 years post ND working experience
Or
b) HND in Mechanical, Production, Plant Engineering, Draughting & Design and Refrigeration plus 1 year post HND working experience.

MATURE ENTRY
Candidates should be at least 25 years of age with relevant work experience or other attainments.

Think in other terms

3.0   STRUCTURE OF THE PROGRAMMES

3.1   The programmes constitute five academic years on full-time basis, each academic year representing a part of the degree Programme. Part IV shall be spent on industrial training attachment with an appropriate organisation.

3.2   A student may be exempted, with the approval of the Senate, from a part or parts of the Programme if his/her qualifications are found adequate by the individual Departments and the Faculty.

4.0   FINAL YEAR PROJECTS
PART V

4.1   Project/Design must be undertaken by all candidates. The Project will involve a major investigation, design or development which will normally contain a significant proportion of laboratory or practical work.

4.2   The original and one copy of the project report will be submitted for assessment on or before the date specified by the Chairman of Department. The examiners may penalize candidates for late submission of the Project Report.

5.0   SCHEME OF EXAMINATION AND ASSESSMENT

5.1 Date of Examinations
   Final and supplementary examinations will take place in each   semester for each module in a Part, at dates to be specified.

5.2 Mode of module Assessment
The assessment of a module may contain contributions due to formal examinations, continuous assessment and module work. Unless otherwise specified, the formal examination will contribute 75% and continuous assessment/module work will contribute 25% for the final marks. Where appropriate, continuous assessment/module work may contribute, either, (a) 50% or (b) 100% of the final mark. With the approval of the Faculty Board, students may be required to pass separately the module work and examination components. Before the commencement of each academic year, Departments will submit to the Faculty Board for approval lists of modules to be examined under either option (a) or option (b).

6.0   MINIMUM PASS MARK AND AGGREGATE MARKS
6.1   The minimum pass mark for a module is 50% as prescribed in General Regulations.

6.2   The aggregate mark of a Part is the weighted average of aggregate marks for the parts constituting the programme of study.

Think in other terms

6.3   The overall aggregate mark is the weighted average of aggregate marks for the parts constituting the programme of study.

7.0   PROCEEDING TO THE NEXT PART

7.1   A student may proceed to the next Part on satisfying the examiners in all the modules for the Part.

7.2   Subject to the provisions of Section 8.5 a student may proceed to the next Part provided that he/she gets an aggregate of 50% or more.

8.0   CARRY OVER

8.1   On the recommendation of the Faculty Board of Examiners a student may be permitted to proceed to the next Part and carry over up to 25% of modules including any supplementary examination failures.

8.2   For Part I examinations the number of carry over modules shall be limited 25% of the modules including examination failures.

8.3   A student carrying over some modules, as above, will be re-examined in these modules at the next regularly scheduled examinations in the following year.

9.0.   REPEATING MODULES

9.1   A student whose aggregate mark for a Part is 50% or more than 25% of the modules, must repeat the Part.

9.2   A student whose aggregate mark for a Part is 45% or more, but who after supplementary examinations fails to get minimum pass marks in more than 25% of the modules, must repeat the Part.

10.0   DISCONTINUING

A student whose aggregate is less than 35% should discontinue the programme.

11.0   INDUSTRIAL ATTACHMENT

During industrial attachment the student will be governed by the general Regulations for Industrial Attachment.

12.0   FINAL YEAR PROJECT ASSESSMENT

12.1 Mark Allocation

Assessment during the module of the Project shall constitute 25% of the final mark while the final Report and oral examination will account for 75%.

12.2 Overall Pass

For each project module, the appropriate Departmental Panel of Examiners shall determine, for each student, an overall mark.

Think in other terms

12.3 **Re-submitting / Repeating**

12.3.1   A student who fails a project shall normally be allowed to re-submit a report and be re- examined within a period to be specified by the appropriate Department.

12.3.2   A student required to re-submit a report but fails the assessment again will have to do a different project. A project module can be repeated only once.

13.0   AWARDING OF A DEGREE AND CLASSIFICATION

In determining a candidate's degree classification, the parts of the degree programme will be weighted as follows:-

Part I   5%
Part II 10%
Part III   15%
Part IV   20%
Part V 50%

13.1   AWARD OF THE DEGREE

13.1.1   Students are required to satisfy the examiners in all the modules before being awarded the degree.

13.1.2   The Bachelor of Engineering Honours Degree under the Seal of the University will be awarded to every successful candidate. The successful candidates will have their degree annotated as being in the respective field of:- Chemical Engineering, Civil and Water Engineering, Electronic Engineering, Industrial and Manufacturing Engineering or Fibre and Polymer Materials Engineering.

DEPARTMENT OF CHEMICAL ENGINEERING

Lecturer and Chairperson
Ms Siboniwe Bhebhe, M.Sc. Chemical Engineering, University of the Witwatersrand, Johannesburg, RSA. BEng. (Hons) Chemical Engineering, NUST, Bulawayo, Zimbabwe.PGDHE, NUST, Bulawayo, Zimbabwe.Membership - AICHE

Secretary
Helga Nyamweda¸ Advanced Pitman Certificate, BBA UNISA

ACADEMIC STAFF

Senior Lecturers
Dr Joel Tshuma, PhD Metallurgy and Materials Sciences, Mexico City, DF, Mexico. M.Sc. Chemical Engineering, Havana, Cuba. Membership - AIChE, ACS, NUSESA

Dr Nkosikhona Hlabangana, PhD Chemical Engineering, University of Witwatersrand, Johannesburg, RSA. M.Sc. Chemical Engineering (Converted to PhD), University of Witwatersrand, Johannesburg, RSA. Certificate in Project Management, University of Witwatersrand, Johannesburg, RSA. BEng. (Hons) Chemical Engineering, NUST, Bulawayo, Zimbabwe. Membership – SAICHE, SAIMM

Lecturer
Eng. Standford Mudono, MEng. Chemical Engineering, Tsinghua University, Beijing, (China). BSc. (Hons) Chemical Engineering, University of Oriente, Santiago de Cuba, Cuba. PGDHE (NUST), PGDMC (China), Membership - ZIE

Mr Liberty. L. Mguni, M.Tech. (Chemical Engineering), University of Johannesburg, Johannesburg, RSA BEng (Hons) Chemical Engineering, NUST, Bulawayo, Zimbabwe.

Ms Nonhlanhla G. Mguni, M.Sc. Chemical Engineering, University of the Witwatersrand, Johannesburg, RSA. BEng. (Hons) Chemical Engineering, NUST, Bulawayo, Zimbabwe. PGDHE, NUST, Bulawayo, Zimbabwe. Membership - ICHEME, SAICHE, FFF.

Eng. Cledwyn T. Mangunda, M.Eng. Manufacturing Systems and Operations Management, NUST, Bulawayo, Zimbabwe. B. Eng (Hons) Chemical Engineering, NUST, Bulawayo,

Think in other terms

Zimbabwe. PGDHE NUST, Bulawayo, Zimbabwe. Membership - AMIChemE, AMSAIChE, ZIE

Ms Tariro Tecla Manhongo, M.Eng. Manufacturing Systems and Operations Management, NUST, Bulawayo, Zimbabwe. BEng (Hons) Chemical Engineering, NUST, Bulawayo, Zimbabwe.

Mrs Olga Kuipa, M.Sc. Eng. Ivanovo Inst. USSR

Temporary Full-time Lecturers
Dr E. Mtetwa, PhD Chemistry, Robert Gordon's University, Aberdeen, UK. M.Sc. Chemical Engineering and Technology, VSCHT, Czechoslovakia.

Mr L.B. Moyo, M.Sc. Chemical Engineering, University of the Witwatersrand, Johannesburg, RSA.
BSc (Hons) (Chemical Engineering), University of the Witwatersrand, JHB, RSA. Membership - ECSA

Mr S. Ncube, M.Sc. Chemical/Process Engineering, Erlangen-Nuremberg, Germany. BEng (Hons) Chemical Engineering, NUST, Bulawayo, Zimbabwe.

Engineering Instructor
Ms Lawrencia Tshuma, BEng (Hons) Chemical Engineering NUST, Bulawayo, Zimbabwe.
National Diploma in Chemical Technology, Bulawayo Polytechnic, Bulawayo, Zimbabwe

Staff Development Fellow
Ms Ivonne Tshuma, BEng (Hons) Chemical Engineering NUST, Bulawayo, Zimbabwe.

Think in other terms

BACHELOR OF ENGINEERING HONOURS DEGREE IN CHEMICAL ENGINEERING

The department offers both conventional and parallel programmes.

PROGRAMME SUMMARY

PART I

Semester I

Module Code	Module Description	Hours	Credits
TCE 1101	Chemical Engineering Calculations	48	4
TCE 1102	Materials and Containment IA	48	4
TCE 1103	Professional Engineering Skills I	24	2
TIE 1101	Engineering Drawing I	48	4
SCH 1120	Physical Chemistry for Engineers	48	4
SCS 1101	Introduction to Computer Science I	48	4
SMA 1116	Engineering Mathematics IA	48	4

Semester II

Module Code	Module Description	Hours	Credits
TCE 1202	Materials and Containment IB	48	4
TCE 1204	Engineering Thermodynamics	48	4
TIE 1101	Engineering Drawing I	48	4
TEE 2292	Principles of Electrical Engineering	48	4
SCH 1221	Organic Chemistry for Engineers	48	4
SCS 1206	Visual Programming Concepts and Development	48	4
SMA 1216	Engineering Mathematics IB	48	4
CTL 1101	Conflict Transformation and Leadership	24	2

Think in other terms

PART II

Semester I

TCE 2101	Transport Phenomena	48	4
TCE 2102	Professional Engineering Skills II	24	2
TCE 2103	Mass Transfer Processes IA	48	4
TCE 2104	Chemical Engineering Thermodynamics IA	48	4
TCE 2105	Fluid Flow I	48	4
TCE 2108	Chemical Reaction Engineering IA	48	4
TCE 2109	Chemical Engineering Laboratory IA	24	2
SMA 2116	Engineering Mathematics II	48	4

Semester II

TCE 2203	Mass Transfer Processes IB	48	4
TCE 2204	Chemical Engineering Thermodynamics II	48	4
TCE 2206	Heat Transfer	48	4
TCE 2207	Process Dynamics and Control	48	4
TCE 2208	Chemical Reaction Engineering IB	48	4
TCE 2209	Chemical Engineering Laboratory IB	24	2
SMA 2217	Engineering Mathematics III	48	4

PART III

Semester I

TCE 3101	Plant and Equipment Design	48	4
TCE 3102	Chemical Reaction Engineering II	48	4
TCE 3103	Minerals Engineering IA	48	4
TCE 3104	Separation Processes IA	48	4
TCE 3105	Fluid-Solid Systems IA	48	4
TCE 3108	Research Methodology	48	4
TCE 3010	Chemical Engineering Laboratory Project	24	2
SMA 3116	Engineering Mathematics IV	48	4

Semester II

TCE 3203	Minerals Engineering IB	48	4
TCE 3204	Separation Processes IB	48	4
TCE 3205	Fluid-Solid Systems IB	48	4
TCE 3206	Fluid Flow II	48	4
TCE 3207	Biochemical Engineering I	48	4
TCE 3209	Health and Safety in Industrial Plants	48	4
TCE 3010	Chemical Engineering Laboratory Project	24	2

Think in other terms

PART IV
TCE 4000   Industrial Training Attachment

PART V

Semester I

TCE 5101	Process Management, Economics and Optimisation I	48	4
TCE 5102	Process Dynamics, Modelling and Control IIA	48	4
TCE 5103	Chemical Engineering Software Packages	24	2
TCE 5104	Environmental Process Engineering IA	48	4
TCE 5005	Chemical Engineering Design Project		
TCE 5006	Research and Development Project		
TCE 5107	Advanced Mineral Engineering IA	48	4
TCE *	Option	48	4

Semester II

TCE 5202	Process Dynamics, Modelling and Control IIB	48	4
TCE 5204	Environmental Process Engineering IB	48	4
TCE 5005	Chemical Engineering Design Project	38	
TCE 5006	Research and Development Project		4
TCE 5207	Advanced Mineral Engineering IB	48	4
TCE *	Option	48	4

OPTIONS*

TCE 5108	Biochemical Engineering II
TCE 5109	Technology of Processes
TCE 5211	Food Process Engineering
TCE 5212	Advanced Separation Processes
TCE 5113	Process Modelling and Simulation
TCE 5214	Liquid/Solid Wastes Management, Remediation
TCE 5115	Process Quality Management
TCE 5116	Product Planning and Control
TCE 5217	Industrial Energy Management

Think in other terms

MODULE SYNOPSES

PART I

TCE 1101 Chemical Engineering Calculations   **4 Credits**

The module focuses on dimensional analysis and units; Material Balances; Material Balance Calculations, Balance on Multiple Unit Processes, Recycle and Bypass, Balances on Reactive Systems, Combustion Reactions; Energy Balances Energy Balances on Closed Systems, Energy Balances on Open Systems at a Steady State, Tables of thermodynamic data, Energy Balance procedures, Balances on non-reactive processes, Balances on reactive processes; Material and energy balances on transient processes and an introduction to computer aided balance calculations.

TCE 1102 - Materials And Containment IA   **4 Credits**

The module looks at materials Engineering: Basic physical metallurgy, Phase diagrams, Microstructures and mechanical properties of materials, Relationship between structure and properties Stress and strain Fracture and creep selection criteria for materials.

TCE 1202 - Materials And Containment IB   **4 Credits**

This module explores corrosion engineering: fundamentals of corrosion and oxidation of metals, Localised corrosion, Pitting and environmental cracking, Degradation in flowing media; Erosion-corrosion and erosion-oxidation, Corrosion protection strategies, Inhibition and water treatment design, Cathode-based and anode-based protection, Ceramics properties and uses, Plastic properties and uses as well as rubber properties and uses.

TCE 1103 - Professional Engineering Skills I   **2 Credits**

This module examines study methods; Communication principles; Technical definitions; Descriptions and instructions; Tables and graphs; Letters Memoranda and curricula vitae; Written reports; Word processing and computer jargon; Interview technique; Running a meeting; Reading, understanding and summarising technical articles as well as group dynamics.

TCE 1204 - Engineering Thermodynamics   **4 Credits**

The module is an introduction to thermodynamics - scope of thermodynamics; First Law of thermodynamics; Volumetric properties of pure fluids; Heat effects and the second law of thermodynamics.

PART II

TCE 2101 Transport Phenomena   **4 Credits**
This module offers a basic Introduction to mass transfer, Estimation of diffusion coefficients, Diffusion processes, Diffusion in laminar flow, Diffusion in turbulent flow; transport process analogies, Mass transfer in flow past miscellaneous shapes, Mass transfer to single spheres, Unsteady-state diffusion; interphase mass transfer theories and mass transfer coefficients.

TCE 2102 Professional Engineering Skills II   **2 Credits**
The module gives an introduction and overview on types of skills, organization, management, human skills, conceptual skills, time management and stress management.

TCE 2103 Mass Transfer Processes IA   **4 Credits**
This module outlines principles of mass transfer; Maxwell Stefan model; Stage wise operations; Binary distillation processes; Distillation with reflux; Distillation equipment; McCabe-Thiele method; Lewis-Sorel method and the Ponchon Savarit method.

TCE 2203 Mass Transfer Processes IB   **4 Credits**
The module looks at gas absorption, Liquid/liquid extraction, Leaching, Humidification, Cooling towers and drying.

TCE 2104 Chemical Engineering Thermodynamics 1A   **4 Credits**
The module examines thermodynamic Properties of Fluids; Thermodynamics of flow processes; Production of power from heat and refrigeration.

TCE 2204 Chemical Engineering Thermodynamics 1B   **4 Credits**
The module focuses on solution Thermodynamics Theory; Solution Thermodynamics Applications; Vapour Liquid Equilibrium (VLE) at Low to Moderate Pressures; Phase Equilibria as well as Chemical Reaction Equilibria.

TCE 2105 Fluid Flow I   **4 Credits**
The module explores fluid mechanics and properties - Properties of Fluids; Viscosity; Newtonian Fluids, Statics - Hydrostatic pressure; Manometry/pressure measurement, Dynamics - The continuity equation; The Bernoulli Equation; Applications of the Bernoulli equation; The momentum equation; Application of the momentum equation; Real Fluids - Boundary layer; Laminar flow in pipes; Transportation of fluids and flow measurement.

TCE 2206 Heat Transfer   **4 Credits**
The module looks at steady State Conduction, Forced and Natural Convection, Reynolds Analogy, Heat Transfer Film Coefficient Correlations, LMTD Heat Transfer Design, Fouling Factors, Radiation; Unsteady State Conduction, 2-D Conduction, E-NTU Heat Exchanger Design, Correction

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Think in other terms

Factors for LMTD Heat Exchanger Design, Condensers, Boilers and Evaporators.

TCE 2207 Process Dynamics, Modelling And Control I   **4 Credits**
The module is an introduction to process control; Introduction to feedback control: the dynamic behaviour of feedback controlled processes; Introduction to Feed-forward control: the dynamic behaviour of the feed-forward controlled processes; Introduction to process systems dynamics and cascade control system.

TCE 2108 Chemical Reaction Engineering IA   **4 Credits**
The module is an introduction to Chemical Kinetics, Mole Balances, Conversion and Reactor Sizing, Rate Laws and Stoichiometry, Concentration versus Time Equations for Single, Irreversible Reactions; Concentration versus Time Equations for Reversible Reactions; Isothermal Reactor Design - Design of the Ideal PFR, CSTR, Batch and Semi-Batch Reactors and CSTRs in Series.

TCE 2208 Chemical Reaction Engineering IB   **4 Credits**
The module looks at collection and Analysis of Rate Data, Multiple Reactions; Series, Parallel, Complex and Independent, Algorithm for Solution of Complex Reactions, Multiple Reactions in PFRs/PBRs and CSTRs, Non-Isothermal Ideal Reactors; Packed Bed Reactors and Residence Time Distribution Functions for Non Ideal Flow Reactors.

TCE 2109 Chemical Engineering Laboratory IA   **2 Credits**
This is an introduction to laboratory practise; safety in the laboratory, relevant analytical equipment and techniques, handling of wastes and a series of practicals based on Part I and Part II modules.

TCE 2209 Chemical Engineering Laboratory IB   **2 Credits**
This is a series of practicals based on Part I and Part II modules.

PART III

TCE 3101 Plant And Equipment Design And Selection   **4 Credits**
The module covers the design, selection considerations and specifications of chemical process industry (CPI) plant and equipment. The range of equipment treated is, to the greatest possible extent, the pieces of equipment that are found in the process flow sheet of an industrial manufacturing plant: storage and reaction vessels, pumps, compressors, process plant piping , valves and other fittings for process control. Considerations used in the Selections of materials of construction are dealt with comprehensively such as process Integration and Pinch Technology; Computer based process design techniques. The module also includes basic precepts of Engineering Economics: business cash flows; time value of money; capital budgeting; methods of budget and investment evaluation.

Think in other terms

TCE 3102 Chemical Reaction Engineering II 4 Credits

The module explores fluid reactions: - kinetics and mass transfer, rate equations, design for reaction towers; Fluid - Particle reactions, reaction models for non-catalytic reactions, Uniform conversion, shrinking core and shrinking particle models; Consideration of controlling mechanism, Design analysis; Catalytic fluid-solid reactions: catalyst types, kinetics and LHHW; Catalytic reactors (packed bed, CSTR and FB); Intrapellet and external heat and mass transfer, Reactor design especially of single or staged packed bed reactors and interstage heat transfer; optimum temperature profiles, reactor choices and operating choices.

TCE 3103 Minerals Engineering IA 4 Credits

The module is an introduction to mineral geology, rock formation, exploration, mining and economics of ore extraction; Principles of mineral ore processing with emphasis on ore handling, ore crushing and grinding, screening, classification and the design of comminution circuits.

TCE3203 Minerals Engineering IB 4 Credits

The module explores the principles of mineral concentration, separation of values from waste, process recoveries, gravity concentration, dense medium separation, froth flotation, magnetic and electrostatic separation, dewatering, tailings disposal and management, design of mineral processing circuits.

TCE 3104 Separation Processes IA 4 Credits

The module gives an introduction to separation processes; UNIFAC and UNIQAC methods; Staged column design; Absorption and stripping; Azeotropic and extractive distillation; Liquid-liquid extraction and supercritical fluid extraction.

TCE 3204 Separation Processes IB 4 Credits

The module looks at evaporation; Adsorption and ion exchange; Membrane processes; Crystallisation; Mixing; Chromatography and Bio separations.

TCE 3105 Fluid-Solid Systems IA 4 Credits

The module examines solids; Introduction to powder technology; Particulate systems; Particle characterization; Particle size measurement; Particle size distribution; Sampling; Particle size reduction; Solids storage, handling and transportation as well as mixing and agitation.

TCE 3205 Fluid-Solid Systems IB 4 Credits

The module focuses on fluidisation and fluidized beds; Liquid/solid separations: Filtration, Sedimentation, Centrifuges; Gas/solid separation: Cyclones, Electrostatic precipitators and (Hot) Gas filtration.

Think in other terms

TCE 3206 Fluid Flow II   **4 Credits**

The module covers fundamental concepts: The continuum hypothesis and mathematical implications; Analytical Classification of Flow Phenomena; Lagrangian & Eulerian Systems; the Substantial Derivative; Equations of particle paths, The Equations of Fluid Motion: Conservation of Mass—the continuity equation, Momentum Balance—the Navier–Stokes Equations; Analysis of the Navier–Stokes Equations; Applications of the Navier–Stokes Equations: Fluid Statics, Bernoulli's Equation, Control-Volume Momentum Equation, Classical Exact Solutions to Navier–Stokes Equations, Approximate Solutions of the Navier-Stokes Equation Potential Flow, Laminar and Turbulent flows and boundary layer analysis.

TCE3207 Biochemical Engineering I   **4 Credits**

The module gives an introduction to microbiology, Classification and composition of cells, Microbial classification, Microbial Systems; Bio kinetic, thermodynamic and stoichiometric preliminaries- Enzyme and Cell kinetics Thermodynamics, Stoichiometry and Metabolical pathways; Bioreactor design and operation- Design, scale up, configuration and construction, Ideal reactor operation: sterilization, control, optimisation and downstream processing.

TCE3108 Research Methodology   **4 Credits**

The module offers an introduction and overview of problem assortment; literature review; hypotheses and postulation; data accumulation; data processing and scientific writing skills.

TCE3209 Health And Safety In Industrial Plants   **4 Credits**

The module teaches the fact that every industrial company ought to propagate a corporate policy that lets it be understood by the workforce; that safety considerations override all preoccupations on company premises, including production; Industrial operations are operated subject to the provisions of the law: the Factories and Works Act (1976, with amendments that followed); The Boiler and Pressure Vessel Regulations contained in the Factories and Works Act are special areas of focus; Engineering codes used in the fabrication and inspection of boilers and pressure vessels that are acceptable to the Chief Inspector of Factories in Zimbabwe, notably the ASME Code, Section VIII, Division 1;Non-destructive testing (NDT) methods used for crack detection in pressure vessels are covered; Plant and process designs for the following: material hazards - mainly attributed to chemicals (toxicity, carcinogenicity, mutagenicity, flammability, etc;); process hazards – mainly attributed to overpressure, temperature deviations, loss of containment, fires and sources of ignition, explosions, human error; Study the methods of hazard identification, and risk evaluation used in the chemical process industry (CPI); process safety and environmental issues in chemical process design including waste minimization and life cycle analysis, HAZOP.

TCE 3010 Chemical Engineering Research Project   **2 Credits**

The purpose of the project is to develop the students' research skills and analytical skills, with a strong emphasis on research skills.

PART 1V   Industrial Attachment

PART V

TCE5101 Management, Economics and Optimisation   **4 Credits**
The module is an introduction to Analytical and Numerical Optimisation Techniques; La-Grangian multipliers; Sequential Search; Simplex acceleration; Linear programming; Network analysis, Introduction to Project Planning; Forecasting; Budgeting; Probability Theory for Decision Making and entrepreneurship.

TCE5102 Process Dynamics, Modelling and Control IIA   **4 Credits**
The module explores applications of Laplace and Z transforms to process control systems; The Routh - Hurwitz test; Root locus analysis; Design of feedback controllers; Frequency response techniques; Control systems design techniques and dead -time compensation.

TCE5202 Process Dynamics, Modelling And Control IIB   **4 Credits**
The module focuses on advanced design techniques of control systems; Complex processes with Multivariable control systems; Multiple - Input Multiple- Output systems; Introduction to artificial intelligence control systems; Process control using digital systems: Real time optimisation and an introduction to PLC.

TCE 5103 Chemical Engineering Packages   **2 Credits**
These are selected from available packages in the department.

TCE 5104 Environmental Process Engineering IA   **4 Credits**
The module gives an introduction and Overview on Laws and governmental policies on industrial waste management; Industrial waste classification; Industrial Solid and liquid (effluent) waste management; Characteristics of industrial waste (solid waste/liquid waste industrial effluent); Identification of pollutants (solid waste) in a production line; Technologies for industrial solid/liquid waste treatment and disposal; Waste solid/water minimization; Selection criteria for solid/liquid waste treatment and disposal technologies; Design of solid/liquid waste treatment and disposal technologies; Impact of industrial solid/liquid waste on the environment as well as sewerage works and health.

TCE 5204 - Environmental Process Engineering IB   **4 Credits**
The module has an introduction and Overview on Industrial gaseous waste management; Pollution Cycle, Identification of gaseous pollutants in a production line; Characterization of industrial gaseous waste, Impact of industrial gaseous waste on the environment and health; Technologies for control of air discharges; Design of equipment and plants for air pollution control; Environmental Impact Assessment (EIA) and Life Cycle Analysis.

Think in other terms

TCE 5005 Chemical Engineering Design Project　　　　　　**38 Credits**

This is project work which will involve; Mass and energy balances of the process; Alternative flow sheeting schemes; The sociological and environmental impact; Hazard analysis of process and plant safety; Detail design of specific units and The economic viability of the process.

TCE 5006 Research And Development Project　　　　　　**4 Credits**

At this advanced stage of research, students are expected to identify possible areas of research and apply all the knowledge gained in the programme to come up with possible solutions and recommendations;

TCE 5107 Advanced Minerals Engineering IA　　　　　　**4 Credits**

The module looks at pyrometallurgy; Unit operations in pyrometallurgy; Fuels, coke making; fluxes; Concentrate pre-treatment processes and equipment, smelting furnaces and reactions, refining processes and uses for selected minerals.

TCE 5207 Advanced Minerals Engineering IB　　　　　　**4 Credits**

The module explores hydrometallurgy and electrometallurgy, principles of hydrometallurgy and electrometallurgy, unit processes in hydrometallurgy; Leaching, leaching techniques, leaching processes; Solution purification and enrichment techniques; Metal recovery; Process routes for selected minerals; Halide extraction, chlorination processes and reduction of halides.

OPTIONS

TCE 5108 - Biochemical Engineering II　　　　　　**4 Credits**

TCE 5109 Technology Of Processes　　　　　　**4 Credits**

TCE 5211 Food Process Engineering (48 Hours)　　　　　　**4 Credits**

TCE 5212 - Advanced Separation Processes (48 Hours)　　　　　　**4 Credits**

TCE 5213 - Process Modelling And Simulation (48 Hours)　　　　　　**4 Credits**

Think in other terms

TCE 5214 - Liquids/Solids Waste Management, Remediation   **4 Credits**

The module looks at the regulations on the disposal of solid and liquid wastes, waste and health, waste water and sewage treatment, sludge treatment, disposal and re-use, product life cycle assessment, resource recovery, soil and ground water remediation.

TCE 5115 - Process Quality Management   **4 Credits**

TCE 5116 - Product Planning And Control   **4 Credits**

The module explores product portfolio models; Role of new products; Separating winners from losers; The new product development process; Product idea selection; Market research and analysis; Product launching; Project management in product launching and product life cycles.

TCE 5217 - Industrial Energy Management   **4 Credits**

The module is an introduction to Energy Management; Energy Data Recording &Processing; Plant Survey; Electrical metering and tariffs; Demand Management; Electric Motors; Lighting Systems; Insulation; Fans; Pumps; Compressed Air Systems; Refrigeration; Fuel Fired Equipment; Steam Generation and Distribution; Heat Recovery Systems and financial Analysis;

DEPARTMENT OF CIVIL AND WATER ENGINEERING

Lecturer and Chairperson
Dr Annatoria Chinyama, BSc Civ Eng (UZ), MSc IWRM (UZ), D-Tech Civ Eng (TUT), MZwIE

Secretary
Mrs T. Ronney, ND Secretarial Studies, BCom. Bus. Mgt. (MSU),

ACADEMIC STAFF

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Staff Development Fellows
Mr Jeremiah Chimhundi, BEng Civ & Water Eng. (NUST)

Senior technician
D.C Jecha, BTechEd. Civ & Con (NUST), MSc Con Proj. Mgt. (NUST), TechZwIE

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BACHELOR OF ENGINEERING HONOURS DEGREE IN CIVIL AND WATER ENGINEERING

The department offers both conventional and parallel programmes.

PROGRAMME SUMMARY

PART I

Semester I

Module Code	Module Description	Credits
SCS 1101	Introduction to Computer Science	10
SMA 1116	Engineering Mathematics 1A	10
TCW 1102	Engineering Drawing	10
TCW 1103	Engineering Communication Skills	10
TCW 1104	Principles of Electrical Engineering	10
TCW1105	Material Science	10

Semester II

CTL1101	Leadership and Transformation Management	10
SMA 1216	Engineering Mathematics 1B	10
SCS 1206	Visual Programming Concepts & Development	10
TCW 1203	Civil Engineering Drawing	10
TCW 1204	Engineering Mechanics	10
TCW 1205	Occupational Health, Safety and Environment	10

PART II

Semester I

TCW 2101	Fluid Mechanics	10
TCW 2102	Engineering Surveying I	10
TCW 2105	Engineering Geology	10
SMA 2116	Engineering Mathematics	10
TCW 2106	Structural Mechanics	10

Think in other terms

TCW 2107	Civil Engineering Materials	10

Semester II

TCW 2201	Soil Mechanics	10
TCW 2202	Engineering Hydrology	10
TCW 2204	Engineering Surveying II	10
SMA 2217	Engineering Mathematics III	10
TCW 2206	Structural Analysis I	10
TCW 2207	Construction Technology	10

PART III

Semester

TCW 3103	Design of Structures I	10
TCW 3104	Wastewater Engineering	10
TCW 3107	Hydraulic Design	10
TCW 3108	Structural Analysis II	10
TCW 3109	Transportation Engineering I	10
TCW 3110	Business Management for Civil Engineers	10

Semester II

TCW 3204	Irrigation Systems Design	10
TCW 3208	Transportation Engineering II	10
TCW 3209	Research Methods	10
TCW 3210	Geotechnical Engineering	10
TCW 3211	Construction Management & Ethics	10
TCW 3212	Design of Structures II	10

PART IV

TCW 4000	Industrial Attachment	120

PART V

Semester I

TCW 5101	Water Quality and Treatment	12
TCW 5099	Final Year Project	12
Elective I		12
TCW 5104	Civil Engineering Business Studies	12

Think in other terms

TCW 5105	Design of Structures III	12

Semester II

TCW 5099	Final Year Project	12
Elective II		12
TCW 5204	Dam Engineering	12
TCW 5205	Water Resources Management	12

ELECTIVES FOR PART V

TCW 5001	Groundwater Hydraulics and Modelling	12
TCW 5002	Pipe Network Analysis	12
TCW 5003	Liquid Retaining Structures	12
TCW 5004	Finite Element Method in Civil Engineering	12
TCW 5005	Traffic and Airport studies	12
TCW 5006	Solid Waste Management	12
TCW 5007	Wastewater Technology	12
TCW 5008	Bitumen Technology	12
TCW 5009	Computer Aided Design in Civil Engineering	12
TCW 5010	Computational Techniques in Civil 12	
TCW 5011	Dynamic Analysis of Structures	12
TCW 5012	Elastic Analysis of Structures	12

TOTAL CREDITS FOR THE PROGRAMME

Part I	120
Part II	120
Part III	120
Part IV	120
Part V	108

Total minimum credits: 588

Think in other terms

MODULE SYNOPSES

PART I

TCW 1102 Engineering Drawing   **10 Credits**

The module gives an introduction to Phase geometry; First and third angle projection; Dimensioning; Pictorial views; Freehand sketching, Drawing of common objects; Sectioning; Intersections; Developments; Conventions and Assembly drawings. It also covers an introduction to the basic concepts of the graphic language as a tool for communicating design related information; Introduction to orthographic projections, flow sheeting, and isometric through a series of graded exercises and introduction to technical drawing, simple geometric constructions.

TCW 1103 Engineering Communication Skills   **10 Credits**

This module aims to equip students with skills necessary for writing, editing, gathering, organizing, and presenting information effectively according to audience and purpose. Topics to be covered include technical documentation, oral and written technical reports, designing principles of technical and professional communication, policy making and leadership skills, teamwork, conflict management styles, public speaking skills, participation in group meetings, interview types and skills, critical thinking and audience analysis as well as study skills.

TCW 1104 Principles of Electrical Engineering   **10 Credits**

The module is an introduction to general concepts of current, voltage, resistance and circuits (dc and ac), elements of loop and nodal analysis, basic networks and theorems, Delta-Wye conversions and network theorems, Capacitor and inductor circuits; Transient analysis; DC and AC power; Forced response; Sinusoidal steady-state response; Frequency response; P-n junction behaviour and rectifier modelling and elementary power supplies.

TCW 1204 Engineering Mechanics   **10 Credits**

The module explores an introduction to Engineering Mechanics: Statics & Dynamics; Introduction to Solid Mechanics; Statics: Systems of forces; Equilibrium; Geometric characteristics of sections; Kinematics; Types of motion; Distance, linear displacement, speed, relative and linear velocity; Linear acceleration; Equations of motion; Kinetics: - Force-mass acceleration method, Work-energy method Conservation of energy; Impulse-momentum method; Conservation of linear momentum, collision, inelastic and collision; Angular momentum; Solid Mechanics: Stress-strain relationships, Elastic and plastic deformation, Hooke's law, Shear stress and strain, Allowable stresses and allowable loads; Temperature effects, Stresses on inclined surfaces; Analysis of stress and strain: - Plane stresses and strain, Principal stresses and

Think in other terms

maximum shear stresses, Mohr's circle of plane stress, Spherical and Cylindrical pressure vessels (Biaxial stress), Triaxial Stress and three-dimensional stress.

TCW 1205 Occupational Health, Safety and Environment   10 Credits

The module covers an introduction to the work and health standards in construction environments; construction safety; Introduction to construction codes and safety standards and personal protection, equipment and accident investigation; Introduction to health and safety legislation; Introduction to Environmental Impact assessment (EIA) and Environmental Management planning (EMP) and Construction sites visits for observations.

TCW 1206 Civil Engineering Drawing   10 Credits

This module provides the opportunity for the student to apply the previous theory into practical drawing using manual drawing and Auto CAD. This will result in generating typical Civil Engineering and simple architectural drawings. The student will develop graphic and other communication skills using current Auto CAD standard software; Develop Visualization skills by using manual and AutoCAD and to solve Civil Engineering architectural graphical problems. The Civil Engineering layout drawings include detailing for reinforced concrete and steel structures as well as interpretation of architectural drawing.

PART II
TCW 2101 Fluid Mechanics   10 Credits

The module offers an introduction to fluid properties, units; Fluid Statics: static pressure relationships, static pressure forces on submerged objects, buoyancy; Fluid kinematics: Classification of flows, velocity and acceleration characterization, Control volume concept, statement of conservation of mass, circulation; Fluid Dynamics: Euler's equation of fluid motion along a streamline, Bernoulli's equation and its applications, impulse momentum principle and its applications, angular momentum principle and its applications; Dimensional analysis; Ideal fluid flow analysis: stream function and velocity potential concepts, potential flow fields; Real fluid flow analysis: laminar and turbulent flow in pipes, pipe friction factor relations, simple pipeline problems; single pipes, pipes in series and pipes in parallel as well as flow measuring systems.

TCW 2102 Engineering Survey 1   10 Credits

The module explores definition of surveying, S I Units in survey; Plane and Geodetic survey; Application of plane and geodetic surveys; Topographical, Cadastral, Hydrographic, Mine, Photogrammetry and Engineering Survey; Chain Surveying; Types of measurements in chain survey; Chain Survey Equipment; Care and maintenance; Methods of setting up; Checks and adjustments to the optical square; Ranging a straight line using a prism square; Taping; Corrections to measured lengths; Temperature, slope, standardization, tension, and mean sea level; Electromagnetic measurements; Microwave, Infrared and Laser Instruments; Booking methods; Theory of Errors; Systematic and Random errors; Methods of eliminating or

minimizing these errors; Compass Surveying; Meridian, magnetic bearing, true north/geographic north, isogons, agonic line and magnetic declination; Factors affecting declination, types of compasses; Bearings; Elimination of local attraction, compass traverses, distance measurement; Adjustment of compass traverses using Bowditch graphical method and reconnaissance work for compass surveys; Areas of regular and irregular figures; Planimetry; Levelling: - dumpy, tilting and automatic levels; Levelling for construction, longitudinal and cross-sections, grading of constructions and some cut and fill work.

TCW 2106 Structural Mechanics   10 Credits

The module focuses on application of the equations of equilibrium; Analysis of axially loaded bars: - Displacements of axially loaded Members; Solution of pin jointed frames; Statically determinate trusses: - Type of trusses, Determinacy and stability of trusses, Computation of internal forces using the method of joints and method of sections and graphical methods; Pure bending theory, introduction to combined bending and direct stress; Internal forces in Beams and frames: - moment, shear, and axial force diagrams; Cables and arches; Pure torsion theory; Torsional behavior of members: - Torsional of circular bars, Hollow circular bars, indeterminate circular shafts, Elastic torsion of thin-walled closed tubes; Buckling of axially loaded columns; Instability of ideal and practical struts, beams and beam-columns.

TCW 2107 Civil Engineering Materials   10 Credits

The module looks at an introduction to Civil Engineering materials; Manufacture and properties of cement, hydration mechanisms and the microstructure of hardened cement paste; Constituent materials and properties of aggregates, fresh cement, hardened concrete and methods of testing; Durability of hardened concrete; Specification and standards of Concrete; Bricks and Blocks; Manufacture of different types of bricks, properties of bricks and mortar; Composite modelling of masonry movements; heat insulation; Structure and mechanical behaviour; Metals:- bonding, structure, plasticity, deformation and strengthening mechanisms of metals; Failure mechanisms of metals in service, welding and corrosion of metals; Timber:- Sources and characteristics of timber; Polymers: - Application and durability of polymers in construction; Nature, composition and properties of bituminous mixtures and testing of Civil Engineering Materials.

TCW 2105 Engineering Geology   10 Credits

The module has an introduction to theories behind formation of the earth; surface; structure and the age of the earth; mineralogy, petrology, igneous, sedimentary and metamorphic rocks, geological structures, geological maps and ground water; Various branches of geology, theory of the earth's origin by the gaseous tidal hypothesis; estimation of the age of the earth, description of the internal constituent of the earth including surface processes such as weathering, erosion and deposition; Mineralogy: Definition of a mineral, physical characters of minerals, crystalline form, atomic structures, classification of minerals; silicate minerals and non-silicate minerals as rock forming minerals and identification of the common rock forming minerals; Petrology: Origin of igneous, metamorphic and sedimentary rocks; Definitions of

Think in other terms

discordant, concordant bodies, dykes, sills, batholiths, laccoliths, etc of igneous rocks; Formation of various igneous rocks using Bowen reaction sieves and classification of igneous rocks; Texture and structures of sedimentary rocks; Different forms of metamorphic rocks, classes of metamorphic rocks; Geological Structures and Maps: Definition of geological map, dip, strike, folds faults, fault and normal fault and practical aspect of solving geological maps using contour lines or by the 3-point borehole system.

TCW 2201 Soil Mechanics   **10 Credits**

This module explores basic Characteristics of Soils: Soil-phase diagrams, definitions and calculations of the following soil properties - Bulk density, dry density, void ratio, porosity, water content, degree of saturation, specific gravity of soil particles, bulk unit weight, saturated unit weight, dry unit weight, submerged density, submerged unit weight and water content; Experiments to determine water content of a soil sample and specific gravity of soil grains are to be carried out, including classification of soil by the sieve analysis method and the Cassagrande apparatus; Permeability of Soils: Darcy's Law, coefficient of permeability and its determination by construct head method, falling head method and pumping well test analysis; Seepage: critical hydraulic gradient, quicksand conditions and piping, drawing of flow nets and determination of factor of safety against piping; Soil Compaction; Site Investigation: Various methods used to obtain information regarding the sequence of strata and ground water levels and also various methods used to collect soil samples for identification and testing such as trial pits, hand auger or post-hole auger, deep boring and drilling methods, borehole log and writing of a site investigation report.

TCW 2202 Engineering Hydrology   **10 Credits**

This module is an introduction to hydrology; Application of hydrology in engineering; Hydrologic cycle; Hydrologic equation and water balance; Meteorology; Precipitation and analysis; Frequency-Intensity-duration curves; Infiltration and infiltration models; Groundwater hydrology; Groundwater flow; Well hydraulics; Surface runoff; River flow and stream gauging; Hydrographs and analysis; Unit hydrographs; Flood routing; Analysis of floods and design criteria; Urban and small watershed hydrology; Hydrologic design; Linear regression and correlation; Statistical and probability analysis of hydrologic data.

TCW 2208 Structural Analysis I   **10 Credits**

The module looks at the types of structures and loading: - Modelling of structural systems and structural elements, Analysis of different types loads; Analysis of statically determinate structures: -Modelling of supports and reactions; Determinacy, indeterminacy, and stability of structures (beams, frames); Deflections (Double integration method, Method of singularity functions, Moment area method, Method of virtual work, Castigliano's second theorem); Qualitative analysis of beams and frames; Influence lines for determinate structures (Beams and trusses); Approximate Analysis of statically indeterminate structures; Analysis of indeterminate

structures (Flexibility method, slope deflection, moment distribution, stiffness method) and computer application in structural analysis.

TCW 2204 Engineering Survey II   **10 Credits**

The module explores Zimbabwean coordinates system and Gaussian system of coordinates; Traversing, triangulation and resection; Fieldwork/reconnaissance, station marking, angular measurement and centering errors; Sources of errors during angle measurement, distance measurement and the three-tripod system; Determination of angular misclosures in closed polygon and closed route traverses and distribution; Coordinate misclosures during traversing and their distribution by the Bowditch and Transit methods; Types and classification of triangulation fieldwork in Zimbabwe; Adjustment of angles in braced quadrilaterals and centre point polygons using the method of equal shifts and coordinate calculations; Resection calculations using Collins Auxiliary Point method and Tan K Formula; Theodolites and theodolite work: Temporary and permanent adjustments of theodolite angle measurement using; the repetition, directional and sector methods; Tacheometry work; Curves: circular, reverse, compound, transaction and vertical curves; Theory and calculations; Setting out methods: Site inspection, error detection, communication onsite and stages; Vertical control, temporary bench marks, sight rails, travelers and boring rods; Slope rails or batter boards, profile boards; Positioning techniques; Setting out Civil Engineering structures; Practical work; Introduction to Global Positioning Systems; Introduction to Geographic Information Systems as well as computer application in engineering survey.

TCW2209 Construction Technology   **10 Credits**

The module focuses on site clearance, site planning; Temporary works and by-laws: formwork systems, shoring, scaffolding, timbering, excavations; Foundation, Floor, roof and wall construction systems; Water proofing techniques; Internal components and finishes; Structural fire protection; Underpinning; Demolition works; Construction plant and equipment; External work: roads, paving, etc; Durability and maintenance; Site visits and site reporting.

PART III

TCW 3107 Hydraulic Design   **10 Credits**

The module has a review of basic concepts of fluid flow; Open Channel flow: Classification of flows, Uniform flow and resistance factors; Energy and momentum principles; Gradually varied flow and longitudinal profiles; Classification of flows, head loss equations, fittings and minor losses, pipes in series, parallel, and branch systems, Pipe materials; General overview of hydraulic structures: conveyance structures, flow measuring devices, control structures, etc; Types of Pumps, Types of Turbines, Operating curves of pumps, Pumps in pipeline system; Transients in pipes (Surges); Design of municipal drainage systems; Drainage requirements, review of hydrologic variables input into design which include storm flow estimation, time of concentration, intensity-duration-frequency rainfall data; Culvert design; Sewer systems:- Rectangular, trapezoidal and circular, inlets, manholes and outfall structures; Design of sewerage

Think in other terms

systems: population estimation, sewerage estimation, sewer materials, flow calculations, sewer appurtenances; Method of analysis and hydraulic design of:- Conveyance structures, water distribution systems and their appurtenances, pump-pipeline systems, Surge and water hammer in pipelines; Pump-turbine-pipeline systems; Pump design and selection, Diversion structures, etc; Storage systems: ground and overhead reservoirs and impoundments and computer application in hydraulic design;

TCW 3108 Structural Analysis II   10 Credits

The module looks at plastic analysis Structures: - Elastic-plastic stress-strain relationship, Plastic bending without axial force, Effect of axial load on plastic moment, Collapse loads and collapse mechanisms of beams and frames, Application of Virtual work and the static method; Dynamic analysis single and two degrees of freedom systems (damped and undamped systems), Energy method, Rayleigh method; Plate analysis: Assumptions in thin plate theory, Moment-curvature relations, Equilibrium of an element, Differential Equation of plate bending, Boundary conditions, Navier solution for a plate simply supported on four sides, Levy's method for plate with various support conditions, Transformation of moments and curvatures; Yield line analysis: - Yield line patterns, Guidelines for choosing yield line patterns, Assumptions used in yield line analysis, Virtual work method as well as the equilibrium method.

TCW 3103 Design Of Structures I   10 Credits

This module is an introduction to structural design; Loads on structures; Design in Timber; Design in structural steelwork; Design of steel beams, connections and joists; Design of Compression members, loading of continuous spans, moment capacity of members, design of purlins and crane girders, trusses, brackets and bracings.

TCW 3104 Wastewater Engineering   10 Credits

The module explores human activities and environmental pollution; Objectives of wastewater treatment; Wastewater characteristics; BOD kinetics; Wastewater flow rates and design flows; Flow equalisation; Wastewater treatment processes and selection; Flow measurement; Screening, Comminution and Grit removal; Primary sedimentation; Introduction to microbial metabolism and role of micro-organisms in biological treatment; Kinetics of biological growth; Trickling filter processes and design; Activated sludge treatment process and design; Biological nutrient removal; Secondary clarification; Wastewater stabilization ponds; Tertiary Treatment; Sludge treatment and disposal; On-site sanitation and low cost appropriate technologies for wastewater treatment and wetland treatment systems.

TCW 3109 Transportation Engineering I   10 Credits

The module covers planning and alignment of highways; Highway surveys; Cross-sectional elements and their functions; Geometric design of highway, design of intersections, design of

Think in other terms

signals, markings and signs; Sight distances; Horizontal and vertical curves; Types of road pavements and their design; Construction and maintenance of roads, stabilisation of materials; Generation, distribution of trips, modal split analysis, choice of routes; Road user, vehicle highway and environmental consequences of the use of highway facilities and traffic flow; Traffic control and regulations; Accidents and their prevention, road safety and computer application in transportation engineering.

TCW 3110 Business Management for Civil Engineers   10 Credits

The module gives an introduction to Business Management, Evolution of Management Theory, Managing in a Changing Environment, Functions of Management, Human Resource Management, Principles of Marketing, Marketing Mix, Consumer Markets, Business Markets, Strategic Marketing, Segmentation, Targeting, Positioning, Management Information Systems and E-commerce.

TCW 3207 Design Of Structures II   10 Credits

The module focuses on design in Reinforced Concrete; Basis of design; Material properties; Loading; Design of beams, slabs, columns; Design of continuous beams, two way slabs, flat slabs; Design of slender columns; Enhancement of Auto CAD application in Civil Engineering Drawings, e.g. detailing, scheduling, labelling and dimensions; Design in Masonry; Design of vertically loaded masonry walls as well as the design of laterally loaded wall panels.

TCW 3208 Transportation Engineering II   10 Credits

The module explores the role and characteristics of rail transportation; Types of gauges and their selection; Cross-sectional elements of a railway track, their functions and requirements; Rail failures and defects; Coning wheels, creep of rails; Rail fixtures and fastening; Geometrical design of rail track; Railway station yards and equipment; Signalling and interlocking; Train resistances and stresses in a railway track, tractive effort and traction; Construction and maintenance of a railway track and track drainage.

TCW 3209 Research Methods   10 Credits

The main objective of the module is to provide the students with the necessary tools to be able to carry out civil and water engineering related research. Topics to be covered include formulating problem statements, research questions and research objectives; Introduction to methods of undertaking research, sources of data, handling and presenting data and findings, data analysis techniques. Continuous assessment will include formulation of research proposals and actual research projects.

Think in other terms

TCW 3204 Irrigation Systems Design   **10 Credits**

The module gives an introduction to irrigation; Soils and classification in irrigation; Soil-water properties; Soil-water-plant relationships; Storage and measuring of soil moisture; Infiltration in irrigation; Crop water requirements; Determination of crop-water requirements:-Temperature-based, pan evaporation and combination methods; Selection of crop coefficients; Guide to selection of irrigation systems; Irrigation project planning; Surface irrigation systems and design:- Furrow and border strip; Sprinkler irrigation and design; Trickle irrigation and design; Operation and management of irrigation systems; Economic analysis and computer application in irrigation design;

TCW 3210 Geotechnical Engineering   **10 Credits**

Important subjects in the module include principles of effective stress and shear strength of soil; Strain-stress behaviour; Soil stiffness; Lateral earth pressure; Mohr-Coulomb and Rankine approaches; Consolidation theory and permeability, Slope stability; Critical soil model; Geo-structural mechanisms and the critical sate soil model; Settlement of foundations and analysis; Geo-technical process for ground improvement; Soil improvement-grouting, vertical drains, geosynthetics, soil reinforcement; Filtration, separation and erosion control; Drainage in plane and flow prevention.

TCW 3211 Construction Management & Ethics   **10 Credits**

The module examines the hierarchy of Construction Projects (Team); Duties and responsibilities of construction team; Site productivity; Construction equipment; Selection of equipment and scheduling; Efficient use of machinery at site; Construction automation and robotics; Project scheduling and planning (Critical path method); Estimations, planning; Contract supervision; Programming:- bar and Gantt charts, critical path networks; Cash flow, inflation, interest costing and budgetary control; Construction contracts:- Payment and variations and claims; Contract law; Types of contracts; General conditions of contracts (ZGCC 4), FIDIC; Standard forms of conditions of contract; ZACE Form 1 & 2; Legal aspects (contract law, employment law and health law); Bills of quantities; The Tender; development of a project; types of tenders; tendering procedure; Introduction to Project Management;   Social cost benefit analysis; Professional ethics;   Code of Ethics, Zimbabwe Institute Engineers; CPD and Continuing Professional Development (Training) CPD.

PART IV
TCW 4000 Industrial Attachment   **120 Credits**

PART V
TCW 5099 Final Year Project   **12 Credits**

Think in other terms

TCW 5101 Water Quality and Treatment   **12 Credits**

The module explores sources and uses of water; Physical, chemical and biological characteristics of water; Water quality standards and guidelines; Health and aesthetic aspects of water quality; Aeration theory, methods and application in water treatment; Water pollution and control; Introduction to Water quality modelling in the environment; Guide to selection of water treatment processes; Coagulation and flocculation; Sedimentation and flotation; Filter media; Slow sand filtration; Rapid filtration; Hydraulics of filtration and backwash; Membrane processes; Disinfection of water; Chemical and Tertiary treatment; Groundwater treatment; Pilot plant design and testing; Treatment and disposal of sludge from potable water treatment; Design, operation and management of water treatment plants.

TCW 5104 Civil Engineering Business Studies   **12 Credits**

The module gives an introduction to Financial Markets And Institutions, Time Value of Money, Fundamental Goal of Financial Management, Determinants of Firm Value, Risk and Return, Portfolio Theory, Project Appraisal, Capital Structure Theory and Practice, and Working Capital Management; Accounting Concepts, Double Entry Bookkeeping, Financial Statements (Income Statement, Balance Sheet and Cash Flow Statement) and Financial Ratio Analysis.

TCW 5105 Design Of Structures III   **12 Credits**

The module looks at the feneral principles of design of foundations for structures; Isolated footings, Combined footings; Retaining Walls: Review of lateral earth pressures; Gravity Walls, Cantilever and Counterfort Walls and design of Piled Foundations.

TCW 5204 Dam Engineering   **12 Credits**

The module explores types of dams and methods of dam classification; Hydraulic design of small, medium and large dams: hydrological considerations, flood routing; Outlet works, spillway design, stilling basin design; Siting considerations and environmental considerations in dam design, construction and use; Sediment transport and channel stability and hands-on with hydraulic design software.

TCW 5205 Water Resources Management   **12 Credits**

The module has introductory issues on the state of water resources at global and regional and national levels; Challenges to planning of water resource projects; Economics of water resource projects; Planning and management of community-based projects; Optimization methods applied to water resource projects; Principles of integrated approach to water resource management; Demand management; Reservoir capacity analysis and flood plain management.

ELECTIVES

All final year students are required to pass at least two electives the choice of which is subject to Departmental Board approval.

TCW 5001 Groundwater Hydraulics and Modelling   12 Credits

The module explores classification of aquifers; Types of formations; Physical properties of aquifers: Porosity, specific retention, storage coefficient, hydraulic conductivity, transmissivity; Principles of groundwater flow: Darcy law, Derivation of equations of flow; Horizontal flow assumption (Dupuit-Forchheimer assumption), Physically-imposed boundary conditions on flow; Methods of solution of groundwater flow equations: Flow nets, Analytical methods, Method of images (Flow near boundaries); Pumping tests and aquifer characterization; Well design, development, and construction, Flow in unconfined aquifers; Numerical modeling of aquifer systems; General concepts of numerical modeling, Finite difference, Finite element, Boundary element, Green element methods; Recharge and discharge area, artificial recharge as a management tool: Methods of artificial recharge as well as groundwater pollution and control.

TCW 5002 Pipe Network Analysis   12 Credits

The module has application of computers to Pipe network Design and Interpolation of results; Matrix solution of complex Pipe networks; Analysis of transient development and control; Computer analysis of water hammer; Parameter optimization, programme modification; Pumping systems analysis; Pipe supports; Design of flexible pipes; Air and vapour in pipelines.

TCW 5003 Liquid Retaining Structures   12 Credits

The module explores codes and handbooks; Design methods; Design objectives and general recommendations; Design examples; Specification and construction; Quality control and testing.

TCW 5004 Finite Element Method in Civil Engineering   12 Credits

The module gives an introduction to the basic concept of the finite element method; Examples; Use of method to design; Review of basic elasticity; Strain energy; Variational theorems: Concept of minimum potential energy; The Ritz method; Spatial discretisation by finite elements; Beam element; Plane stress and plane strain elements; Axisymmetric element; Isoparameteric elements and numerical integration; Three dimensional elements; Plate bending elements; Application to structural problems in plane stress; Application to fluid flow, potential problems and consolidation; Implementation of the method on microcomputers-programming strategies as well as the use of packages advantages and pitfalls.

Think in other terms

TCW 5005 Traffic and Airport Studies   **12 Credits**

The module explores the need for traffic analysis and studies; Traffic flow characteristics; Speed-density volume relationships; Traffic volume studies, its purpose and methodology, presentation of collected data, its analysis and utility; Speed studies, various methods of conducting speed studies, analysis of data and its presentation; Travel time and delay studies, floating method of study, delay at intersection, and presentation of data; Origination and Destination; Surveys, methods, their advantages and disadvantages, presentation of collected data; Parking studies, methods of parking, parking layout, multi storey parking and underground parking; Accident studies, collection, storing, recording and reporting of data, collision diagrams, their analysis; Remedial measures; History of aviation; Development trends in aircraft size, speeds, flying heights and other characteristics affecting airports; Planning of airports, regional planning, master plans, and strategic plan; Aviation forecasting; Airport obstruction clearance; Imaginary surfaces; Control devices; Planning and Design of terminal buildings and its facilities.

TCW 5006 Solid Waste Management   **12 Credits**

The module gives an introduction to evolution of solid waste management; Regulatory framework and management agencies; Sources and types of solid wastes; Diseases and pollution; Classification; Physical, chemical and biological properties;;; Generation and collection rates; Handling, separation and recovery; Transformation and recovery; Storage and processing at source; Collection and transportation of wastes; Disposal of wastes; Hazardous wastes and their disposal; Sanitary landfill design and operation practice; Compositing; Scavenging and its negative and positive impacts; Environmental issues-lactates, odours and gases; Control and monitoring of negative impacts; Restoration and rehabilitation of landfills and environmental impact assessments of landfills.

TCW 5007 Wastewater Technology   **12 Credits**

The module explores wastewater technologies and selection of treatment processes; Control of biological nutrients; Nutrient removal from wastewater: - Biological nutrient removal plant configuration for raw and settled wastewater; Reactor selection; Specialized treatment systems for phosphorous and nitrogen removal: - Modified Ludzack-Ettinger nitrification-denitrification process; Wuhrmann-nitrification-denitrification process; Bardenpho Process for nitrogen removal; Phoredox process for biological nitrogen and phosphorous removal and UCT process; Process volume requirements for the biological nutrient reactor; Solids flux theory; Layout and hydraulic design of biological reactor clarifiers; Wastewater treatment for small communities: On site sanitation; Anaerobic treatment of industrial wastewater; Tertiary treatment processes; Microstrainers; grass plots; maturation ponds; slow and rapid sand filters; Wastewater reclamation, reuse and disposal; Aerated lagoons; Sludge treatment, disposal and reuse; Sludge rheology and transport and visits to wastewater treatment plants.

TCW 5008 - Bitumen Technology   **12 Credits**

The module examines Bitumen and Tar, their types and method of extraction; Practical significance of tests on bitumen; Various types of bituminous roads and treatments, construction techniques; Different tests for Bitumen: Penetration test, softening point test, flash and fire point test, viscosity of bitumen test, Ductility tests, Distillation test; Cutbacks, emulsions etc; Bituminous mix Design; Marshall method, HV method and other methods.

TCW 5009 Computer Aided Design In Civil Engineering   **12 Credits**

The module gives an overview for CAD: Hardware and software for CAD; Introduction to programming techniques; Graphics for CAD; Graphic devices; Mathematics for graphics; Representation of images; Geometric modelling; Application to foundation and frame modelling in three dimensions; Analytical tools, modelling for CAD; Interactive design in CAD environment; Programming environment for CAD; Knowledge based approaches for engineering design; Applications in project management, hydraulic design, foundation engineering, transportation engineering and structural engineering.

TCW 5010 Computational Techniques in Civil Engineering   **12 Credits**

The module gives an introduction to numerical methods; The need and philosophy; Classical approximate methods; Variation methods - The Ritz method and the Galerkin methods; The finite difference method application to beams and plates; Disadvantages; The concept of finite element-discretisation and assembly; Variation principles; Classical element formulation; Interpolation functions; The isoparametric element and numerical integration; Application beams, plane elasticity and two dimensional potential problems; Introduction to boundary element method as well as implementation on microcomputer.

TCW 5011 Dynamic Analysis of Structures   **12 Credits**

The module explores basic concepts of Dynamic Analysis; Damped and undamped vibration; Single and several degrees of freedom and an application of the method to the analysis of structures (building and foundations).

TCW 5012 Elastic Analysis of Structures   **12 Credits**

The module explores basic concepts of Elastic Analysis; Application of the method to slabs; Navier method, Ritz method, concept of minimum potential Energy, Line method; Application of the Navier solution and the Crash of method to the analysis of grillages.

Think in other terms

DEPARTMENT OF ELECTRONIC ENGINEERING

Lecturer and Chairperson
Dr. Busiso Mtunzi, PhD Physics- Renewable Energy (UFH –SA), MSc Renewable Energy. (UZ - Zimbabwe), BTech (Hons) Applied Physics. (UZ-Zimbabwe)

Secretary
U, Magaya

Technicians
Mr. Keith Ncube, Bachelor of Engineering Honours Degree in Electronic Engineering, NUST, Bulawayo, Zimbabwe

Mr. Vusumuzi Ncube, National Diploma in Control & Instrumentation

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Think in other terms

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Mr Eben Makumbe, B Tech degree in Electrical Engineering ,UZ, Zimbabwe. Further Education Teacher's Certificate.

BACHELOR OF ENGINEERING HONOURS IN ELECTRONIC ENGINEERING

PROGRAMME SUMMARY

PART I (125Credits)

Semester I

Module Code	Module Description	Credits
SMA1116	Engineering Mathematics 1A	10
TIE1101	Engineering drawing	10
TCE1103	Professional engineering skills	5
TEE1102	Electrical engineering workshop	5
TEE1131	Computer engineering and programming	10
TEE1143	Electrical engineering circuit analysis	10
TEE1154	Physics for electronic engineers	10
Total Credits		**60**

Semester II

Module Code	Module Description	Credits
SMA1216	Engineering Mathematics 1B	10
TEE1213	Electronic engineering devices and circuits	10
CTL1101	Conflict Transformation and Leadership	10
TEE1231	Software engineering	10
TEE1202	Electronic engineering workshop	5
TEE1214	Digital electronics	10
TEE1232	CAD for electronic engineers	10
Total Credits Semester II		**65**

PART II (140 Credits)
Semester I

Module Code	Module Description	Credits
SMA2116	Engineering Mathematics 2	10
TEE2104	Laboratory I	5
TEE2106	Design and project I	5
TEE2142	Electrical machines	10
TEE2151	Network theory	10
TEE2115	Analogue electronics 1	10
TEE2113	Digital devices and systems	10
TEE2141	Electrical measurements	10

Think in other terms

Total Credits Semester I   **70**

Semester II

SMA2217	Engineering Mathematics 3	10
TEE2204	Laboratory II	5
TEE2206	Design and project II	5
TEE2212	Electronic drives	10
TEE2255	The professional engineer	10
TEE2233	Object oriented programming	10
TEE2256	Electromagnetic theory	10
TEE2215	Analogue electronics 2	10
Total Credits Semester II		**70**

PART III (130 Credits)
Semester I

Module Code	Module Description	Credits
SMA3116	Engineering Mathematics 4	10
TEE3104	Laboratory III	5
TEE3106	Design and project III	5
TEE 3151	Digital signal processing	10
TEE3113	Linear integrated circuits	10
TEE3122	Communication engineering 1	10
TEE3133	Software engineering applications	10
TEE3112	Microprocessors	10
Total Credits Semester I		**70**

Semester II

TEE 3241	Control engineering	10
TEE 3204	Laboratory IV	5
TEE 3206	Design and project IV	5
TEE 3232	Embedded computer systems	10
TEE 3231	Computer architecture and Operating systems	10
TEE 3222	Communication engineering 2	10
TEE 3255	Engineering management	10

Total Credits Semester III   **60**

PART IV (120 Credits)
Semester I & II

Module Code	Module Description	Credits

Think in other terms

TEE 4000	Industrial Attachment	120

PART V (120 Credits)
Semester I

Module Code	Module Description	Credits
TEE 5003	Honours project	50
TEE 5155	Project Management	10
TEE 5122	Communication systems performance	10
TEE 5142	Modern control engineering	10
Total Credits Semester I		**80**

Semester II

TEE 5223	Mobile communication	10
TEE 5233	High speed networks	10

Elective Modules Select II

TEE 5222	RF and microwave devices and circuits	10
TEE 5234	Advanced Software Engineering	10
TEE 5241	Industrial control	10
TEE 5221	Communication systems	10
TEE5211	Integrated circuits technologies	10
TEE 5212	Power electronics applications	10
Total Credits Semester II		**40**
TOTAL CREDITS FOR THE DEGREE		**635**

Think in other terms

MODULE SYNOPSES

PART I

SMA1116 Engineering Mathematics 1A   **10 Credits**

The module explores calculus in one variable; Limits and continuity of functions; Differentiation; Leibniz's Rule; L'Hopitals Rule; Elementary functions including hyperbolic functions and their inverses; Integration – techniques including reduction formulae; Applications – arc-length, area, volumes, moments of inertia, centroids; Plane polar coordinates; Complex Numbers: Basic algebra; De Moivre's theorem; Complex exponentials; Linear Algebra: Vector algebra in 2 and 3 dimensions; Scalar and vector products; Equations of lines and planes.

TIE1101 Engineering Drawing   **10 Credits**

The module has an introduction to plane geometry; First and third angle projection; Dimensioning; Pictorial views; Freehand sketching; Drawing of common objects; sectioning; Intersections, Developments; Conventioning; Assembly Drawing and exercises.

TCE1103 Professional Engineering Skills 1   **5 Credits**

The module examines study methods; Communication principles; Technical definitions, Descriptions and instructions; Tables and graphs; Letters; Memoranda and Curricula Vitae; Written reports; Word processing and computer jargon; Interview technique; Running a meeting; Reading as well as understanding and summarizing technical articles.

TEE1102 Electrical Engineering Workshop   **5 Credits**

The module looks at safety regulations; Standard electrical and electronic symbols and circuit diagrams; Use of Electronic equipment: Oscilloscopes, Signal Generators, Multi-meters, Electronic Kits; Soldering/unsoldering techniques Basic Circuit Development and PCB fabrication; Breadboard and veroboard.

TEE1143 Electrical Engineering Circuit Analysis   **10 Credits**

The module focuses on the general concepts of current, voltage and resistance; DC and ac circuits; Kirchoff's Laws; Loop and nodal analysis of circuits (dc and ac); Delta-Wye conversions (dc and ac); Network Theorems (dc and ac); Capacitance; Inductance; Transient analysis of capacitive and inductive networks (for dc sources); Magnetism and introduction to magnetic circuits; Steady state response of capacitors and inductors to ac; AC power and an introduction to three phase AC systems.

TEE1154 Physics For Electronic Engineers   **10 Credits**

The module looks at atomic arrangements, unit cell, crystal systems; Intrinsic and Extrinsic semiconductors; Contact phenomenon: P-N junction; Applied mechanics; Statics: scalar and vector quantities, equilibrium, solution of pin jointed frames, stress and strain, pure bending theory, and pure torsion theory; Dynamics: kinematics, types and equations of motion, work done by a constant and a varying force, circular motion, rotational work, power and energy.

SMA1216 Engineering Mathematics 1B   **10 Credits**

The module explores the functions of Several variables: Partial derivatives, chain rules; Applications; Linear Algebra: Matrices – basic operations, rank, inverses; Systems of linear equations; Determinants; Eigen values and Eigen vectors; Linear independence; Ordinary Differential Equations; First order differential equations; Integrating factors; Linear second order equations with constant coefficients; Variation of Parameters; Systems of equations and applications of differential equations.

Think in other terms

CTL1101 Conflict Transformation And Leadership   **10 Credits**

The module is tailored in a manner to provide students with intellectual skills on the symbiotic relationship that exist on the three tier terms (peace, leadership and conflict). The module attempts to probe into the interplay between these thematic motifs and show their role and complementarities in the process of human development. The module further seeks to provide a skills tool kit on how to analyse conflicts, identify their underlying causes, evaluate how conflict undermines the productive use of resources thereby plaguing development and how responsible leadership transforms adversity into peaceful, equitable and just global society in harmony with nature. It is envisaged that the students who would successfully completed the module shall be well grounded in the theory and practice to face the challenges of leadership and conflict at personal, community, national and global levels. The students would be able to trace the emerging patterns and conflict trends in Africa shall form the basis of reflection.

TEE1213 Electronic Engineering Devices and Circuits   **10 Credits**

The module outlines rectifying and Zener diodes: structure, operation, characteristics and parameters; Diode applications: rectifiers and power supplies; clippers and clamps; Schottky diode; Transistors; Bipolar Junction Transistors (BJTs): structure, terminals and operation; BJT configurations, static characteristics and parameters; biasing methods; d;c; circuit analysis and design; Darlington pair; BJT packages and data sheet; Field Effect Transistors (FETs): types, structure, terminals and operation; Configurations and static characteristics; d;c; circuit analysis; Power devices and heat sinks; Opto-electronic and photo- electronic devices: Light-Emitting Diodes (LEDs), infra-red diodes, 7-segment displays, Liquid Crystal Displays (LCDs), photodiode and phototransistor; Applications; Thermistors: structure, types, operation and applications.

Think in other terms

TEE1232 CAD for Electronic Engineers   10 Credits

The module focuses on graphical techniques for drawing circuit diagrams, logic circuits, flowcharts; Concepts of engineering drawings; Presentation of graphs; Design of artwork for printed circuit boards; Use of pictures and cartoons and use of CIRCUIT MAKER PRO program for graphical design.

TEE1231 Software Engineering   10 Credits

The module has software development life cycle; Requirements, specification, design implementation and testing, coding, maintenance; Function-oriented design methodologies; Documentation; Implementation strategies; Debugging, anti-bugging; Introduction to specifications, verification and validation; Elementary proof of correctness; Code and design reading; Structured walkthroughs; Testing strategies; Software reliability issues; Configuration Management; CASE tools; Programming languages; Compilers; The DotNet framework and programming in C.

TEE1202 Electronic Engineering Workshop   5 Credits

The module examines measuring current-voltage characteristics for rectifying, Zener, light-emitting diode opto-electronic devices and thermistors; Diode rectifiers, clippers and clamps; Bipolar Junction Transistor (BJT) static characteristics in Common-Emitter, Common-Base and Common-Collector configuration; DC biasing methods and Darlington pair.

TEE1214 Digital Electronics   10 Credits

This module looks at numerical systems: Binary, Octal, Hexadecimal; System conversions; Mathematical operations in straight and BCD code; Logic gates; Truth tables, Boolean algebra theorems and K-maps; Minimization of logic expressions; Combinational logic applications and design: arithmetic circuits, encoders and decoders, code converters, multiplexers and de-multiplexers as well as Flip-Flops.

Think in other terms

PART II

SMA2116 Engineering Mathematics II   **10 Credits**

This module explores multiple Integrals; Iterated integrals, change of order; Change of variable; Polar, cylindrical and spherical coordinates; Applications in three dimensions; Vector Calculus; Scalar and vector fields; Directional derivatives; Gradient, divergence and curl; Line and surface integrals; Theorems of Green, Gauss and Stokes; Fourier Analysis; Fourier Series; Half range series; Fourier integrals and transformations.

TEE2142 Electrical Machines   **10 Credits**

This module covers fields and magnetic circuits; Energy conversion phenomena; Three-phase theory; Transformers: principles, operation and construction; Special transformers; Principles, classification, characteristics and construction of synchronous, induction and dc machines; Single phase induction motors and steady- state transient behaviour of machines.

TEE2104 Laboratory   **5 Credits**

This consists of a number of experiments carried out in the laboratories to support the lecture materials of the semester.

TEE2106 Design And Project   **5 Credits**

The module explores the design of a circuit/system related to the current theoretical subjects; Literature review on a given topic, design, computer simulating and practical test as well as writing a technical report.

TEE2151 Network Theory   **10 Credits**

The module explores DC circuits analysis; First order circuits: The source free RC and RL circuits, step response of RC and RL circuits; Second order circuits: The source free series and parallel RLC circuits, step response of a series and parallel RLC circuit; AC circuits analysis: Kirchhoff's law in the frequency domain; Sinusoidal steady analysis; Frequency response; Series and parallel resonance; Filters; Transfer functions; Advanced circuit analysis: Applications of Laplace Transform, Fourier series and Fourier Transform to circuit analysis; Two-port networks: Impedance parameters, admittance parameters, hybrid parameters, transmission parameters, relationship between parameters and interconnection of networks.

TEE2113 Digital Devices and Systems   **10 Credits**

The module focuses on Flip-Flops review; Master-slave Flip-Flops; Shift registers; Counters: asynchronous, with mod numbers < 2N, synchronous, down counters, up/down counters, integrated circuits counters; Registers; Memory devices: magnetic memories, semiconductor memories: ROM, static and dynamic RAM and applications.

TEE2115 Analogue Electronics I   **10 Credits**

The module explores Bipolar Junction Transistor (BJT) h-parameters and equivalent circuits; Single stage small-signal amplifiers analysis: Common Emitter (CE), Common Base (CB), Common Collector (CC); Multistage amplifiers; Coupling methods, frequency response, analysis and design; Differential amplifier, Darlington pair; Negative feedback amplifiers; Large signal amplifiers: class A, class B and class C; Circuits analysis and design.

Think in other terms

TEE2141 Electrical Measurements   **10 Credits**

The module looks at basic electrical measuring devices, ammeters, voltmeters; Measurement of non-electrical parameters; Transducers and their operating principles; Signal conditioning; Oscilloscopes as measurement instruments; Recording measurement devices; Electronic measuring instruments, digital voltmeters, multimeters and measurement of AC power.

SMA2217 Engineering Mathematics III   **10 Credits**

The module explores Laplace Transforms; Definitions; Basic ideas; Applications to ordinary differential equations; Statistics; An introduction to Applied Statistics; Introduction to probability and distribution theory; Descriptive statistics/initial data exploration; Summary statistics, graphical presentation data; Point estimation/test of hypothesis; Interval Estimation; Analysis of Variance and Regression analysis.

TEE2212 Electronic Drives   **10 Credits**

This module looks at power electronic devices: characteristics, drive requirements and device protection; Converters: DC- DC, DC-AC, AC-AC, AC-DC, and control techniques; Power and distortion factor; Special transformers; Application of AC and DC motors; Special motors; Motor control: variable speed drives, regenerative braking, slip energy recovery, four- quadrant operation; Selection and sizing of motor- drive systems and transducers for power electronics applications.

TEE2204 Laboratory   **5 Credits**

This consists of a number of experiments carried out in the laboratories to support the lecture materials of the semester.

Think in other terms

TEE2255 The Professional Engineer   **10 Credits**

The module examines research techniques, project proposals, technical report writing and bibliography; General research survey on technological developments; Brief history of engineering; Engineering boards and ethics.

TEE2206 Design and Project   **5 Credits**

The module outlines the Design of a circuit/system related to the current theoretical subjects; Literature review on a given topic, design, computer simulating and practical test and writing a technical report.

TEE2233 Object Oriented Programming   **10 Credits**

The module explores process-oriented software development: functions, pointers and arrays; Process-oriented analysis, design and implementation, and testing using C++; Data-oriented software development: structures, dynamic memory allocation, file handling, and relational database; Object-oriented software development: encapsulation, polymorphism and inheritance; Object-oriented analysis, design and implementation using C++ classes and objects and structures.

TEE2256 Electromagnetic Theory   **10 Credits**

The module covers Maxwell's equations; Laplace and Poisson equations and their solution; Boundary conditions; Plane waves in a perfect dielectric; propagation in imperfect dielectric; Propagation in imperfect conductors, skin effect; Generalized wave equation, field distributions in rectangular waveguide; Radiation field, dipoles, radiation resistance, impedance, mutual impedance and linear arrays.

Think in other terms

TEE2215 Analogue Electronics II   **10 Credits**

The module covers FETs circuits; Optoelectronic devices and thermistor circuits; Positive feedback; Oscillators and Multivibrators; Sine-wave oscillators- Wien-bridge and R-C-shift types; Astable, Mono-stable and Bi- stable multivibrators; RF and crystal oscillators; Voltage regulators and Linear ICs basic building blocks.

PART III

SMA3116 Engineering Mathematics IV   **10 Credits**

The module focuses on differential Equations; Power series solutions; Singular points; Frobenius method; Special functions and their properties; Legendre polynomials, Bessel functions; Partial Differential Equations; Solution of the partial differential equations; Method of separation of variables; Numerical Methods; Errors, absolute and relative; The solution of nonlinear equations; The solution of linear systems; Interpolation and polynomial approximation; Curve fitting; Numerical differentiation and integration and approximate solution of differential equations.

TEE3151 Digital Signal Processing   **10 Credits**

The module has an analysis of continuous and discrete signals and systems; Fourier series and transforms; Laplace transforms, Z transforms, transfer functions, analysis of stability, probabilistic convolution, impulse response and transfer functions.

TEE3113 Linear Integrated Circuits   **10 Credits**

The module covers operational amplifier circuits: comparators, inverting and non-inverting amplifiers, mathematical operations, oscillators and multivibrators, active filters; Voltage regulators; Timer ICs and their applications; Instrumentation amplifiers; Analogue-to-Digital converters and Digital-to-Analogue converters.

TEE3122 Communication Engineering I   **10 Credits**

The module gives an introduction to communication systems; Telecommunication signals; Analogue cellular systems; Amplitude modulation; Angle modulation; Multiplexing methods and noise in communication systems.

TEE3133 Software Engineering Applications   **10 Credits**

The module looks at databases; Data-oriented software development and implementation using SQL; Web development and Java programming.

TEE3112 Microprocessors   **10 Credits**

The module looks at Basic concepts of microprocessors; Architecture and Operation; Instruction sets and assembly language programming; Subroutine, interrupts, I/O and applications of microprocessors.

TEE3241 Control Engineering   **10 Credits**

The module explores examples of controlled processes, objectives and terminology, open and closed-loop controllers; Modeling by transfer functions; Simple servomechanisms; derivation of transfer functions from specifications; Time and frequency–response specifications; Direct analysis and design; stability, Routh criterion; The ITAE and other performance criteria; Examples of servo design; Frequency- response analysis and design; Root-locus methods; system analysis and design.

TEE3232 Embedded Computer Systems   **10 Credits**

The module explores applications of embedded systems; Microcontrollers: memory maps, programming languages, I/O, timers, interrupts, hardware interfacing; Picocontrollers: memory maps, SFRs, stacks, programming languages, oscillator types, configuration fuses, watchdog timers and code protection.

TEE3204 Laboratory   **5 Credits**

This consists of a number of experiments carried out in the laboratories to support the lecture materials of the semester.

TEE3222 Communication Engineering II   **10 Credits**

The module is an introduction to digital communication systems; Digital modulation and demodulation; Digital transmission and multiplexing and digital cellular systems.

TEE3206 Design And Project   **5 Credits**

The module explores the design of a circuit/system related to the current theoretical subjects; Literature review on a given topic, design, computer simulating and practical test and writing a technical report.

Think in other terms

TEE3231 Computer Architecture And Operating Systems   **10 Credits**

The module examines evolution of computers hardware for Von Neumann machines; Operating systems for single tasking; Process scheduling for concurrent operation; Inter-process communication; Deadlock avoidance; Memory management; Virtual memory; Architectures for parallel processing and computer networking;

TEE3255 Engineering Management   **10 Credits**

This module is based on "Management by Engineers" by D; Johnson through group discussion and talks by external speakers. Hence it is centred on industrial organizations; reviews and performance measures, planning and managing change, development and motivating groups, leaderships and communication; financial management; business environment; companies and basic accounts.

PART IV

TEE4000 Industrial Attachment   **120 Credits**

The module offers familiarization with actual plant organization and operations, training in practical engineering work for graduate engineers, exposure to as many of the following as possible; industrial management, plant maintenance, design and development, service/field engineering; working with planning, manufacturing, production and marketing departments as well as industrial research.

Think in other terms

PART V

TEE5003 Honours Project   50 Credits
The module goes through the selection of a problem, research, planning of possible solutions, selection of an optimal solution, acquisition of components, testing, construction of a prototype and writing of the final report.

TEE5122 Communication Systems Performance   10 Credits
The module explores the concept of noise characterization and receiver performance; Overview of contemporary communication systems link budget; Random processes and spectral analysis: linear systems; the Gaussian random process; error probabilities for binary signalling and performance of baseband binary systems detection of band-pass binary signals.

TEE5142 Modern Control Engineering   10 Credits
The module looks at State Space Analysis: State-space methods of analysis and design; Observability and controllability; Pole placement for the optimization response; State observers and pole placement design with state observers; Multi-input, multi-output systems and cross-coupling problems; Digital Control: Digital time control systems; Modeling of Sampled Processes; Transient response; Steady state response; Stability; Design of Digital Controllers and Root Locus.

TEE5155 Project Management   10 Credits
The module is on project proposal writing- types of proposals; Project definition, life cycle, and systems approach; Project scoping, work definition, and work breakdown structure (WBS); Project time estimation and scheduling using GANTT, PERT and CPM; Project costing, budgeting, and financial appraisal; Project control and management, using standard tools of cost and schedule variance analysis; project management use-case through practical, example projects; use of computers in project management, some software tools for PM e;g; MS Project and PM techniques e;g; PRINCE2.

Think in other terms

TEE5223 Mobile Communication Systems   **10 Credits**

The module has an introduction to mobile communications; Global System for Mobile communications (GSM); Long term Evolution (LTE); IEEE 802;16 and WIMAX.

TEE5233 High Speed Networks   **10 Credits**

The module gives a comprehensive view of high-speed LAN, MAN, and ATM technologies and standards and evolution towards broadband integrated services digital network (B-ISDN).

ELECTIVEAL MODULES

TEE5222 RF And Microwave Devices and Circuits   **10 Credits**

The module looks at oscillators: Magnetrons, Gunn and Impatt diodes, Other group III-V semiconductor devices; Amplifiers: Bipolar Junction Transistors and GaAs; FET amplifiers, low noise broadband and power amplifier design; Mixers: the mixing process, noise and noise figure measurement, single ended, single balanced and double balanced mixers; Control Devices: P;I;N; diode modulators, switches and phase shifters.

TEE5241 Industrial Control   **10 Credits**

The module focuses on industrial control situations, process control; instrumentation, actuators, transducers and controllers; hybrid systems; time-domain analysis, state-space analysis, stability; computer control; system characterization, algorithm design, feedback control for digital systems and PLC applications.

TEE5234 Advanced Software Engineering   **10 Credits**

The module explores Software Measurement & Testing; Software Design & Architecture, Computational Models: UML and MVC modeling, Access Control & Privacy Policies, Agents & Multi-Agent Systems, Data Structures and their Implementation in C++ or Java, Database Technology, Parallel & Distributed Systems and Software Engineering of Internet Applications.

Think in other terms

TEE5221 Communication Systems 10 Credits

The module examines optical fibre systems, sources, transmission and system characteristics; digital systems, signal processing, data transmission, switching, satellite communications and television systems.

TEE5211 Integrated Circuits Technologies 10 Credits

The module explores Microelectronics procedures for Si and GaAs; Logic families: TTL, ECL, I2L, MOSFET, CMOS and PMOS; Introduction to FPGAs and Nano-electronics concepts.

TEE5212 Power Electronics Applications 10 Credits

The module gives a review of power electronic devices: ratings, performance and applications; Switch mode DC-DC and DC-AC converters; Control techniques: square wave and PWM outputs; Implementation: hardware, software, implementation problems; Harmonics and interference: EMI reduction, regulation, regulations, filtering; Resonant-mode converters: zero-current and zero-voltage; Switch mode and interruptible power supplies; Static var; compensators, HVDC transmission; Special transformers for switched power applications; Variable speed drivers, control schemes and performance.

Total Credits for the Undergraduate Programme

Part I	125 credits
Part II	140 credits
Part III	130 credits
Part IV	120 credits
Part V	120 credits
Total	**635 credits**

Think in other terms

REGULATIONS FOR THE POST-GRADUATE DIPLOMA IN ELECTRONIC ENGINEERING WITH A MAJOR IN:

i.Communication Systems,
ii.Computer-Based Systems,
iii.Control Systems and Instrumentation,
iv.Electronic Systems

1.0 PREAMBLE
1.1   The Senate shall be the final authority for the interpretation of regulations.
1.2   The Senate reserves the right to alter, amend, cancel, suspend or replace any of the regulations.
1.3   A student who has started a Programme of study following one set of regulations shall not be affected by regulations subsequently adopted unless agreed to in writing by the student.

2.0 ENTRY REQUIREMENTS
2.1   A good first degree in Electronic Engineering or related field plus appropriate experience.
2.2   Fluency in English and at least one other language for the exchange of knowledge in the African environment. The Faculty of Arts, Education and Social Studies could have Continuing Education Programmes to assist those with a language deficiency.

3.0 DURATION OF PROGRAMME
The programme consisting of module work shall last one academic year or two semesters on a full-time basis and up to two academic years or four semesters on a part-time basis.

4.0 STRUCTURE OF PROGRAMME
4.1   The programme shall consist of eight (8) to ten (10) modules distributed over two semesters and with a concentration in either (a) Electronic Systems,
     (b) Communication Systems (c) Computer-based Systems, or
     (d) Control Systems and Instrumentation.

   4.2   Normally five (5) modules in each research area shall be on offer per semester starting in the first semester of the post-graduate academic year.

Think in other terms

5.0   EXAMINATIONS

5.1 Formal Examinations will take place at the end of each semester.5.2   Examinations will be subject to external assessment.

5.3 The student shall be required to take formal examinations in the taught modules, to submit a written dissertation and to attend an oral examination.

6.0   MARKING SCHEME

Modules shall be assessed as follows: 75% from formal examination and 25% from continuous assessment.

7.0   AWARD OF THE DIPLOMA

In order to be awarded the diploma, a candidate shall be required to pass eight of the modules taken in the programme including the design project, provided the student may not drop more than two modules with a failing grade.

8.0   DIPLOMA CLASSIFICATION

The following classification shall be used for the diploma:

80% and above	-	DISTINCTION
70%-79%	-	MERIT
60% - 69%	-	CREDIT
50 - 59%	-	PASS
Below 50%	-	FAIL

9.0   SYLLABI

Details of each module shall be maintained in accordance with the provisions of the General Academic Regulations for Higher Degrees.

10.0   PROGRAMME

Communication Systems

Semester I

Module Code	Module Description	Credits
TEE6121	Fundamentals of Communication	

	Engineering I
TEE6122	Communication System Error Control Coding
TEE6123	Theory of Noise Generation and Measurement
TEE6124	Analysis, Simulation and Design in Electronic Engineering

(Cross-listed with SCS 6106)

TEE 6125	Linear and Non-linear Systems Theory

Semester II

TEE6221	Fundamentals of Communication Engineering II
TEE6222	Signal Detection Principles
TEE6223	Wireless Communication Systems

TWO ELECTIVES
 from among:

TEE6225	Communication Circuit Design
SCS6105	Digital Signal Processing
SCS6102	Information Systems for Management and

Business

SCS6106	Computer-Aided Design and Engineering
TEE6201	Engineering Project Management

11.0 TRANSFERS BETWEEN DIPLOMA IN ELECTRONIC ENGINEERING AND MASTER OF ENGINEERING (ELECTRONIC ENGINEERING) DEGREE PROGRAMMES

11.1   A registered student in the second semester of the diploma programme may apply, on the recommendation of the Departmental Panel of Examiners,   for transfer of credit and proceed to the Master of Engineering (Electronic Engineering) Degree.

11.2   A registered student in the second semester of the Masters' programme who wishes instead to proceed to the Diploma in Electronic Engineering may apply, on the

Think in other terms

recommendation of the Supervisory Committee, for transfer of credit and proceed to the Diploma.

REGULATIONS FOR THE MASTER OF ELECTRONIC ENGINEERING DEGREE

1.0   ENTRY REQUIREMENTS
A good Honours degree (First or upper second class) in Electronic Engineering or equivalent.

2.0   DURATION OF PROGRAMME
The programme shall last one-and-a half academic years or three semesters on a full- time basis. It is recommended that the first two semesters be devoted to the module work while the third semester is devoted to the preparation of a dissertation.

3.0   STRUCTURE OF THE PROGRAMME
The programme shall consist of module work (Part I) lasting two semesters full-time and a Masters' thesis (Part II) lasting at least six months full-time.

4.0   DEGREE CLASSIFICATION
The following degree classification shall be used for the Programme:

80% and above	-	DISTINCTION
70% - 79%	-	MERIT
60% - 69%	-	CREDIT
50% - 59%	-	PASS
Below 50%	-	FAIL

MODULE SYNOPSES

TEE 6122 Communication System Error Control
The module has an introduction; Coding error detection/correction codes, both block and convolutional and survey of error-control strategies used in storage and transmission channels.

TEE 6123 Theory of Noise Generation and Measurement
The module looks at noise representation by statistical parameters, noise generators in measurements and application to communication systems.

TEE6124 Analysis, Simulation and Design In Electronic Engineering
The module explores the implementation of computer-aided and numerical methods of solving problems in electronic engineering.

TEE 6125 Linear and Non-Linear Systems Theory
The module focuses on state-space description and analysis of both continuous and discrete-time dynamic systems and optimisation.

TEE6221 Fundamentals of Communication Engineering II
The module explores statistical analysis of large-scale communication systems subject to noise and multipath fading.

TEE 6222 Signal Detection Principles
The module examines optimum signal detection reception over linear average white Gaussian noise channels; fourier series representation of random signals and derivation of minimum mean square error (MMSE) receivers.

TEE 6223 Mobile and Personal Communication Systems
The module gives a design and performance analysis of wireless communication systems: advanced modulation techniques, optimum receiver design, dispersive channels multipath propagation, multi-signal interference and error control.

Think in other terms

TEE 6225 Communication Circuit Design

The module focuses on design and performance testing of low-noise amplifiers, oscillators and filters.

TEE 6226 Digital Signal Processing

The module looks at differential equation characterisation of digital filters, transform analysis, spectral analysis, design and implementation of filters, practicals on aliasing, digitalisation and applications.

SCS 6103 Computer Communication and Networks

See the Faculty of Applied Science, Department of Computer Science Listing.

SCS 6106 Simulation and Modelling

See the Faculty of Applied Science, Department of Computer Science Listing.

TEE 6201 Engineering Project Management

The module looks at the entrepreneur, project planning, implementation and review, decision making factors, problem formulation and solution using optimisation theory, finite mathematics, and statistical techniques.

TEE 7129 Master's Thesis

The topic selected with the approval of the supervisor and the chairman of the department.

Think in other terms

REGULATIONS FOR THE MASTER OF PHILOSOPHY DEGREE

1.0 PREAMBLE

1.1 The Senate shall be the final authority for the interpretation of regulations.

1.2 The Senate reserves the right to alter, amend, cancel, suspend or replace any of the regulations.

1.3 A student who has started a Programme of study following one set of regulations shall not be affected by regulations subsequently adopted unless agreed to in writing by the student.

2.0 ENTRY REQUIREMENTS

2.1 A good Honours degree (in the First or Upper Second Class) in Electronic Engineering or equivalent.

2.2 Fluency in English and at least one other language for the exchange of knowledge.

3.0 DURATION OF PROGRAMME

3.1 The programme shall last one and a half (18 months) to three (3) years on a full-time basis or three (3) to five (5) years on a part-time basis.

3.2 During this time, the Masters' degree student shall be free to sit in on modules offered in the chosen area of concentration.

4.0 STRUCTURE OF THE PROGRAMME

4.1 The programme shall consist of Parts I, II and III.

4.2 Part I is the preliminary stage during which the student studies scientific research methods, conducts literature searches and prepares a preliminary proposal. The stage may last from three (3) to six (6) months in a full-time programme.

4.3 Part II is the research stage during which the focus on the limited topic becomes swiftly narrow and specific. In a full-time programme, the research stage may last six (6) to twenty-four (24) months.

4.4 Part III is the candidacy stage which may last up to nine (9) months in a full-time programme.

4.5 The programme of study may begin any time the University is open.

5.0   ASSESSMENT

5.1 The student will be expected to actively participate in weekly research seminars in which staff and students take turns presenting current topics in research.   The quality of the reports and their oral presentations will be monitored by the supervisor.

5.2 The student will be expected to publish at least one (1) paper in a conference, symposium or an international journal as a contribution to knowledge.

5.3 The student will be expected to participate in at least one workshop on a significant problem.

5.4 In order to proceed into Part III of the programme, the student will be expected to present a draft dissertation of sufficient merit to satisfy the supervisor or Supervisory Committee.

5.5 A prospective degree candidate who fails to meet the conditions set out above shall be permitted to re-submit the draft dissertation only one more time.

6.0   MARKING SCHEME

6.1   Performance in seminars, workshops and publications, rate of growth in scholarly research and any modules taken for credit as part of the approved programme shall be a pre-requisite for admission to candidancy for the degree.

6.2   The dissertation and its oral defence shall determine the success or failure of the candidate, and shall be assessed as follows:

20%   for originality, independence and creativity
50%   for quality and analysis of design
 15%   for general understanding of field
10%   for application of theory
5%   for clarity of the document.

7.0   WEIGHTING OF EXAMINATIONS AND AWARD OF THE DEGREE

7.1   The Master's dissertation and its oral defence shall be the sole required criteria for success or failure of the candidate.

7.2   In order to be awarded the degree, a candidate shall be required to have satisfactorily conformed to the general regulations of the University on the submission of a thesis for a Master of Philosophy Degree.

8.0   DEGREE CLASSIFICATION
The Master of Philosophy Degree shall not be classified.

Think in other terms

9.0   FORMAT,   SUBMISSION AND DISTRIBUTION OF DISSERTATION

9.1   A candidate shall be required to submit, for examination, four typed (double-spaced) copies of his dissertation in loose-bound form within a suitable cover in the following format:

Size of Paper: International A4 (210 x 297)

Size of Drawings or Maps: No restriction is placed on the size of draw-or maps.

Margins: There must be a margin of 40 mm on the left hand side, of 10 on the right hand side, and margins of 20 mm at the top and bottom of the page.

9.2   After the dissertation has been approved by the Panel of Examiners, the candidate shall submit at least three copies bound in accordance with the

following specifications:-

Art vellum or cloth; overcast; edges uncut; lettered boldly on the spine gold letters indicating DEGREE, DATE, NAME (Letters should be 5 mm and 10 mm in size)

9.3   A candidate shall be required to lodge with the Chairman of Department at least three bound copies of the approved dissertation. One bound copy will be retained by the relevant Department and two bound copies will be deposited in the University Library. Library copies shall be open reference.

10.0   SYLLABI

Details of each module shall be maintained in accordance with the provisions of General Regulations for Higher Degrees.

11.0   PROGRAMME   IN   COMMUNICATION   SYSTEMS

Prospective candidates will propose, in consultation with the supervisor, a programme of study deemed necessary to facilitate the successful completion of the chosen research project. The programme will be submitted first to the Chairperson of the Department and for his approval and then filed with the faculty Higher Degrees Committee. The programme shall include the following compulsory components:-

Think in other terms

PROGRAMME SUMMARY

PART I: Preliminary Stage

Module Code   **Module Description**
TEE 7001   Scientific Research Methods
TEE 7002   Research   Seminar I
TEE 7021   Research   In Communication Systems I

PART II: Research Stage

TEE 8021   Research Seminar II
TEE 8022   Research in Communication Systems II

PART III: Candidacy Stage

TEE 8029   Master of Philosophy's Dissertation Pursuit and refinement of topic selected in Part I Variable Credit, continuous registration.

Think in other terms

REGULATIONS FOR THE DOCTOR OF PHILOSOPHY DEGREE (UNDESIGNATED)

1.0   PREAMBLE

1.1 The Senate shall be the final authority for the interpretation of regulations.

1.2 The Senate reserves the right to alter, amend, cancel, suspend or replace any of the regulations.

1.3 A student who has started a Programme of study following one set of regulations shall not be affected by regulations subsequently adopted unless agreed to in writing by the student.

2.0.   ENTRY REQUIREMENTS

2.1 A Master of Science (Electronic Engineering) with a MERIT or DISTINCTION classification, or equivalent. A lower level pass in a Master's programme might be considered if supported by evidence of scholarly post- qualification activities deemed sufficient by the Departmental   Board   and approved by the Faculty Higher Degrees Committee

2.2 A good command of English.

2.3 At least one year of post-baccalaureate practical experience has to have been gained under the supervision of a degreed electronic engineer.

3.0   DURATION OF PROGRAMME

3.1 The Programme shall last three (3) to five (5) years on a full time basis or five

(5) to eight (8) on a part-time basis.

3.2 During this time the doctoral student shall be free to sit in on modules that may enhance his/her competence to conduct research in the chosen area of concentration.

4.0   STRUCTURE OF THE PROGRAMME

4.1 The Programme shall consist of Part I, II and III.

4.2 Part I is the preliminary stage during which the student studies scientific research methods, conducts literature searches and prepares a preliminary proposal. The stage may last from three (3) to nine (9) months in a full-time programme.

4.3 Part II is the research stage during which the focus on the topic becomes increasingly narrow, detailed and specific. In a full-time programme the research stage may last from 20 to 45 months.

4.4 Part III is the degree candidacy stage which may last from 7 to 12 months in a full-time programme.

5.0   ASSESSMENT

5.1 The student will be expected to actively participate in weekly research seminars in which staff and students take turns presenting current topics in research. The quality of the reports and their oral presentations will be monitored by the supervisor or an alternate designated by him/her.

5.2 The student will be expected in addition to present research results in symposia and conferences of international standard at least once during the period of registration for the degree.

5.3 The student will be expected to publish at least three (3) papers in international journals if his/her programme is intended as a contribution to the advancement of knowledge.

5.4 A practically oriented student will be expected to organise and manage either a week-long (5-working days) workshop on a novel approach to solving a problem (or carrying out a task), or an equivalent number of small workshops on significant problems.

5.5 In order to proceed into Part III of the programme, the student will be expected to present a draft dissertation of sufficient merit to satisfy the Supervisory Committee.

5.6 A prospective degree candidate who fails to meet the conditions set out in

5.5 Above shall be permitted to re-submit the draft dissertation only one more time unless if he/she elects to transfer into the Master of philosophy programme instead.

6.0   MARKING SCHEME

6.1 Performance in seminars, rate of growth in mature scholarly research and any modules taken for credit as part of the approved programme shall be prerequisites from admission to candidacy for the degree.

6.2 The dissertation and its oral defence shall determine the success or failure of the candidate and shall be assessed as follows:

30%   for originality, independence and substantial contribution
25%   for quality of analysis and design
20%   for depth of understanding of the field and its paradigms
15%   for pragmatic insight
10%   for clarity of thesis statement and supporting argument

7.0   WEIGHTING OF EXAMINATIONS AND AWARD OF THE DEGREE

7.1 The doctoral thesis and its oral defence shall constitute the sole criteria for success or failure of the candidate.

7.2 In order to be awarded the degree, a candidate shall be required to have satisfactorily conformed to the general regulations of the University on the submission of a thesis for a Doctor of Philosophy Degree.

8.0   DEGREE   CLASSIFICATION

The Doctor of Philosophy Degree shall not be classified.

Think in other terms

9.0 FORMAT, SUBMISSION AND DISTRIBUTION OF DISSERTATIONS

9.1 A candidate shall be required to submit, for examination, at least five typed (double-spaced) copies of his/her dissertation in loose-bound form within a suitable cover in the following format:

Size of Paper: International A4 (210 x 297)
Size of Drawings or Maps: No restriction is placed on the size of drawings or maps.

Margins: There must be a margin of 40 mm on the left hand side, of 10mmon the right hand side, and margins of 20 mm at the top and bottom of the page9.2 After the dissertation has been approved by the Panel of Examiners, the candidate shall submit at least three copies bound in accordance with the following specifications:-
Art vellum or cloth; overcast; edges uncut; lettered boldly on the spine in bold letters indicating DEGREE, DATE, NAME (Letters should be between 5 mm and 10 mm in size).
9.3 A candidate shall be required to lodge with the Chairperson of the Department at least three bound copies of the approved dissertation. One bound copy will be retained by the relevant Department and two bound copies will be deposited in the University Library. Unless Senate has agreed to the contrary, the Library copies shall be open to public reference and dissemination through University Microfiche International.

10.0 SYLLABI

Details of each module shall be maintained in accordance with the provisions of the
General Academic Regulations for Higher Degrees.

11.0 PROGRAMME AND MODULE SYNOPSIS

Prospective candidates will propose, in consultation with the supervisor, a programme of study deemed necessary to facilitate the successful completion of the chosen research project. The programme will be submitted first to the Chairperson of the Department for his approval and then filed with the Faculty Higher Degrees Committee. The programme shall include the following compulsory components:

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MODULE SYNOPSES

PART I
PRELIMINARY STAGE
TEE 7001 Scientific Research Methods

The module looks at the basic concepts, the research process, scientific writing for publication and project management. 3 Credits: 1 Lecture. 6 Practical.

TEE 7021 Research In Communication Systems I

The module explores the selection and development of current interest in the field in view of the needs of Zimbabwe and the Southern Africa Development Community mainly. 3 Credits: 9 hours Research Reports to supervisor. Co-requisite: TEE 7001Attendance at presentation and discussion of results by all researchers in the department.1 Credit for every 15 seminars attended plus report.

PART II: RESEARCH   STAGE

TEE 8021 Research Seminar   II
The module looks at presentation and discussion of research results by the student. Up to 3 Credits can be accumulated, 1 Credit per presentation. Pre-requisite: TEE 7002.

TEE 8022 Research in Communication Systems II
The module explores regular reports to the Supervisory Committee on progress towards the candidacy stage. Activities reported on must include participation in symposia and conferences, publications and workshops.
3 Credits for each accepted formal report. Pre-requisite: TEE 7021

TEE 9021 Doctor's Dissertation
Pursuit and refinement of topic selected in Part I. Variable Credit, continuous registration.

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DEPARTMENT OF FIBRE AND POLYMER MATERIALS ENGINEERING

Lecturer and Chairperson
Prof. Londiwe C. Nkiwane, MSc. Jassy Romania, MA Gothenburg Sweden, PhD Leeds, UK, PGDHE-NUST

Secretary
S. Ndlovu, HND Office Management, Bcom HR (LSU)

Senior lecturers
Dr A.B. Nyoni, MSc Leeds, PhD Leeds, A.T.I Textile Inst UK, OND, HND Textile Tech, Kaduna, Nigeria, Mzim. AIPMZ, AMS, PGDHE-NUST

Dr P. Gonde, BSc Comp. Science, MBA NUST Z'bwe, PGDHE-NUST, PhD NUST

Lecturers
M. Moyo, B.Textile Tech (Hons) NUST, MEng (Mfg Syt & Op Mgt) NUST, PGDHE-NUST, Cert in Textile Testing and Quality Control India, (on study leave)

L. K. Ncube, B.Textile Tech (Hons) NUST, MEng (Mfg Syt & Op Mgt) NUST, PGDHE-NUST, Cert in Textile Mill Management India,

S. R. Ncube, B Textile Tech (Hons) NUST, MEng Textile Engineering China, PGDHE-NUST

L. N. Ndlovu, B Textile Tech (Hons) NUST, MEng Textile Engineering China, PGDHE-NUST (on study leave)

P. Dzingai, B Textile Tech (Hons) NUST, Cert in Quality Assurance & Quality Control Speciss, MEng Textile Engineering China, PGDHE-NUST

N. R. Ndebele, B Textile Tech (Hons) NUST, MPhil NUST, PGDHE-NUST

N. Z. Nkomo, B Textile Tech (Hons) NUST, Cert in Textile Mill Management India, MEng Textile Engineering Kenya

BACHELOR OF ENGINEERING HONOURS DEGREE IN FIBRE AND POLYMER MATERIALS

1.0   PREAMBLE

The Williams Commission report of February 1989 recommended that within the Faculty of Industrial Technology, a department of Textile Technology should be established and the year 1999 saw the first intake of students. The Textile Technology curriculum focuses on spinning and its preparatory processes, weaving, knitting, nonwovens, garment manufacture, technical textiles, dyeing and finishing. Thus, the programme addresses the Textile and Apparel manufacturing industries. The nature of the Textile industry has been changing from the last century, as such the department's research and educational emphasis has been shifting from the production of fibres and fabrics to include the utilization of fibres, especially polymers, in engineered materials. The department has been conducting research in fibrous structural composites, geotextiles, nonwovens, paper manufacture, polymer materials, leather processes, filtration, enzyme treatments, biomedical materials, thermoplastic curing, recycling and utilisation of waste material. This shift to encompass engineered polymer materials is resulting in a need to create a programme to cater for this growth in development of new materials for various applications and also add to available knowledge of polymers and fibres expanding the boundaries of science into new and innovative directions. In light of these developments, the Department consulted its constituencies (students, alumni, current employers of our graduates, potential employers of our graduates, and graduate programs that attract our graduates) so as to draw up a programme that will be built on a solid fundamental understanding of polymers, their synthesis, structure, processing and properties, as well as the structure and properties of fibres and the materials and products manufactured from them.

The world is witnessing a materials revolution with the 20th century's greatest engineering achievements and advances in technology being developments made towards understanding and improving the structure, properties and performance of polymeric materials, as well as their environmental relationships. This increased use of fibres and polymers in all aspects of life, and the influx of materials industries that use fibres and polymers present a unique prospect to utilize such opportunity and invest in the education and research necessary to keep these industries growing.

We live in a world that is both dependent upon and limited by materials. Materials processing industries in the world need expertise in field of material science to Mann and monitor their various production facilities. In Zimbabwe there are a number of companies which deal with leather, plastics, rubber, fibre, yarn and fabric manufacture. However, these companies have expressed the need for experts in their respective fields. Therefore it is the aim of this programme to address these needs by providing graduates trained in the areas identified. Students from the Fibre and Polymer Materials Engineering programme will graduate with relevant expertise that they can offer not only in Zimbabwe but to the global community.

Think in other terms

This rapidly evolving area of science and technology requires professionals who can work at the interface between different disciplines to meet future global challenges. The Fibre and Polymer Materials Engineering programme has a thrust to contribute to the world in line with the Sustainable Development Goals (SDGs). With reference to Goal 12 of the SDGs, the programme seeks to provide training to develop skills to substantially reduce waste generation through prevention, reduction, recycling and reuse so as to achieve sustainable management practises and efficient use of resources especially natural ones. Fibres and polymers abound in everyday life in applications ranging from medical to aerospace as well as in areas as diverse as textiles, composite materials and Hi-tech materials. Some of the research will focus in plastics and resins derived from plants and these bio-based polymers and fibres will become increasingly important in a sustainable future. The review is intended to ensure that the curriculum of the department continues to meet the educational needs of the students, the objectives of the University, the objectives of industries and be applicable in doing community based projects. It is also intended to make sure that the programme remains relevant to technological advances in the industry.

PROGRAMME SUMMARY

PART I

Semester I

Module Code	Module Description	Credits
SCH 1102	Organic Chemistry	10
SMA 1116	Engineering Mathematics 1A	10
SPH 1104	Modern Physics	10
TFE 1103	Materials Science	10
TIE 1101	Engineering Drawing I	10
TIE 1102	Engineering Communication Skills	10
SCS 1101	Introduction to Computer Science and Programming	10
CTL 101	Conflict Transformation and Leadership	10

Semester II

Module Code	Module Description	Credits
TFE 1203	Fibre Science	10
TFE 1205	Electrical and Electronic	5
TFE 1206	Engineering Mechanics I: Statics (FP)	5
TFE 1207	Fluid Mechanics	10
TCE 1204	Engineering Thermodynamics	10
TIE 1201	Engineering Drawing II	10
SMA 1216	Engineering Mathematics 1B	10
CTL 1201	Conflict Transformation and Leadership II	10

PART II

Semester I

Think in other terms

TFE 2101	Polymer Engineering I	10
TFE 2102	Yarn Technology I	10
TFE 2103	Workshop Technology	10
TFE 2108	Engineering Mathematics II (FP)	5
TFE 2105	Software Engineering Concepts	5
TFE 2106	Engineering Mechanics II: Dynamics (FP)	5
TFE 2104	Leather Chemistry	10
TFE 2107	Introduction to Non-woven Materials	10

Semester II

TFE 2201	Polymer Engineering II	10
TFE 2202	Yarn Technology II	10
TFE 2203	Technology of Fabric Manufacture I	10
TFE 2205	Paper and Pulp Technology I	10
TFE 2204	Leather Process Technology	10
CBU 4203	Business Management and Ethics	5
SORS 2211	Applied Statistics for Polymer Engineers	10
TFE 2207	Instrumentation and Control	5

PART III

Semester I

TFE 3100	Research Methods	5
TFE 3101	Plastic Technology I	10
TFE 3102	Rubber Technology I	10
TFE 3103	Technology of Fabric Manufacture II	10
TFE 3105	Paper and Pulp Technology II	10

Think in other terms

TFE 3104	Colouration of Materials	10
TFE 3106	Polymer Materials Analysis I	10
TFE 3100	Research Methods	5

Semester II

TFE 3200	Project Design	10
TFE 3201	Plastic Technology II	10
TFE 3202	Rubber Technology II	10
TFE 3203	Factory Planning and Management	10
TFE 3204	Economic Environment	5
TFE 3205	Finishing of Materials	10
TFE 3206	Polymer Materials Analysis II	10

PART IV

Semester I & II

TFE 4000	Industrial Attachment	120

PART V

TFE 5000 Research /Design Project (50 credits)

Semester I

TFE 5101	Composite Materials I	10
TFE 5102	Mineral Fibrous Materials	10
TFE 5103	CAD/ CAM	10
CAC 2106	Management Accounting	5
TFE 5105	Production and Operations Management Systems	10

Semester II

TFE 5201	Composite Materials II	10

Think in other terms

TFE 5202	Environmental Management	10
TFE 5203	Nano fibre Technology	10
CBU 1209	Principles of Marketing	5
TFE XXXX	*Elective Module*	10

TOTAL CREDITS FOR THE PROGRAMME

Part I   135

Part II   135

Part III   130

Part IV   120

Part V   140

Total minimum credits: 660

MODULE SYNOPSES

PART 1
Semester 1

SCH 1102 Organic Chemistry   **10 Credits**
The module introduces students to the structure and bonding in organic molecules, stereochemistry, organic reaction mechanisms, the chemistry or aliphatic hydrocarbons and the basics of organic spectroscopic analysis.

SMA 1116 Engineering Mathematics 1A   **10 Credits**
The module focuses on calculus in one Variable: Limits and continuity of functions; Differentiation; Leibniz's Rule; L'Hopital's Rule; Elementary functions including hyperbolic functions and their inverses; Integration – techniques including reduction formulae; Applications – arc- length, area, volumes, moments of inertia, centroids; Plane polar coordinates; Complex Numbers: Basic algebra; De Moivre's Theorem; Complex exponentials; Linear Algebra: Vector algebra in 2 and 3 dimensions; Scalar and vector products and equations of lines and planes.

SPH 1104 Modern Physics   **10 Credits**
The module looks at the particle nature of radiation - The photon: Planck's postulate and thermal radiation, Blackbody radiation, the photoelectric effect, the Compton effect, X-ray production and pair production; Interaction of radiation with matter-photon emission and absorption; Stationery states, discrete energy spectrum and the continuous energy spectrum; The Frank-Hertz experiment; Spontaneous and stimulated emission; The Wave nature of particles - The matter wave: De Broglie's Postulate; The electron diffraction experiment; The wave-particle duality; The uncertainty principle; The properties of matter waves; The Thomson and Rutherford mode; The stability of the atom and Bohr's Postulates and his model of the atom; Atomic spectra; The Hydrogen Atom; Correction for finite nuclear mass; The Nuclear Models: Nuclear properties, sizes and densities, masses and densities; The Nuclear Models - Liquid drop; The deuteron; Shell Fermi gas models; Binding energy nuclear forces; Magic numbers and the nuclear decay and nuclear reactions, e-capture a, and emission; Fission and fusion and other nuclear reactions; The origin of elements; Introduction to Elementary Particles: Isospin, Pions, Leptons and Families of elementary particles.

TFE 1103 Materials Science   **10 Credits**
The module has an introduction to polymers, metals, ceramics and composites; Structure and bonding in materials; Phase diagrams and transitions; Defects and imperfections in materials; Diffusion and transport; Polymers: monomers, homopolymers, copolymers, chemical bonding and properties affected by primary and secondary bonds, degree of polymerisation, glass and melting transitions, stereochemistry, addition and condensation polymerisation, molecular weight distribution, techniques for polymerisation, structure and properties of thermoplastics,

thermosetting and 2 elastomeric polymers; Solubility and swelling of polymers; Additives for polymer products and their effects; Metals and alloys; Structure, properties, processing and applications of traditional and advanced ceramics; Properties and applications of various composites; Optical, electronic and thermal properties of materials; Overview of materials processing: melt processing, powder processing, chemical vapour deposition and composite processing.

TIE 1101 Engineering Drawing I   **10 Credits**
The module gives an introduction to Planegeometry; Spacegeometry; First and third angle projection; Dimensioning; Pictorial views; Freehand sketching; Drawing of common objects; Sectioning; Intersections; Developments; Conventions; Assembly drawings and exercises.

TIE 1102 Engineering Communication Skills   **10 Credits**
The module examines study methods; Communication principles; Technical definitions, Descriptions and instructions; Tables and graphs; Letters; Memoranda and Curricula Vitae; Written reports; Word processing and computer jargon; Interview technique; Running a meeting; Reading, understanding and summarising technical articles.

SCS 1101 Introduction to Computer Science and Programming   **10 Credits**
The module explores information Society, History of Computers: Data and Information, Number systems and arithmetic, Data representation, Basic Computer Components: - CPU, I/O units, Storage; Brief Concepts of Computer Languages and Programming Techniques: high/low level languages, compiler, interpreter, grammar, recursion, simple data structures (arrays, lists, trees, hash tables, queues & stacks), problem solving; Algorithms: Sorting, compression, numerical and encryption; Operating systems and its functions:- process and memory management, I/O, Data Communication, Job Control; processing:- File structures, organisation and access, Databases; Fundamentals of Networks; A simple program, initialization, printing, components, keywords, constants, assignment and expressions.

PLC 1101 Peace, Leadership and Conflict Transformation I   **10 Credits**
The Peace, Leadership and Conflict Transformation module is tailored in a manner to provide students with intellectual skills on the symbiotic relationship that exist on the three tier terms (peace, leadership and conflict). The module attempts to probe into the interplay between these thematic motifs and show their role and complementarities in the process of human development. The module further seeks to provide a skills tool kit on how to analyse conflicts, identify their underlying causes, evaluate how conflict undermines the productive use of resources thereby plaguing development and how responsible leadership transforms adversity into peaceful, equitable and just global society in harmony with nature. It is envisaged that the students who would successfully completed the module will be well grounded in the theory and practice to face the challenges of leadership and conflict at personal, community, national and global levels. The students would be able to trace the emerging patterns and conflict trends in Africa shall form the basis of reflection.

Think in other terms

Semester II

TFE 1203 Fibre Science   **10 Credits**

The module explores the basic concepts in fibre science; Essential requirements and examples of fibre forming polymers; Characteristic features of fibres; Classification of fibres – natural and manmade; Origins, production and structure of fibres; Fibre properties and identification; Relationship between polymer structure, fiber properties and utilization.

TFE 1205 Electrical and Electronic Engineering Principles   **5 Credits**

The module gives definitions for electrical quantities and units; Scientific and engineering notations; DC circuits; Voltage and current sources; Resistors in series, parallel and series-parallel; Kirchhoff's voltage and current law; DC circuits analysis, Superposition and Thevenin's theorem; Power in a dc circuit; Capacitors and inductors in dc circuits;AC circuits; AC signals, quantities, parameters and units; Basic ac circuits analysis; Transformers; Introduction to dc and ac machines; Diode types, rectifiers and power supplies; Bipolar and Field-Effect Transistors; Basic transistor circuits dc analysis; Thermistors and opto-electronic devices; Introduction to amplifiers, oscillators and multivibrators; Introduction to linear integrated circuits and operational amplifiers.

TFE 1206 Engineering Mechanics I: Statics (FP)   **5 Credits**

The module objective is to understand the effect of forces on bodies which are at rest, the geometric characteristics of sections, the principle of virtual work, as well as the basics in the mechanics of solids; Principles of statics: Introduction systems of forces; The basic principles of Mechanics; Revision of knowledge of scalar and vector quantities; Fundamental concepts: - Space, time, force, material and mass; Introduction to Newton's laws of motion; first, second and third; Units of measurement; Description of physical problems in relation to mathematics; Precision, Approximations and mathematical limits; Method of solving problems; Definitions of Statics and Dynamics (Kinetics and Kinematics); Concept of equilibrium; Solution of pin jointed frames; Geometrical characteristics of sections; Friction; The principle of Virtual work; Solid mechanics: - Direct stress and strain, Pure bending theory, introduction to combined bending and direct stress and pure torsion theory.

TFE 1207 Fluid Mechanics   **10 Credits**

The module gives an introduction to fluid Properties, Fluids vs; Solids, Viscosity, Newtonian Fluids, Properties of Fluids; Statics; Hydrostatic pressure, Manometry / pressure measurement; Dynamics; The continuity equation, The Bernoulli Equation, Applications of the Bernoulli equation, the momentum equation, Application of the momentum equation; Real Fluids; Boundary layer, Laminar flow in pipes, Transportation of fluids and flow measurement; Process mixing; Flow patterns, power number, blending, mixing times, solids suspension and distribution, gas dispersion and a scale up of mixing vessels.

Think in other terms

TCE 1204 Engineering Thermodynamics **10 Credits**

This module is an introduction to thermodynamics - scope of thermodynamics; First Law, conservation of energy; volumetric properties of pure fluids; Second Law and heat effects.

TIE 1201 Engineering Drawing II **10 Credits**

The module gives a definition Applications of AutoCAD; Introduction to Menu options on the Opening screen; Settings, Limits and Control of AutoCAD programme; Use of basic operating commands SNAP, GRID, ORTHO, ENTER, ESCAPE, UNDO, SAVE, SAVE AS; Coordinates and coordinate systems: Cartesian, Relative, Polar; AutoCAD function key commands; Toolbars: DRAW; MODIFY, SOLIDS, SUFACES; Control Boxes in AutoCAD: Colors CB, Linetype CB, Lineweight CB, Dimensions CB, Layers CB; Practical lab exercises and assignments in 2D and 3D such as drawing and dimensioning of various Machine Parts, Architectural Plans, Electronic Circuit Diagrams, Process Flow Charts and Block Diagrams.

SMA 1216 Engineering Mathematics IB **10 Credits**

The module examines functions of Several Variables: Partial derivatives, chain rules; Applications - maxima and minima problems, Lagrange multipliers; Linear Algebra: Matrices - basic operations, rank, inverses; Systems of linear equations - Gauss elimination; Determinants and their properties; Eigen values and Eigen vectors; Linear independence; Ordinary Differential Equations; First order differential equations - separable, linear; Integrating factors; Linear second order equations with constant coefficients; Variation of Parameters; Systems of equations; Applications of differential equations to mechanics, physics and engineering.

Think in other terms

PART II
Semester I

TFE 2101 Polymer Engineering I   10 Credits

The module focuses on physical structure of polymers: semi-crystalline, amorphous, and rubbery states; Chain branching, networking in polymers, Iso-free volume theory: deformation of polymers -glassy and viscoelastic; molecular statistics of rubbery states; Tensile, shear, compression and impact properties, Effect of temperature and strain rates in polymers; Rheology: relationship between molecular weight, temperature and shear rates, Effect of additives, Structure-property correlation in glassy, semicrystalline and oriented polymers, Polymer manufacturing: Compression molding, transfer molding, injection molding, blow molding, reaction injection molding, extrusion, pultrusion, calendaring, rotational molding, thermoforming; Commodity and specialty plastics, Nanopolymers and conducting polymers.

TFE 2102 Yarn Technology I   10 Credits

The module explores cotton fibre characteristics, Ginning practices for cotton; Impurities in cotton bale; Purpose of opening, cleaning, and mixing of fibres in blow room; Principles of opening and cleaning in blow room; Sequence of cleaning machines in blow room; Waste disposal; Transportation of fibre mass; Influence of process parameters on opening and cleaning; Principles and methods of fibre mixing and blending; Control of fibre flow; Assessment of blow room performance; Principles of carding; Outline of carding machine; Card feed system: design feature, licker-in clothing, cleaning and analysis; Card cylinder: design feature, clothing, carding, pre and post carding zones; Doffer : web collection, clothing and delivery; Sliver packaging; Assessment of card performance; Carding parameters and its influence; Objectives and principles of drafting; Roller drafting: roller arrangement; Web delivery and condensation; Causes of sliver mass variation; Role of draft and its distribution; Auto-leveller in card and draw frame; Woollen and worsted systems, Preparation (sorting, scouring, drying, carbonizing), Opening & Cleaning, Carding, Gilling; Aim and Objectives of combing; Preparation of fibre assembly for Combing; Fibre fractionation and combing; Sequence of operations in a rectilinear comber; Comber machine elements and modern developments; Theory of fibre fractionation and quality aspects in combing.

TFE 2103 Workshop Technology   10 Credits

The module gives a definition of safety; Objectives of safety; Safety precautions in the workshop; Fire prevention and protocols; Medical equipment; Accidents in the factory; Safety methods: safety by construction, workshop layout, protective clothing etc; Fire prevention in textiles factories; Noise; Dust; Machine Protection; Implementation of safety measures; Description and functions 6 of various tools; Safety measures using various tools; Purpose and language of measurement; Reliability and precision; Measuring instruments; Marking using dividers, punchers, engineers squares, scribers; Tolerances: definition and practises Allowances: definition and practises; Marking, hand sawing and filing; drilling, drilling practices, drilling machines; centre lathe - turning & screw cutting, tapping; Quality control and standards;

Maintenance of production facilities; Maintenance Personnel- workshop management; Aims of a maintenance programme; Maintenance organisation; Maintenance personnel-duties; Computers in maintenance; Basic concepts; Systems and procedures; Lubrication; Definitions in Air engineering; Air conditioning; Machine cleaning; Fibre collection and filtration.

TFE 2108 Engineering Mathematics II (FP)   5 Credits
The module looks at multiple Integrals; Iterated integrals, change of order; Change of variable; Polar, cylindrical and spherical coordinates; Applications in three dimensions;Vector Calculus; Scalar and vector fi elds; Directional derivatives; Gradient, divergence and curl; Line and surface integrals; Laplace Transforms; Defi nitions; Basic ideas and applications to ordinary differential equations.

TFE 2105 Software Engineering Concepts   5 Credits
The module gives an introduction to Software Engineering Processes and how to model these processes using a derivative of the Structured Analysis and Design Technique (SADT) Methodology; Software Development Life Cycle Processes, Computer Programming (C++), Processes for Planning and Controlling Software Development, Quality Management Processes, Data Communications and Computer Networks and Distributed Computing.

TFE 2106 Engineering Mechanics II: Dynamics (FP)   5 Credits
The module's objective is to understand the kinematics behavior of rigid bodies and kinetic behavior of bodies under the action of a system of forces; Definition of kinematics; Types of motion (rectilinear motion, angular motion, circular motion of a particle, movement of rigid bodies); Distance, relative linear displacement, speed, relative and linear velocity; Instantaneous center of rotation; Linear acceleration; Equations of motion; Change of direction- mean acceleration, relative velocity; Kinetics: - Work power and energy, work done by constant force, work done by varying force; Energy, conservation of energy, mechanical energy and power; Finding power when velocity is known; efficiency; Circular motion, angular displacement, angular velocity, relationship between angular and tangential velocity; Angular and centripetal acceleration; Centripetal force, complex shapes (sections); Torque and angular acceleration; Newton's second law; Moment of inertia; Calculation of moment of inertia; Parallel axis theorem, rotational work, power and energy; Hoists; Impulse and momentum; Conservation of linear momentum, collision, inelastic and collision and angular momentum.

TFE 2104 Leather Chemistry   10 Credits
The module explores matrix structure of skin and molecular structure of collagen; Chemical principles involved in pretanning operations; Salt less curing methods - Swelling mechanisms; porosity of hides and skins; Unhairing mechanisms; Chemistry of tanning materials: Classification, isolation, characterization and structural elucidation of vegetable tannins; biogenesis and biosynthesis of hydrolysable and condensed tannins; Mechanism of tanning: Transport of tanning materials into pelt, diffusion equilibria and mechanism of vegetable, mineral and combination tannages, role of crosslinking and fibre coating in matrix stability; Post

Think in other terms

tanning and finishing: Physicochemical interactions of syntans, fatliquors and dyes with collagen and leather.

TFE 2107 Introduction to Non-Woven Materials   10 Credits

The module examines raw materials: Fibrous matter, fibre description considerations, properties of nonwoven materials produced using, different fibrous matter, bonding agents used in nonwovens, properties desired in a bonding agent, working of binders, classification of binders, types of binders, classification of nonwovens, production steps for different methods;General production steps for manufacturing nonwoven: dry bonded production steps, spun bonded production steps, wet bonded production steps, Types of webs and their formation techniques: staple fibre webs, wet laid webs, dry laid webs, fibre preparation, opening, cleaning, blending and mixing, carding, web laying, parallel-laid webs, crosslaid webs, randomly-laid webs, continuous filament webs, spunlaid webs, melt blown webs; Nonwoven materials bonding techniques: mechanical bonding, needle punching technology, stitched bonding technology, hydro-entanglement, adhesive bonding or chemical bonding, saturation adhesive bonding, spray adhesive bonding, foam bonding, application of powders, print bonding, discontinuous bonding, thermal bonding, hot calendaring, area bonding, point bonding, embossing, belt calendaring, through, air bonding, ultrasonic bonding, radiant heat bonding, bonding of spunlaid webs and finishing of nonwoven materials: classification of finish applied to nonwoven materials (shrinkage, wrenching and creping perforating and slitting, singeing, washing, dyeing, printing).

Semester II

TFE 2201 Polymer Engineering II   10 Credits

The module examines yield, deformation and fracture mechanism, Factors contributing to strength and toughness of polymeric materials, Strategies to reduce stress and increase toughness of polymers, Fatigue: relationship to processing behaviour , Time temperature superposition, Creep recovery and stress relaxation, Crazing, Degradation and stabilization of polymers: Effect of different factors including the environment ,Degradation prevention of polymeric materials, Thermal properties of polymers Fire-resistant plastics, loss on ignition, Polymer composites: effect of fibre and 8 particulate reinforcement, Methodologies for assessment of polymer properties and performance, Nanocomposites: Design of thermal, electrical, mechanical properties; Biomedical polymers; surface modification/design of polymers, Novel applications and advances in polymers (clean energy, electronics, sensors, smart applications).

TFE 2202 Yarn Technology II   10 Credits

The module covers objectives of roving operation; Machine elements of speed frames; Flyer twisting; types and design aspects of flyers; Drafting systems in speed frames; Package building in speed frames; New development and automation in speed frames; Quality aspects in speed frame; Processing of synthetic fibres and their blends; Melt spinning, dry spinning, and wet spinning; Yarn Texturing: Basic principles of various methods and description of essential

features of machines; Aim and Objectives of ring spinning; Machine elements of ring frames; Principles of ring twisting; design aspects of spindles, rings and travelers; Drafting and package building; New developments and automation in ring frames; Quality aspects in ring spinning; Processing of synthetic fibres and their blends; Principles of yarn winding; Principle of doubling and twisting of yarns; Methods of doubling: Ring, Two-For-One and Three-For-One twisting; Quality aspects in doubling and twisting; Introduction to new spinning systems; Principle of open end spinning; Rotor, air-jet, friction, vortex and electrostatic spinning systems; Comparison of yarn structures; Introduction to other factors in yarn production: effect of environmental conditions, temperature and humidity, regain, lubricant, dust levels, waste control systems, material recovery and maintenance of production facilities.

TFE 2203 Technology of Fabric Manufacture I   **10 Credits**
The module is a study of the principles and machine processes needed to construct a range of knitted fabrics, including introduction to knitting, general terms and definition, basic knitted structures, machine knitting needles, warp and weft knitting machines; A study of the classification of knitting machinery by mechanism and end-use; An examination of the pattern potential and mechanism used for pattern control on warp and weft knitting machines; An analysis of the dynamics of knitting systems; A study of the elements of a knitted loop structure; Seamless and 3D knitting; A study of the economics of competing fabric production systems and Knitting calculations.

TFE 2205 Paper and Pulp Technology I   **10 Credits**
The module explores wood and fibre raw materials; Preparation of wood and chips for pulping; Pulping: primary categories of pulping, including chemicals, and cooking conditions; Pulping terminology; Kraft pulping; Chemical Pulping: Alkaline pulping; Batch and continuous pulping process, Characteristics of alkaline pulps; Sulphite pulping, Process variables, Characteristics of sulphite pulping: Mechanical Pulping: Mechanical pulping processes; Refiner Mechanical and Chemical refiner Mechanical pulping; Thermo-mechanical and Chemi-Thermomechanical pulping Process; Semi Chemical and Chemi Mechanical Pulping: Types of process; Waste Paper Pulping: Fibre 9 separation of waste paper, Production of unbleached pulps, Deinking of waste paper and various deinking systems.

TFE 2204 Leather Process Technology   **10 Credits**
This module looks at speciality leathers: Different types of raw materials used, properties required, physical and chemical standards required and process details to achieve the specifications of different types of leathers; Processing of exotic leathers; Such as reptiles, crocodiles, lizards, fish, ostrich; Cleaner processing – beamhouse: Eco-friendly process technologies: sulphide free unhairing systems; Ammonia - free deliming, salt free pickling systems, solvent free degreasing systems; Paradigm shift from chemical processing of hides and skins to bio beam house processing; Cleaner processing: tanning, post tanning and finishing;

Advanced finishing techniques: Finishing equipment, techniques for newer and novel finishing system.

CBU 4203 Business Management and Ethics   5 Credits
The module offers an introduction to Business Management and Ethics, Evolution of Management Theory, Managing in a Changing Environment, Planning, Organising and Delegating, Leadership, Controlling, Human Resource Management, and Management Information Systems; Safety, Background of Ethics (Charter of Rights and Freedoms), Contracts, Torts (Negligent Malpractice), Forms of Carrying on Business, Intellectual Property (patents, trademarks, copyrights and industrial designs), Professional Practice (Professional Engineers Act, Professional Misconduct and Sexual Harassment), Alternative Dispute Resolution, Labour Relations and Employment Law.

SORS 2211 Applied Statistics for Polymer Engineers   10 Credits
The module has an introduction to Applied Statistics; Statistics - its definition and scope; Descriptive Statistics/Initial Data Exploration: Summary statistics, measurements of central tendency, mean, mode, median, measures of dispersion, range, variance, standard deviation; Graphical presentation of data, stem and leaf plots, histograms, box plots; Point Estimation/ Tests of Hypothesis, interval estimation, z-test, t-test; Design and Analysis of Experiments, completely randomized design, randomized complete block design, Latin squares, factorial experiment; Regression Analysis, simple linear regression and statistical Computing.

TIE 2207 Instrumentation and Control   5 Credits
The module looks at instrumentation; Final control elements, Measuring devices for flow, temperature, pressure and level; Introduction to Process Control; Mathematical Modelling; Development of mathematical Models, Modelling considerations for control purposes; Dynamic Behaviour of Chemical Processes; Computer simulation and the linearization of nonlinear systems, Brief of Laplace transforms, Transfer functions and the input output models; Dynamics and analysis of first, second and higher order systems; Feedback Control Schemes; Concept of feedback control, Dynamics and analysis of feedback-controlled processes, Stability analysis, Controller design, Frequency response analysis and its applications; Advanced Control Schemes; Feedback control 10 of systems with dead time or inverse response, Control systems with multiple loops and feedforward and ratio control.

PART III
Semester I

TFE 3100 Research Methods   5 Credits
This is a theory module on introductory topics in design of products using fibrous materials, Review of literature Engineering and design principles, Introduction to methodologies are: Case

Study, Grounded Theory, Ethnography, Action Research, Phenomenography, Dismodule Analysis and Narrative Analysis.

TFE 3101 Plastic Technology I   10 Credits

The module looks at Definitions, Brief History of Plastics; Petrochemicals and Monomers; Basic Polymerization; The Plastics Industry, Materials, properties and applications: Thermoplastics, Thermoset materials; Plastic additives: Additives and Compounding Ingredients General description of extrusion processes, type of extruders, screw and their output in terms of drag, leakage and pressure flow, influence of screw dimensions and output, die and screw characteristics; Design of barrel and screw for commodity, heat sensitive and engineering polymers; Barrier Screws; Individual extrusion systems, Dies, Sizing and Downstream equipments, Faults, Causes and Remedies for film, pipe, lamination, profiles, cables, sheet, Box Strapping; Twin-screw extrusion and Co Extrusion systems; Casting of films; Multilayer systems for Films and Pipe General description of Compression and Transfer moulding and its application in processing of thermosetting materials.

TFE 3102 Rubber Technology I   10 Credits

The module focuses on definition, introduction to rubber products; Basic properties of latex, Latex stabilization; Production of latex concentrate: Introduction and significance of latex concentration, Types of latex concentrate, Properties and testing of latex concentrate, Significant of latex handling and storage; Latex processing: Methods of preparation of latex compounding ingredients, Preparation of latex formulation, Industrial latex processing; Vulcanization Technology: Introduction and significant of vulcanization, Types of vulcanization, Properties and physical testing of vulcanizates, Evaluation of rate and state of cure using vulcanization testing.

TFE 3103 Technology of Fabric Manufacture II   10 Credits

This module gives a study of the technology of weaving preparation-winding, warping, sizing, drawing in and tying in; A study of weaving machine design parameters; The types of sheds and Shedding mechanisms: their operation, range of application and programming: cam, dobby and jacquard; Shuttleless weaving machines, their operation and programming; Techno-Economics of shuttleless weaving; Beating up mechanisms- cam and crank arm systems; Take up and let off systems- negative, positive and continuous mechanisms; 'Colour' patterning methods-warp and weft patterning; Multiphase weaving machines and their range of application; Production of 11 woven pile fabrics-terry weaving machine design and operation; Warp and weft stop motions; Methods of driving weaving machines and their control; 3D weaving; Weaving process control and weaving calculations.

TFE 3105 Paper and Pulp Technology II   10 Credits

The module highlights pulp processing: different operations in fiber; Line pulp processing: Fiberizing, Washing, Screening, and Cleaning; Major equipment types and key operating variables; Bleaching: bleaching equipment, chemicals bleaching reactions; Recycling: categories

Think in other terms

of recycled paper and board; Types of contaminants associated with recycled paper; Different operations and equipment involved with contaminant removal; Chemical recovery: Evaporation, Combustion, and Recausticizing; Introduction to paper grades and properties; Paper mill stock preparation: Refining Process, Additives used in paper; Paper machine wet end operations, types of Headboxes used in papermaking; Pressing, Drying, Calendering and winding; Surface treatments, coating, drying of coating, equipment and mechanism; Effluent treatment: primary and secondary effluent treatment.

TFE 3104 Colouration of Materials   10 Credits
The module gives an introduction to dyes and colouration of materials; CIE colour system; Colour matching by composition methods; Instrumental match prediction; An introduction to the synthesis and chemical properties of azoic, direct, vat, reactive, sulphur, disperse, cationic, anionic, acid and mordant dyes; The relationship between dye structure and colour; Interactions of dyes and fibrous/polymeric materials; Analysis of dye formulae; Machinery and apparatus involved in dye-stuff manufacturing; The chemistry of dye application; Pre-treatment processes before dyeing such as desizing, singeing, scouring, bleaching, mercerization; Combined preparatory processes for materials; Degradation of materials during pre-treatment processes; Mechanisms of colouration; Colouration of fibrous materials, paper, plastics, leather and rubber; Pre-treatment and dyeing machinery such as batch processing and continuous processing equipment.

TFE 3106 Polymer Materials Analysis I   10 Credits
The module explores mechanical (physical) testing and analysis of fibres, polymer and fibre materials properties: High Volume Instrument, Advanced Fibre Information System, Tensile strength testers, spectrogram analysis, permeability tests, compression properties; Double cantilever beam tests, shear tests; Inter-laminar fracture toughness; Testing and analysis of composite, paper and pulp, rubber and plastic materials.
Semester II

TFE 3200 Project Design   10 Credits
The module examines sketching, Project-based learning, Interdisciplinary project design, Design and develop products for solutions to real-life problems; Design projects with minimal maintenance requirements and benefits in sustainability and social impact, Fabrication: Suggest and use convenient product prefabricate, Safety, and cost over product design life and Reporting(methodology results, Solid modelling).

TFE 3201 Plastic Technology II   10 Credits
The module looks at basic concepts of injection moulding for thermoplastics; Machine layout, construction and specification, type of injection units; Principle and theory of standard operation, elements of moulding cycle, screw plasticizing and conveying output, screw driver principles, outline of mould features, clamping devices-hydraulic and toggle types; Process variables and

their importance, temperature, pressure, injection rate, etc; Faults and remedies in injection moulding; Injection moulding of thermosets; Reaction injection moulding; Description of various thermoforming processes-simple vacuum, drape, bubble and plug assisted formings; Thermoforming and process variables affecting the product quality; Machining of Plastics; General description of blow moulding processes, type of blow moulding machines, parison control, types of Dies, process variables, problems and their remedies; Stretch blow moulding; Rotational moulding- description and features of rotational moulding and its comparison with blow moulding; Welding / Joining of Plastics – Definition, Principle of Working ; FRP Processes – Hand lay, Spray, Autoclave, Filament winding, Pultrusion and matched mould – principle.

TFE 3202 Rubber Technology II   10 Credits
This module explores rubber processing: Definition and structure of natural rubber, Physical properties of natural rubber, Types of rubber sheets and modified forms of natural rubber; Rubber Compounding: Ingredients of rubber compounding Effect of temperature on cell growth, Method of rubber compounding; Rubber Processing Technology: Equipment using in rubber processing, Types of rubber processing, Stages in Processing; Machinery: Bale Cutters; Mills; Internal / Intensive Mixers; Stock Blenders; Automation; Shaping Processes: Extrusion and Calendering, Curing Processes and Equipment, Compression Moulding and Presses, Transfer and Injection Moulding, Other Curing Systems including Microwaves and Autoclaves; Tyres and Tubes: Tyre Parts and Anatomy - Tyre Markings, Tyre Types, Tyre Building, Curing, Curing Presses and Moulds and inner tubes.

TFE 3203 Factory Planning and Management   10 Credits
This module examines location and Design of Plant; A study of Systematic Planning of Production Facilities Layout, Production Plant, Transport and Logistics Facilities, and Configuration of the Organisation; An Analysis of Factory Buildings; Making Decisions to Invest in New Machinery or Second Hand Machinery; Types of Energy used in a Factory, Energy Management and Conservation; Functions of Management, Role of Managers in a Factory and the Systems Approach to Management; Control of Services from Public Utilities; Shift Systems Employed in Factories and their Management; Time and Stress Management; Establishment of Production Norms and Improving Productivity and Managing Factory Costs.

TFE 3204 Economic Environment   5 Credits
This module covers basic Principles of Economics, Macroeconomic Theory and Analysis, The Economic Problem, Choice and Opportunity Cost and The Production Possibilities, Different Economic Systems, Demand and Supply, Competitive Markets, Imperfect Competition and Firm Behaviour, Economic Growth and The Business Cycle, Unemployment and Inflation, The Financial Institutions and The Role of The Banking Sector, Fiscal and Monetary Policy.

TFE 3205 Finishing Of Materials   10 Credits
This module has an introduction to the finishing of materials; Functional finishes for materials: antimicrobial treatments, heat-setting, cross-linking agents, antistatic agents, surface active

Think in other terms

agents, water repellence, flame retardants, enzyme treatment and surface modifying finishes; Aesthetic finishes for materials: calendaring, raising, softening and hand-building; Mechanical finishing and chemical finishing equipment; Special finishes for materials: post tanning and finishing of leather, finishing of paper, plastics and rubber; Nature, important features and functions of mechanical and chemical finishing equipment; their advantages and limitations will be explored; An introduction to print design including methods of repeating designs and preparing a design for hand screen printing; Styles of printing; Pre-treatment of materials for printing; Printing thickeners including synthetic thickeners; Printing auxiliaries; Printing of blended materials; Printing machinery; Printing of fabrics, paper, plastics, leather and rubber and methods of dye fixation after printing.

TFE 3206 Polymer Materials Analysis II   **10 Credits**
The module explores an introduction to methods of characterization, identification and analysis of fibrous and polymer materials; Optical microscopy, dyeing and staining, solvent solubility, chemical reagents, physical testing and separation methods; Examination of fibrous materials for the forensic and cause of fibre modification or damage arising from chemical or physical agents or treatments; Understanding the principles and applications of instruments used in chemical analysis; Chromatography: gas, liquid, paper gel-permeation, thin-layer, ion exchange spectrophotometry; Microscopy: Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Scanning Probe Microscopy (SPM); Spectroscopy: Ultraviolet - Visible Spectroscopy (UV/Vis), Fourier Transform Infrared Spectroscopy (FT-IR), Fourier Transform Raman Spectroscopy (FT-RAMAN), Nuclear Magnetic Resonance Spectroscopy (NMR), Electron Spin Resonance Spectroscopy (ESR), Atomic Absorption Spectroscopy (AAS), Atomic Emission Spectroscopy (AES), Plasma Emission Spectroscopy; Thermal Analysis: thermo-gravimetric analysis (TGA), differential thermal analysis (DTA), differential scanning calorimetry (DSC), thermo-mechanical analysis (TMA); Graphical presentations and interpretations of testing techniques.

PART IV
TFE 4000 Industrial Attachment   **120 Credits**

PART V

Semester 1

TFE 5101 Composite Materials I   **10 Credits**
The module focuses on the introduction to Composites; Basic Definitions and Classification of Composites; Advantages of Composites materials; Reinforcements & Matrices for various types of composites; Fibers/Reinforcement Materials; Matrix Materials; Fiber reinforced Polymer (FRP) Laminated composites Lamina & Laminate Lay-up, Ply-orientation definition; Manufacturing Processes; Laminated Composites: Introduction to Mechanics of Plates (Kirchhoff's Plate Theory); Classical Laminated Plate Theory; Stress-resultants in a Laminate

Think in other terms

Laminate forces and moments; Structural Mechanics of Laminates); Laminate Stiffness and ABD Matrices; Special Classification of Laminates: Symmetric, Antisymmetric and Nonsymmetric laminates; Behaviour of a Laminae; Linear Elastic Stress-Strain Characteristics of FRP Composites; Stress and Strain concepts in 3-D; Introduction to Anisotropic Elasticity Stress-Strain relations for Anisotropic and Orthotropic cases; Tensorial concept and indicial notations as well as plane stress concepts.

TFE 5102 Mineral Fibrous Materials   **10 Credits**

The module covers traditional Ceramic Raw Materials, Non-Traditional and Special Ceramic Raw Materials; Typical Ceramic Body Compositions; Raw Material Preparation, Batching, and Body Preparation; Forming Processes; Drying; Ceramic Firing; Ceramic Kilns; Glaze Technology; Glass Manufacturing Processes; Additional Technological Factors; Asbestos fibre manufacture; Geology and Fibres Morphology; Crystal Structure of Asbestos Fibres; Properties of Asbestos Fibres; Production process; Industrial Applications; Impact on health and environment.

TFE 5103 CAD/CAM   **10 Credits**

This module is on Computer Aided Design (CAD) Systems and Computer Aided Manufacturing (CAM) Systems, Scope of CAD/CAM; Product Life Cycle, Design Process, Application of Computers for Design, Benefits of CAD, Computer configuration for CAD Applications, Grover's Model of product life Cycle for Selection of CAD/CAM; Representation of Drawings from 2D to 3D; (wireframe, surface and solid modelling); Principles of Numerical Control, Numerically Controlled (NC) Machines, Benefits of NC Machines over Conventional Machines, Computer Numerically Controlled (CNC) Machines; Types of CNC Machine Tools, Features of CNC Systems, Direct Numerical Control (DNC), Elements of CNC, and CNC Programming: Types, Manual Part Programming, Canned Cycle, Offset, Computer-Aided Part Programming Tools (Automatically Programmed Tool-APT); Programmable Logic Controllers (PLC): Logical Control and Programming the PLC; Computer Aided Process Planning (CAPP), Automated Material Handling, Automated Assembly and Inspection; CAD/CAM Integration and CAD/CAM Systems.

CAC 2106 Management Accounting   **5 Credits**

The module emphasizes the introduction to cost and management accounting; Cost concepts, classification and behaviour; Material and inventory control: Stock valuation, FIFO, LIFO, AVCO; Classification and analysis of overheads; Marginal costing; Fixed, flexible and cash budgets; Income statement according to direct and absorption costing methods; Standard costing systems; Manufacturing costs; Statement of cash flow IAS; Introduction to financial statements; Valuation of a business; Budgeting; Inventory management and an introduction to auditing.

TFE5105 Production and Operations Management Systems   **10 Credits**

The module explores an introduction to Production and Operations Management, Classification of production systems, Project Management, Manufacturing Processes and Facility Layout,

Service Processes and Waiting Lines, Quality Management, Queuing Systems, Simulation and Modelling, Lean Manufacturing, Demand Management and Forecasting, Aggregate Sales and Operational Planning, Inventory Control, Material Requirements Planning and scheduling.

TFE 5000 Research /Design Project

Semester II

TFE 5201 Composite Materials II   10 Credits
This module explores strength and Failure theories; Strength of Laminates; Failure Mechanics of Composites; Macro mechanical Failure Theories; Maximum stress theory, Maximum Strain Theory, Tsai-Hill Theory, Tsai-Wu Theory, Comparison of Failure Theories; Design Concepts; Typical Structural Component Design process; Laminate Analysis/Design software; Composite Codes & Standards; Behaviour of a Laminae; Micromechanics of Laminae; Mechanics of load-transfer in a Laminae, Prediction of Engineering Property in a Laminae; Macro mechanics of a Laminae; Lamina Stress-Strain relations in material coordinates, Transformation relations, Lamina; Stress-Strain relations in Structure/Global coordinates; Identification of faults; Joining of composites; Environmental Effects of composites; Categories of scrap composites, recycling methods for: Thermoplastic matrix Composites, Thermosets matrix composites and applications.

TFE 5202 Environmental Management   10 Credits
The module explains the fundamentals of Environmental Management and Environmental Management Systems, Environment Health and Safety in Industries, Air Pollution and Control, Noise Pollution and Control, Water Pollution and Control, Solid and Hazardous Waste Management, Environmental Impact Assessment (EIA) and Environmental Conservation.

TFE 5203 Nano fibre Technology   10 Credits
The module focuses on the introduction to textile nanomaterials; Electrospinning: Theoretical background, Electrical pressure and liquid body disintegration, Taylor cone and critical tension, Needle-less 16 electro spinning, Coaxial electro spinning, radiation effects, Liquid jet; Electrospinning– modifications, Polymeric nanofibre production, Carbon nanotubes; Application of electrospun materials, Composite materials (nanocomposites), Testing of nanofibrous materials; Physical principles of nanofibre production, Theoretical evolution of electrospinning, Liquid jet in an electric field, Special collectors, Electrospinning variants, Exceptional features of electrospinning, Polymeric solutions for electrospinning, Nanofibres in a cell, drawing of nanofibers; Force spinning and applications of nanofibrous materials.

CBU 1209 Principles of Marketing   5 Credits
This module is an introduction to Marketing, Key Concepts and Marketing Functions, Modern Marketing, The Marketing Environment, The Marketing Mix, Strategic Marketing, Consumer

Markets, Business-Business Marketing, Marketing Research, Segmentation and Positioning, Product and Branding Strategy, and Product Life cycle.

TFE 5000 Research /Design Project   **50 Credits**

ELECTIVES

TFE 5205 Green Composites   **10 Credits**
This module explores Green Composites: An Introduction; Processing Cellulose for Cellulose Fibre and Matrix Composites: Hemp and Hemp-Based Composites; Plant Fibre–Based Composites; Bast Fibers Composites for Engineering Structural Applications; Effect of Halloysite Nanotubes on Water Absorption, Thermal, and Mechanical Properties of Cellulose Fibre–Reinforced Vinyl Ester Composites; Eco-Friendly Fibre-Reinforced Natural Rubber Green Composites; Machining Behaviour of Green Composites: A Comparison with Conventional Composites; Potential Biomedical Applications of Renewable Nanocellulose; Green Composites from Functionalized Renewable Cellulosic Fibres; Properties and Characterization of Natural Fibre–Reinforced Polymeric Composites.

TFE 5206 Biomaterials   **10 Credits**
The module covers an introduction to biomaterials, the structures of materials, characterization of materials; Classes of biomaterials, Metals, Ceramics, Polymers, Composites, Biological materials; Tissue response to materials, Host response to biomaterials, Material response to host, Biocompatibility of materials; Biomaterials; Soft tissue replacement: sutures, skin, maxillofacial implants, Blood interfacing implants; Hard tissue replacement: long bone repair, joints and teeth, Transplants; Biomaterials in Tissue Engineering; Nanomaterials in tissue engineering; Nanomaterial-cell interactions, Electrospinning technology for nanofibrous scaffolds, Nanomaterials for skeletal, muscle, nerve, and heart tissue engineering, Nanomaterials for stem cell tissue engineering, Nanomaterials for drug delivery, Magnetic nanoparticles for tissue engineering and Nanoparticles/nanotubes/nanowires for cellular engineering.

TFE 5207 Functional Polymer Materials   **10 Credits**
The module highlights an introduction and Concepts of adaptive polymers and textiles; Adaptive polymers; Adaptive textiles; Shape memory polymers (SMPs): Principles of shape memory function in SMPs; Classification of SMPs; Supramolecular SMPs; Shape memory fibres; Adaptive polymeric gels and applications: Classification and molecular structure of polymeric gels, Synthesis of adaptive polymeric gels; Properties and applications of adaptive polymeric gels; Adaptive polymeric particles and applications; Classification of adaptive polymeric particles; Properties of adaptive polymeric particles; Manufacturing of polymeric particles; Applications of adaptive particles; Adaptive textiles using adaptive polymers: Adaptive textiles for thermoregulation; Shape memory polymeric textiles; Adaptive chameleon textiles;

Think in other terms

Luminescent adaptive textiles; Conductive polymer textile; Other functional textiles; ; Adaptive polymeric composites and applications: Thermal adaptive polymeric composites; Electro adaptive polymeric composites; Light adaptive polymeric composites; Magnetic adaptive polymeric composites; Moisture/water adaptive polymeric composites and applications.

TFE 5208 High-Tech Polymer Materials   **10 Credits**

This module covers industrial fibrous materials: Types, methods of production and applications; Braided structures and their technical applications; Functional requirements, structure and properties; Geotextiles: Types and application of geosynthetics; Functions and application areas of geotextiles; Protective clothing: Clothing requirements for protection; Coating and Laminating: Coating - need and areas of application of coated fabrics; Polymeric materials and fabric substrates for coating; Coating methods and equipments used; Characteristics of coated and laminated fabrics and their evaluation; Building fibrous materials: Applications of coated fabrics for building structure; Properties of fabrics for architecture and construction; Medical fibrous materials: Introduction and classification of Medical Textiles; Fibres used for medical applications; Medical Drapes and Linen; Implantables; Extracorporeal devices, Tissue Engineering; Healthcare and Hygiene products.

TFE 5209 Fundamentals and Principles of Packaging   **10 Credits**

This module explores background to packaging standards; Overview of Packaging Industry; Introduction to packaging; Packaging materials; Introduction to print; Packaging Conversion processes; Quality standards; Legislation; Glass Packaging; Types of container, properties, design, quality standards, defects, risk; Plastics Packaging;Types of plastics, rigid and flexible; Plastics manufacturing techniques, materials, forming methods, quality defects and risks; Paper, Paperboard, Corrugated and Wood Packaging; Manufacture, qualities, testing, decoration methods, corrugated boards, transit properties, adhesives, quality issues; Metal Packaging;Two/three piece can making, containers and closures (steel and aluminium) extrusion, coatings, decoration, flexible metal foil foils.

TOTAL CREDITS FOR THE PROGRAMME

YEAR I   **200**

YEAR II   **200**

Total minimum credits: **400**

DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING

Lecturer and Acting Chairperson
Dr Eng N Tayisepi, Class 1 Fitter & Turner Machinist (MPDA Chapter. 28:02), Dip. Tech Voc. Ed. (HEXCO), Exec. Dip. in Bus. Leadership (ZOU), HND Mech. Eng (HEXCO), B Tech (Hons) Industrial & Mfg. Eng (NUST), M Eng (Mfg Syt & Op Mgt) (NUST), D Eng Mech. Eng (University of Johannesburg), Pr Eng, MZweIE, AMSAIIE

Secretary
Ms A. Ncube, Advanced Pitman Certificate, Diploma in Personnel Management (IPMZ), Cert. Court & Parliamentary Reporting (Australia), Exec Secretary (Pitman)

ACADEMIC STAFF

Professor
(Vacant)

Associate professor
(Vacant)

Senior Lecturers
Eng. S. Mhlanga, B Eng (Hons) Industrial Eng (NUST), MSc Advanced Mfg Sys (Brunel), UK, Postgrad Cert in Higher Education Management (Wits), Postgrad Cert in Engineering Education & Project Management (Tsinghua University), CEM Certified Energy Manager (SA), MZweIE

Dr. Eng. W. M. Goriwondo, B Eng (Hons) Industrial Eng (NUST), MSc Mfg Sys & Op Mgt (UZ), PhD (NUST), Cert of Quality Assurance (City & Guilds), Cert of Modern Safety & Risk Mgt (IRCA), FZweIE

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Lecturers
Mr W. Tumbudzuku, B Eng (Hons) Industrial Eng (NUST), M Eng Mfg Sys & Op Mgt (NUST)

Mr V. S. Moyo, B. Ed. Voc & Tech. (Hudds), MBA (NUST), CAE CGLI, Mech. Eng. TECH Cert PT2. CGLI. T2B, SSC Trs Cert

Eng. L. Nyanga, B Eng (Hons) Industrial & Man Eng. (NUST), M Eng Mfg Sys & Op Mgt (NUST), MZweIE

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Dr. Eng. L. Mugwagwa, B Tech (Hons) Production Eng (CUT), M Eng Mfg Eng & Op Mgt (NUST), PhD Industrial Eng (Stellenbosch), PGDHE (NUST), MZweIE, AMSAIIE

Eng. V. M. Sibanda, ND Mech. Eng. Prod. (HEXCO), FTC Mech. Eng. Plant (C&G) UK, Class 1 Fitter Machinist, B Eng (Hons) Industrial & Mfg. Eng. (NUST), M Eng Mfg. Sys & Op Mgt, (NUST), PGDHE (NUST), FZweIE)

Eng. S. T. Nyadongo, B Eng (Hons) Industrial & Mfg Eng (NUST), M Eng. Mfg Eng & Op Mgt (NUST), PGDHE (NUST), MZweIE,

Eng. E. Murena, ND Mech DDT (HEXCO), B Eng (Hons) Industrial & Mfg Eng (NUST), M Eng (Mfg Eng & Op Mgt), (NUST), PGDHE (NUST), MZweIE, MSAIIE

Eng. B. Sarema, B Eng (Hons) Industrial & Mfg Eng (NUST), M Eng. Mfg Eng & Op Mgt (NUST), PGDHE (NUST) MZweIE, AMSAIIE, Pr Eng (ECZ), Pr Eng (ECSA)

Eng. G. Kanyemba, B Eng (Hons) Mechatronics (CUT), M Eng Mfg Eng & Op Mgt (NUST), PGDHE (NUST), C Eng (UK)

Engineering Instructors

Mr N. M. Dewa, FETC (HEXCO),, ZNCC Mech. (HEXCO), Dip Ad Ed (UZ), B. Tech. Ed (NUST), AMITD (UK)

Eng. G. Munhuwamambo, Dip Tech Voc Ed (HEXCO), Class 1 Turner Machinist (MPDA 28:02), NACC (HEXCO), B. Tech Ed. Mech. Eng (NUST), MZweIE

Chief Technician

Eng. A. N. Mnkandla, NC Motor Mech, ND Auto Eng, B Eng (Hons) Industrial & Mfg Eng (NUST), M Eng. Mfg Eng & Op Mgt (NUST), MZweIE, AMSAIIE

Think in other terms

Stores Person
Ms M. Moyo, Dip Purchasing and Supply Mgt (HEXCO), B Com Purchasing and Supply Mgt (LSU)

Technical Assistant
Mr V. Ndoro, Cert. in Basic Machineshop Eng(Westgate)

BACHELOR OF ENGINEERING HONOURS DEGREE IN INDUSTRIAL AND MANUFACTURING ENGINEERING

PART I
SEMESTER I

Module Code	Module Description	Credits
TEE 1103	Electrical Engineering - Basic Circuit Analysis	
SCS 1101	Introduction to Computer Science	
SMA 1116	Engineering Mathematics 1A	
TIE 1101	Engineering Drawing I	
TIE 1102	Engineering Communication Skills	
TIE 1103	Workshop Technology I	
TIE 1104	Ergonomics & Industrial Safety I	
TIE 1105	Introduction to Industrial and Manufacturing Engineering	

SEMESTER II

CTL 1101	Leadership and Conflict Transformation	
TEE 1203	Electronic Engineering - Electronic Circuits & Devices	
SCS 1206	Visual Programming Concepts and Development	
SMA 1216	Engineering Mathematics 1B	
TIE 1201	Engineering Drawing II	
TIE 1203	Workshop Technology II	
TIE 1204	Ergonomics and Industrial Safety II	
TIE 1206	Applied Mechanics	

PART II

SEMESTER I

SMA 2116	Engineering Mathematics II	
TEE 2114	Electrical & Electronic Technology I	
TIE 2101	Thermodynamics	
TIE 2103	Solid Mechanics I	
TIE 2104	Materials Technology I	
TIE 2106	Dynamics I	
TIE 2109	Computer Applications	
TIE 2107	Engineering Design Principles	

SEMESTER II

SMA 2217	Engineering Mathematics III	
TEE 2295	Electrical & Electronic Technology II	

Think in other terms

TIE 2202	Fluid Mechanics
TIE 2203	Solid Mechanics II
TIE 2204	Materials Technology II
TIE 2206	Dynamics II
TIE 2208	Engineering Design Applications
TIE 2211	Quality & Reliability Engineering

PART III

SEMESTER I
TIE 3108	Introduction to Thermal Systems
TIE 3110	Maintenance Engineering
TIE 3112	Manufacturing Systems I
TIE 3113	Manufacturing Processes I
TIE 3114	Industrial Instrumentation and Control I
TIE 3115	Industrial Management I
TIE 3117	Business Studies I
TIE 3119	Concurrent Engineering I

SEMESTER II
TIE 3212	Manufacturing Systems II
TIE 3214	Industrial Instrumentation and Control II
TIE 3215	Industrial Management II
TIE 3217	Business Studies II
TIE 3219	Concurrent Engineering II
TIE 3220	Manufacturing Engineering Design
TIE 3213	Manufacturing Processes II

PART IV

| TIE 4000 | Industrial Attachment |

PART V

SEMESTER I
TIE 5101	Manufacturing Systems III
TIE 5102	Production Planning and Control
TIE 5103	Manufacturing Processes III

Think in other terms

TIE 5105	Business Studies III
TIE 5111	CAD/CAM I
TIE 5009	Project

SEMESTER II

TIE 5009	Project
TIE 5205	Business Studies IV
TIE 5208	Operations Research
TIE 5211	CAD/CAM II
TIE 5214	Environmental Conscious Manufacturing

Electives *(Choose One)*

TIE 5215	Manufacturing Systems Engineering
TIE 5216	Advanced Manufacturing Technology
TIE 5217	Manufacturing Strategy

Think in other terms

MODULE SYNOPSES

PART I

TEE 1103   Electrical Engineering Circuit Analysis
See Electronic Engineering Department.

TIE   1101   Engineering Drawing I
The module examines an introduction; Plane geometry; Space geometry; First and third angle projection; Dimensioning; Pictorial views; Freehand sketching; drawing of common objects; Sectioning; Intersections; Developments; Conventions; Assembly drawings and exercises.

TIE   1102   Engineering Communication Skills
The module has an introduction to Engineering Communication; Communication in the Work place; Methods of communication; Technical Methods of communication; Business communication at the workplace: Memoranda, Letters, Reports, Curricula vitae, Job Application Letter, Resume, Resignation Letter, Termination Letter; Tables and graphs; Interview techniques; Running a meeting; Technical articles (Writing technical and conference papers); Presentations; Summaries and abstracts; Referencing; Lab Logs and oral presentations.

TIE   1103   Workshop Technology I
The module examines an introduction to Workshop Technology; Industrial safety and behaviour, types of production workshops and layout; Measuring and Gauging: Purpose and language of measurement and gauging; Interchangeability and precision; units of measurement, line and end measurement; Precision measuring instruments and gauges; micrometers, vernier callipers, slip gauges, depth and height gauges, telescopic gauges, Vernier height gauges, Go, No GO, dial test indicators, callipers, etc; Machine Shop Practice: marking out; marking out tools – marking out table/surface plate, Angle plate, Vee bocks, dividers, scribing blocks, spirit levels etc; Material removal processes: turning and threading, milling and drilling; Machine tools, centre lathe, milling machines, drilling machines and power saws (Equipment operation and maintenance).

TIE   1104   Ergonomics & Industrial Safety I
This module focuses on recognition of the environmental factors and hazards: Solvents: Effects, Healthy and Safety procedures, critical exposure factors, evaluation of exposure, Industrial Noise and Vibration, Ionising and Non-ionising radiation, Temperature extremes, Ergonomics guidelines for working posture; Biomechanics; Anthropometrics, sources of anthropometrical data; Assessment of human static strength; Lifting, pushing, pulling and carrying; Work phase design; Standing versus sitting; Human factors/behaviour; displays; Control; Mental overload; Ergonomic checklist; Fundamental concepts of industrial safety: Definitions: The safety

Think in other terms

professional and the industrial hygienist; Government regulations: Factories and Works Act, National Social Security Authority (Accident Prevention and Worker's Compensation Scheme); Environmental factors or stresses: Chemical, Physical and ergonomic stresses; biological agencies; mode of entry of harmful agents - inhalation, skin absorption and ingestion; Occupational diseases: Anatomy, physiology, hazards and pathology of the common target organs: lungs, skin, ear and eyes.

TIE 1105 Introduction to Industrial And Manufacturing Engineering

This module explores the definition of Industrial Engineering and Manufacturing Engineering and difference and definitions of the other engineering disciplines (mechanical, automotive, production, electrical, electronics, chemical, civil and water, textile etc); Career paths in Industrial and Manufacturing Engineering profession and professional practice; Work study principles are application as data gathering to be used in the different modules in the profession and Industrial visits and Seminars with former students as guests.

CTL 1101 Leadership and Conflict Transformation

This module looks at understanding Conflict: The evolution of Conflict Management and Peace studies field; Defining Conflict; Typologies of conflict, Levels and stages of conflict; Theories of conflict; Conflict Analysis and Tools: Conflict Mapping; ABC Triangle; Conflict Tree; Conflict Onion; Force- field analysis; SPITCEROW ; Economic Roots of Conflict: Resource Based Conflicts; Greed vs Grievance Theory; Resource Abundance and Resource Scarcity Theories; Globalisation and Conflict Leadership and Conflict Handling Mechanisms: Multi-Track Diplomacy (Track 1 &2); Litigation and Arbitration.

TIE   1201   Engineering Drawing II - Computer Graphics

This module covers definition Applications of AutoCAD; Introduction to Menu options on the Opening screen; Settings, Limits and Control of AutoCAD programme; Use of basic operating commands SNAP, GRID, ORTHO, ENTER, ESCAPE, UNDO, SAVE, SAVE AS; Coordinates and coordinate systems: Cartesian, Relative, Polar; AutoCAD function key commands; Toolbars: DRAW; MODIFY, SOLIDS, SUFACES; Control Boxes in AutoCAD: Colors CB, Line type CB, Line weight CB, Dimensions CB, Layers CB; Practical lab exercises and assignments in 2D and 3D such as drawing and dimensioning of various Machine Parts, Architectural Plans, Electronic Circuit Diagrams and Process Flow Charts, Block Diagrams.

TEE 1203   Electronic Engineering Circuits & Devices

See Electronic Engineering Department.

TIE   1203   Workshop Technology II

The module examines workshop Safety in welding processes; Use of hand tools: Bench working, hand sawing, cutting and filing; Material forming processes: forging, casting and powder metallurgy; Material joining processes: Fusion welding, high energy beam welding, friction welding, soldering, brazing, riveting, bolting and adhesive bonding; Automotive: The engine,

Think in other terms

engine lubrication, fuel system, cooling system, transmission system, chassis frame and ignition system.

TIE   1204   Ergonomics and Industrial Safety II
The module focuses on recognition of the environmental factors and hazards: Solvents: Effects, Healthy and Safety procedures, critical exposure factors, evaluation of exposure, Industrial Noise and Vibration, Ionising and Non-ionising radiation, Temperature extremes, ergonomics, Biological hazards, Industrial toxicology, Illumination; Evaluation of the environmental factors and hazards: Critical exposure factors, measuring instruments and sampling the environment; Occupational Safety and Health Standards; Basic hazard-recognition procedures, calculations and interpretation of results; Control of the environmental factors and hazards: Methods of Controls; Engineering control, general control methods, training education, Industrial Ventilation, Personnel protective equipment, Respiratory protective equipment, Inspections and administrative control; Occupational health and safety programmes: Governmental Regulations: Factories and Works Act - Chapter 283, 1982; RG Authority (Accident Prevention and Workers Compensation Scheme), Hazardous Substances and Articles Act and Regulations; Shop Licences Act; The Safety Professional: Definitions; Accident prevention activities; Codes and standards; Plans and specifications; Machine design; Records; Education and Training; Total loss and damage control; system safety; Industrial Hygiene Programme as well as seminars and visits to industry.

TIE   1206   Applied Mechanics
The module looks at forces: vectors, equilibrium, free-body diagrams, couples, links; Frameworks: method of sections, method of joints, support reactions and types; Beams: cantilever beams, simple beam, beam with overhang, types of loads, point or concentrated loads, distributed loads, uniform and non-uniform, couples, shear forces (SF), bending moments (BM); Kinematics: uniformly and non-uniformly accelerated motion, kinematic relations for velocity, displacement, time and acceleration, velocity and acceleration diagrams; Kinetics: Newton's 2nd law, force, mass, acceleration, impulse and momentum, work and energy

PART II

SMA 2116 Engineering Mathematics II
The module explores multiple Integrals: Iterated integrals, change of order; Change of variable; Polar, cylindrical and spherical coordinates; Applications in three dimensions; Vector Calculus: scalar and vector fields; Directional derivatives; Gradient, divergence and curl; Line and surface integrals; Theorems of Green, Gauss and Stokes; Fourier Analysis: Fourier series and transforms.

TEE 2114 Electrical and Electronic Technology I
The module gives an introduction to electromechanical devices with related electronic measurement and control instrumentation for industrial engineers; Electro-mechanics topics in

the first module include conversion phenomena, magnetic fields and circuits, transformer performance, principles of electro-mechanics and digital signal conditioning, and process control transducers.
Credits: 3; Lecture sessions: 48; Pre-requisite: TEE 1103

TIE 2101 Thermodynamics
This module focuses on the basic concepts and principles; Principles of fluids (substances); work and heat systems, closed and opened; The First Law of Thermodynamics; The Second Law of Thermodynamics; Entropy, Reversible work, irreversibility; Cycles of internal combustion engines and steam engines, efficiencies; Power and refrigeration vapour and gas cycles and Heat Transfer.

TIE 2103 Solid Mechanics I
This module explores basic concepts, States of loading, Elements of Linear Elasticity, Plane elasticity problem, Applications, Visco-elasticity, Plasticity, Force and deflections, Large Deformation, Constitutive relations, Rigid and deformable solids, Internal forces in bodies, Statically determinacy, Axially loaded members, Shear and bending moment diagrams, Concepts of stress and strain, constitutive relations, Energy methods, Torsion, Columns, Bending and shearing stresses in beams of symmetrical cross-section, Second Moment of Area, Elastic Flexural Formula, Deflection of beams by integration, Torsion of shafts, Power Transmission in Shafts, Stress in cylindrical and spherical shells, Transformation of plane stress and strain, Bending deflection of simple beams by direct integration methods, Energy concepts, Material Property Relationships, Failure Theories, Shaft Design, Slope and Displacement in Transversely loaded Beams, Design of Columns with Concentric and Eccentric Loads, Springs and torque.
Prerequisites: TIE 1206, SMA 1116

TIE 2104 Materials Technology I
The module offers an introduction - Why study materials technology? Classification and application of engineering materials; Atomic structure and interatomic bonding in solids; The structure of crystalline solids - metallic crystal structures, density computations, polymorphism and allotropy, crystal systems, crystallography; Imperfections in solids – vacancies, interstitials, substitutions, line defects, interfacial defects, bulk or volume defects, atomic vibrations; Diffusion – diffusion mechanisms, steady-state diffusion, non-steady-state diffusion, factors that influence diffusion; Mechanical properties of metals - concepts of stress and strain, elastic and plastic deformation, stress-strain behaviour, anelasticity, elastic properties of materials, tensile properties, true stress and strain, compressive, shear, and torsional deformation, destructive methods of testing for mechanical properties, non-destructive testing techniques of material properties, variability of material properties; Strengthening mechanisms in metals - strengthening by grain size reduction, solid-solution strengthening, strain hardening; recovery, recrystallization, grain growth; Failure - ductile fracture, brittle fracture, principles of fracture mechanics, fatigue, cyclic stresses, creep and generalized creep behaviour.

Think in other terms

TIE 2106 Dynamics I

The module looks at the dynamics of particles; Introduction; Force, Mass and Acceleration; Work and Energy; Impulse of energy and momentum, special applications; Dynamics of systems of particles; Introduction; Work and energy; Impulse and momentum; Conservation of energy and momentum; Introduction to three-dimensional dynamics of rigid bodies; Introduction; Angular momentum; Kinetic energy; Momentum and energy equations of motion; Parallel - plane motion; Gyroscopic motion; Mass moments of inertia; mass moments of inertia about an axis and products of inertia. Prerequisites: TIE 1206 - Applied Mechanics.

TIE 2107 Engineering Design Principles

The module focuses on the introduction to engineering design; Phases of the engineering design process; Factors of safety; Fits and tolerances; Design of shafts - shafts subjected to pure twisting or pure bending, shafts subjected to combined and fluctuating loads, design of shaft keys and couplings, types of shaft couplings; Design of power Screws - types of screw threads, Torque required to raise or lower a load, Efficiency of power screws, concept of self-locking; Design of gear drives – classification of gears, gear terminology, gear teeth forms, interference in involute gears, gear materials; spur gears – design for strength, static and dynamic tooth loads, wear loads, design procedure for spur gears; helical gears – types of helical gears, terminology, proportions for helical gears, strength of helical gears, design procedure for helical gears; bevel gears - classification of bevel gears, bevel gear terminology, proportions for bevel gears, forces acting on bevel gears, design procedure for bevel gears; worm gears, worm gear terminology, proportions for worms, efficiency of worm gearing, strength of worm gear teeth, wear tooth load for worm gears, thermal rating of worm gearing, forces acting on worm gears, design procedure for worm gearing; gear trains – simple gear trains, compound gear trains and epicyclic gear trains.

TIE 2109 Computer Applications

The module looks at electronic spreadsheets (MS Excel for Windows): mathematical calculations, VBA programming, graphical analysis, perform queries (using SQL), multi-linked spreadsheets; Database management systems (DBMS): create, maintain, and print reports from a database, customising the user interface by creating and maintaining forms and reports, query tables using basic query operations such as "and", "or", "not"; Engineering information modelling that is compliant to STEP/ STEP-NC standards using the following modelling languages; ER/EER, IDEF1X, UML, EXPRESS/ EXPRESS-G, XML; Software development methodologies: design of customised packages targeted at solving various engineering problems i.e.; CNC machining, management information systems, production planning and control, computer-integrated-manufacturing (CIM) systems, and intelligent systems; Computer applications in- CAD/CAM/CAE/CAPP/CIM, PDM/PLM, Flexible Manufacturing Systems (FMS), & Reconfigurable Manufacturing Systems (RMS);Introduction to C++ programming: Basic structure of C++ program, arithmetic expressions in C++ and Array programming in C++.

TIE 2202 Fluid Mechanics

The module has an introduction to the concepts and applications of fluid mechanics; Hydrostatics (fluids at rest); Fluid motion (fluid dynamics), Types of fluid flow (Lamina and Turbulent flow); steady flow, unsteady flow, uniform flow, non-uniform flow and hybrid flow types; Bernoulli's Equation and its application; Steady Flow energy equation; Pipeline flow; Orifice flow; Fluid measurement; Momentum; Dimensional Analysis and Similarity; Boundary Layer Theory; Turbo-machinery (pumps, compressors, wind turbines etc;) classification and design and sizing procedures.

SMA 2217 Engineering Mathematics III

The module explores laplace Transforms: Definitions; Basic ideas; Applications to ordinary differential equations; Probability exploration; Summary statistics, graphical presentation of data; Point estimation\test of hypothesis; Interval Estimation; Analysis of Variance; Regression analysis - simple, multiple, polynomial regression; Statistical computing using MINITAB and an editor and applications to engineering problems.

TEE 2295 Electrical and Electronic Technology II

This module is a continuation of TEE 2114. It explores electro mechanics topics: Alternating current machines, automatic control analogue controllers, digital control principles and control loop characteristics. Credits: 3; Lecture sessions: 48; Pre-requisite TEE 2114.

TIE 2211 Quality And Reliability Engineering

The module explores quality and reliability in engineering; Statistical analysis for quality and reliability engineering; Standardised quality management systems: Statistical process control methods, Six Sigma and ISO 9000 series; Quality management and quality assurance programmes; Quality measurement techniques; Process capability, reliability, reliability programmes and reliability engineering.

TIE 2206 Dynamics' II

The module looks at vibrations and time response of single-degree-of-freedom systems; Introduction; Free vibrations of particles: undammed free vibrations, damped free vibrations; Forced vibrations or particles; Undammed forced vibrations; Damped forced vibrations; Vibrations of rigid bodies; Energy methods; Vibrations of two-degree-of-freedom systems; Introduction; Free vibrations; Forced vibrations; Lateral vibrations of beams; Cams; Eccentric circular cam with flat follower and curved follower; Balancing of machines; Introduction; Balancing of a single and multi-cylinder engines; Geared systems; Gear trains; Torque relations in Governors; Function of governor; Spring loaded governors and spring connected balls; Pre-requisites. TIE 1203, 2103 - Solid Mechanics I & II; TIE 2106 – Dynamics I.

TIE 2203 Solid Mechanics II

The module looks at complex Stresses: Stresses on Oblique Planes; Material subjected to pure shear, mutually perpendicular direct stresses, combined direct and shear stresses, principal

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plane, principal angle, solution methods; Thick cylinders/Thick-walled pressure vessels: Lame theory, internal pressure only, Stress systems, Change of cylinder dimensions, Compound cylinders – similar materials and different materials, Failure theories, Plastic yielding, Compound Cylindering methods; Asymmetrical Bending: Product second moment of area, Principal second moment of area, Mohr's circle, Land's circle, Rotation of axes, Stress determination, Deflections; Struts: Euler's theory, Equivalent length, Euler theory versus experimental results, validity limit, Struts formulae, Struts loading conditions, Struts with unsymmetrical cross-section and torsion of non-circular thin rings.
Prerequisites: TIE 2103, TIE 1206

TIE 2204 Materials Technology II

The module looks at phase diagrams - basic concepts, solubility limit, one-component (or unary), binary phase diagrams, binary isomorphous systems, interpretation of phase diagrams, the iron–iron carbide phase diagram; Phase transformations - isothermal transformation diagrams, continuous cooling transformation diagrams, microstructural changes; Types of metal alloys - ferrous alloys, nonferrous alloys, applications of ferrous and non-ferrous alloys; Heat treatment of metals - annealing processes, tempering, surface or case hardening techniques, bulk hardening, precipitation hardening; Corrosion and degradation of metals - electrochemical considerations; corrosion rates, forms of corrosion, corrosion prevention; Composites – particle reinforced composites, large-particle composites, dispersion-strengthened composites, fibre-reinforced composites, influence of fibre length on fibre strength, influence of fibre orientation and concentration on fibre strength, structural composites, laminar composites, sandwich panels; Ceramic materials - glasses, glass–ceramics, clay products, refractories, abrasives, cements, advanced ceramics; material selection and design considerations.

TIE 2208 Engineering Design Applications

The module outlines the design of belt drives - material used for belts; flat belt drives, open and crossed flat belt drives, power transmitted by a flat belt, ratio of driving tensions for flat belt drives, V-belt drives - advantages and disadvantages of V-belt drive over flat belt drive, ratio of driving tensions for V-belt drives; Design of rope drives - fibre ropes, ratio of driving tensions for fibre ropes; wire ropes - construction of wire ropes, designation of wire ropes, stresses in wire ropes, procedure for designing a wire rope; Design of chain drives - classification of chains, chain drive terminology, length of chain and centre distance, characteristics of roller chains, power transmitted by chains, design procedure for chain drive; Design of springs – types of springs, material for helical springs, terms used in helical springs, stresses in helical springs, deflection of helical springs, energy stored in helical springs; leaf springs - construction of leaf springs, stresses in spring leaves, length of leaf spring leaves; Design of clutches - material for friction surfaces, design of a disc or plate clutch, design of a cone clutch, centrifugal clutch, design of a centrifugal clutch; Design of brakes - energy absorption and heat dissipation, types of brakes, single block or shoe brake, pivoted block or shoe brake, double block or shoe brake, simple band brake, differential band brake, band and block brake, internal expanding brake; joints - bolted, riveted and welded joints and lubrication systems.

Think in other terms

PART III

TIE 3108 Introduction to Thermal Systems
The module looks at the role of Thermal Energy in the energy mix of a country; Design of Heat driven energy system components and heat exchangers (Boilers, Steam turbines, condensers, cooling towers etc); Improving efficiency of the systems; Steam plants; gas-turbine cycles; Combined cycles, Refrigeration and Air conditioning systems; Heat Pumps; Renewable thermal energy systems (Solar thermal for heating and cooling, Concentrated Solar Plants, Solar thermal heating for domestic and industrial processes, Geothermal energy, Biogas) and Nuclear reactors. Prerequisites: TIE 2101 Thermodynamics, SMA 2116 & 2217 Engineering Mathematics

TIE 3110 Maintenance Engineering
This module looks at an introduction to Maintenance & Reliability, Maintenance in context; Maintenance Policies: Operating Maintenance Policies, Solved Problems; Types of Maintenance: Preventive, Corrective, Systematic, Condition based; Maintenance Department: Organisation of Maintenance Operations: ABC Analysis, Repair and replacement, An introduction to Condition Based Maintenance, Investigation of failures, Lifetime of physical equipment, Some main maintenance problems, Condition monitoring as a production tool, Troubleshooting, computer based maintenance, Expert systems, Establishing a maintenance plan - Preliminary considerations, Establishing a maintenance plan and schedule, Planning and scheduling of plant shutdowns; Systems Reliability - Weibull Parameters: System reliability - solved problems and estimating machinery reliability - Weibull diagram TPM. Prerequisites: SMA 2117 - Engineering Mathematics III; TIE 2210 Maintenance Engineering I.

TIE 3112 Manufacturing Systems I
This module focuses on the classification of Manufacturing systems: project, jobbing, batch, line, continuous; Facility layout and design: problems that stimulate facility layout, objectives and performance measures for a good layout, techniques in facility layout design, systematic layout planning, quadratic assignment problem Approach; decomposition of large families, net aisle and department Layout, locating new facilities, single and multifacility; Assembly Lines: Flow line transfer and general serial systems faced lines without buffers, two-stage paced lines with buffers, unpaced lines; Approaches to Line Balancing:- Ranked Positional Weight, - Largest Candidate Rule, - Kilbridge and Western method, - Comsoal Random Sequence Method; Practical issue in line balancing, sequencing of a mixed model and improvements to solutions on line balance.

TIE 3113 Manufacturing Processes I
This module looks at casting Processes: Solidification of castings, Gating and feeding systems, mould materials and their testing, continuous casting, special casting processes, design of

castings, casting defects and inspection and quality control. Prerequisites: TIE 1107 & 1207 – Workshop Technology I & II; TIE 2107 & 2207 - Material Technology I & II;

TIE 3114 Industrial Instrumentation & Control I
The module explores Industrial Instrumentation (Measurement): Principles of Measurement: most commonly measured variables; light waves as standards of length; precision of an individual observation; measurement; measurement of a small sample; uncertainty in the sample standard deviation and required sample size; undependable observations; the weighted arithmetic mean; metrological characteristics of measuring means; accuracy classes of limits of error numerical expression for errors of measuring means; static characteristics; gain; sensitivity; resolution sensitivity of an instrument or a transducer; dynamic characteristics of measuring means; errors in engineering measurements statistical quality control; Analogue Measuring Instruments: flow meters (e;g; Rhodes flow indicators), pressure gauges; thermometers; scales etc; Electronic Instrumentation: sensors and transducers; Signal Conditioning & Processing: operational amplifiers; filters; AD/DA Converters; microprocessors; interfacing and interface cards; Instrument Performance; Accuracy and errors of measurement; Axiom of Randomness and axiom of distribution.

TIE 3115 Industrial Management I
The module examines industrial Management, The nature of organization, structure of organization, Company mission statement, Management of function, Industrial Relations, Managing Organizational Conflicts, Communication, The human resources function, The Pareto Principle and Theories of Motivation.

TIE 3117 Business Studies I: Marketing
The module explores the principles, characteristics and functions of marketing.

TIE 3119 Concurrent Engineering I
The module focuses on the stages in the life cycle of a product, characteristics of Global competition, characteristics of a competitive product, Research and Development (R&D): its role in the design of products, factors influencing forward move of a product, concurrent engineering approach in the product development process, identifying customer needs; The product development process: concept development, concept generation, concept selection, Product architecture: product family design, modularisation methods, Industrial design process, Innovation and Intellectual Property (IP): driving forces for innovation, forms of Intellectual Property, requirements for patentability and patent procedure. Prerequisites: TIE 2104, TIE 2204- Materials Technology I & II; TIE 2107- Engineering Design Principles;

TIE 3220 Manufacturing Engineering Design
The module outlines Jig and Fixture Design: Clamping devices in manufacturing, effects on product quality; Principles of location, clamping of work, tool guiding, adjusting devices, assembly fixtures, inspection fixtures in automated manufacturing; Die design: Presses, material

Think in other terms

strip, blanks, procedure for die design, strip layout, design of die blocks, punches, plates, pilots, gauges, finger and automatic stops, strippers, fasteners, die set selection, types of dies; Design for Manufacturing (DFM) guidelines for polymer processing, metal casting and sheet metal forming; Relative Tooling Cost and Total Relative Part Cost.

TIE 3212 Manufacturing Systems II
This module looks at scheduling with many products: order release, bottleneck scheduling; Job shop sequencing, single-machine scheduling, two-machine flow shops; Job shop scheduling: dispatching rules, schedule generation; Group Technology: definitions, GT Implementation: visual inspection, coding methods, monocode, polycode, hybrid code: Opitz, Dclass, MICLASS coding systems; Selection of classification and coding systems, benefits of GT; Cellular Manufacturing: design of cellular manufacturing; systems cell formation approaches: Production Flow Analysis, Binary Ordering Algorithms, single pass heuristic, similarity coefficient methods; Evaluation of cell Designs; Production Planning and Control in cellular manufacturing systems and economics for cell formation.

TIE 3213 Manufacturing Processes II
The module explores forming Processes: Hot and cold forming; Formability; Wire working; Extrusion; Folling; Deep drawing; Forging; Defects in wrought metals; Sheet forming and forming loads; Welding and Joining Processes: Industrial welding processes; control and practical applications; Residual stresses; Weld metallurgy; Weld defects; Designing against failure; Mechanical fastening and adhesive bonding etc.

TIE 3214 Industrial Instrumentation and Control II
This module looks at industrial Control (Theory & Practice): Time domain and Frequency domain System modelling (time and frequency domains); Representation and Reduction of multiple systems (Block diagram techniques); Stability; Steady-state Errors (Accuracy); Root Locus method; Frequency Response methods; PID Controllers Compensators; Programmable Logic Controllers (PLCs) and introduction to State Space Methods.

TIE 3215 Industrial Management II
This module explores leadership styles, control process, and industrial relations.

TIE 3217 Business Studies II: Financial Analysis
The module emphasizes concepts, Types of investments, cost and management accounting and budgets.

TIE 3219 Concurrent Engineering II
The module covers the introduction to Value Analysis (VA) and Value Engineering (VE), phases of value analysis; Functional Analysis/ Modelling: Product function (Top-Down), Functional Analysis System Technique (FAST) (Top-Down), Subtract and operate procedure (Bottom-Up);

Think in other terms

Design for "X"-ability (DFX)-design for manufacturability (DFM), design for assembly (DFA), reliability, robustness, serviceability, design for compatibility (DFC), design for green (DFG) and design for logistics (DFL); Assembleability evaluation methods (AEM): Lucas, Boothroyd Dewhurst and Hitachi methods; Robust design methodology: Taguchi quality control, Design of Experiments (DOE): Factorial design, Taguchi design; Product Data Management (PDM) and Product Life Cycle Management (PLM) systems and the capabilities and benefits of PDM/PLM systems. Prerequisites: TIE 3119.

PART IV

TIE 4000 Industrial Attachment

PART V

TIE 5102 Production Planning and Control
Operations functions; Forecasting; Aggregate production planning; Master production planning; Material requirement planning; Production scheduling for flow and job shops; Work methods and measurement engineering; Prerequisites: TIE 3117, 3218 - Business Studies I & II; TIE 3112, 3212 - Manufacturing Systems I & II; TIE 2202 - Quality & Reliability Engineering;

TIE 5101 Manufacturing Systems III
Flexible manufacturing systems; materials Components - machines, part movements, supporting workstation, system controller; Systems Planning and Control - control hierarchy, decision hierarchy, system control; Automated manufacturing systems: Automated material handling, inspection, assembly and distribution logistics; Material management systems; JIT, CIM systems and analytical Queuing Models; Prerequisites: TIE 3112, 3212 - Manufacturing Systems I & II; TIE 2111 - Computer Applications;

TIE 5103 Manufacturing Process III
This module looks at powder metallurgy: Production of metal powders, their characteristics, purity, grain size etc; Control and testing Pre-treatments; Pressing, lubricants; Sintering; Injection moulding, film blowing, calendaring, mixing, extrusions; Machining Process: Metal cutting, cutting tools, mechanics of chip removal, economics of cutting, cutting processes, turning, milling, sawing, thread cutting, metal removal rate calculations and grinding.

TIE 5105 Business Studies III: Risk Management
The module is on risk and Insurance: Risk and uncertainty, risk management, administration, transfer mechanism and market organisation.

Think in other terms

TIE 5111 Computer Aided Design And Manufacturing I
The module explores Computer Aided Design: Product Design Process, CAD Hardware: CADCAM systems: mainframe, minicomputer, workstation microcomputer; Input-output devices, Selection of CADCAM systems; Geometric modelling: wireframe modelling, Analytic curves, parametric representation of curves, Hermite cubic spline, Bezier Curves, B-spline; surface modelling: surface entities, surface representation; solid modelling: Boundary representation, validation of Brep using Euler's Law, constructive solid geometry, sweep representation, primitive instancing method, cell decomposition scheme, Octree spatial decomposition; Computer Graphics and transformations; Computer Aided Engineering Analysis, CADCAM Data Exchange; Practicals using AutoCAD; 2D and 3D draughting and modelling.

TIE 5009 Final Year Project
The module aims to develop the student's ability to integrate the theoretical, practical and business aspects of manufacturing, and improve communication skills. The duration is 8 hours/week minimum for semesters I and II. Students should supplement this with additional time as the project demands. Projects may be based on a suitable topic arising from the student's industrial training attachment, or they may be suggested by the Industrial and Manufacturing Engineering staff; They should ideally have a broad production engineering theme, involving various aspects of manufacturing, although projects of a more specialised nature are not excluded.

TIE 5214 Environmentally Conscious Manufacturing
The module focuses on managing environmental quality: Introduction, systems, sustainable development, limits to growth and development, environmental problems an externality, environmental quality, indicators of environmental quality, quality criteria, standards and guidelines; Economic concepts and policies for controlling individual waste discharges, economic concepts relating to regional and national environmental quality management; Pollution technology; Waste removal at source, waste removal at discharge point, efficient use of assimilative capacity; The role of models in integrated environmental management, modelling water quality, modelling biographical interactions, ecosystem models; Eco-design and Lifecycle Assessment.

TIE 5208 Operations Research
This module examines optimisation techniques and strategies; Decision theory: games and decision trees Linear programming: graphical, simplex; Assignment and transportation problems Queuing theory forecast methods and inventory theory; Networks and graph techniques. Prerequisites: SMA 2116, 2217 - Engineering Mathematics II and III.

TIE 5211 Computer Aided Design and Manufacture II
This module explores Computer Aided Manufacturing: Numerically controlled machines, benefits of NC machines over conventional machines, computer numerically controlled

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machines, motion and coordinate system nomenclature for NC machines, NC-Part programming; Preparatory functions (G-codes), axis motion commands, feed and speed commands, miscellaneous commands; Computer-Aided Part Programming Tools (APT); Programmable Logic Controllers (PLC): Logical Control, Programming the PLC, Counters and Timers; Data communication; Local Area Network; Process interface and practical sessions in the Laboratory both simulation and machining.

TIE 5205 Business Studies IV: Banking
The module looks at the objectives, structure, interest, money and inflation, decision techniques and the Zimbabwe financial system.

TIE 5009 Final Year Project

ELECTIVES (Choose One)

TIE 5215 Manufacturing Systems Engineering
The module explores robotics and Automation: Microprocessors; Components of robots; Robotics programming and industrial applications; Controllers and interface with process machines; Systems Simulation: Concepts; Modelling and analysis techniques for solving complex problems; Introduction to Computer integrated manufacturing: CIM architecture; Control systems in manufacturing; Data communication and part recognition for automated manufacturing.

TIE 5216 Advanced Manufacturing Technology
The module outlines integrated manufacturing; Computer aided process planning and optimisation; Computer networks in manufacturing; Expert systems in manufacturing Artificial intelligence in manufacturing; Chip less material removal processes; Electric discharge machinery; Electrochemical machining; Chemical milling; Ultrasonic machining; Use of lasers and planning for machine tool operations.

TIE 5217 Manufacturing Strategy
The module examines strategic management; Production/operations management; Project management Operations research methods for management and technology management.

Think in other terms

MASTER OF ENGINEERING (M Eng) DEGREE IN INDUSTRIAL AND MANUFACTURING ENGINEERING

1.0   PREAMBLE

The Department shall offer the following options of Master of Engineering degrees:
(a) Master of Engineering in Industrial and Manufacturing Engineering (Manufacturing Systems and Operations Management)
(b) Master of Engineering in Industrial and Manufacturing Engineering: (Manufacturing Engineering and Operations Management)

2.0   ENTRY REQUIREMENTS

The normal entry requirement for the Master of Engineering shall be a Bachelor's Degree at the level of at least a Second Class Honours, Lower Division in Industrial, Manufacturing, Production, or Mechanical Engineering. In some cases, applicants with qualifications which are deemed to be equivalent to the Honours award may be accepted under the Special Entry requirement.
Additionally, all candidates for the Master of Engineering must have at least two years industrial experience.

3.0   PROGRAMME REQUIREMENTS

3.1   An approved programme of study consists of core and elective modules with credit points totalling not fewer than 30 credits (10 modules) and 6 credits for the thesis.   Of the 30 credits total, 18 credits are allocated to the First Semester. Not less than 18 credits should be taken from the Manufacturing component.

3.2   It is therefore important that a candidate admitted to the programme liaises with the Department   to ensure that the Department and Faculty regulations are met.

3.3   The project leading to a thesis should be carried out under the supervision of an academic member of staff. On completion of the project, a candidate, must after consultation with,   and with the consent of the supervisor, present 3 copies of the thesis to the Department.

3.4   Successful completion of the programme requires that the candidate passes all modules totalling 30 credits and defending his/her thesis before the Supervisory Committee. The results shall be considered by the Faculty Board of Examiners and shall be subject to approval by the Academic Board of Examiners and Senate.

Think in other terms

4.0   STRUCTURE OF PROGRAMME

4.1 Full-time Programme
The MEng programme will require two semesters taught modules work by full-time students. Candidates should pass all the modules taken and complete the dissertation by the end of the academic year in order for the candidate to qualify for the award of the degree.

4.2 Part-time Programme
The MEng programme taken on a part-time basis requires the candidate registering for at least 9 credits per semester in order to complete the programme in 2 years. The dissertation will take at least 6 months before submission for oral examination.

4.3 Transfer to the Post-Graduate Diploma Programme   (PGD)
A Master of Engineering degree student may transfer to the PGD programme anytime before the commencement of dissertation, if he or she will have satisfied the requirements for the award for the PGD. Should the student change before the completion of two semesters, he or she would be required to plan the rest of the programme to meet the PGD requirements.

5.0   AWARD OF MEng DEGREE
The award of MEng degree shall be in three categories: 80% and

above	-	Distinction
70% - 79%	-	Merit
60% - 69%	-	Credit
50% - 59%	-	Pass
Below 50%	-	Fail

5.1   Submission of Thesis for Examination
Candidates are required to be still registered with the University until submission of their thesis for examination. Three bound copies shall be submitted. One copy shall be for the candidate's supervisor, one for the student, and one for the University Library.

6.0   OPTIONS FOR THE MEng. PROGRAMME
There are two options for the MEng programme:
a)   Manufacturing Systems and Operations Management
b)   Manufacturing Engineering and Operations Management

Manufacturing Systems and Operations Management

Think in other terms

Module Modules		Module Description	Credits
TIE	6210	Systems Modelling and Simulation	
TIE	6110	Manufacturing Information & Database Systems	
TIE	6111	Design, Analysis and Control of Manufacturing Systems	
TIE	6220	Automation and Robotics	
TIE	6211	Manufacturing Strategy	
TIE	6230	Quality Systems	
TIE	6134	Operations Management	
TIE	6000	Master's Thesis	

Electives

TIE	6120	Computer Control of Manufacturing Systems	
TIE	6121	Computer Aided Design & Manufacturing (CAD/ CAM)	
TIE	6132	Logistics	
TIE	6133	Human Factor Engineering	
TIE	6130	Operations Research	
TIE	6231	Management of Technology	
TIE	6232	Selected Topics in Advances in Manufacturing	
EMB	502	Human Resource Management	
EMB	503	Financial and Management Accounting	

Manufacturing Engineering and Operations Management
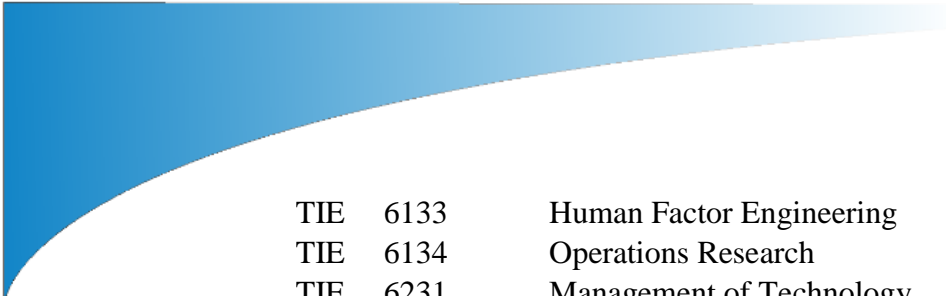
Module Code	Module Description		Credits
TIE	6122	Manufacturing Technology	
TIE	6220	Automation and Robotics	
TIE	6120	Computer Control of Manufacturing Systems	
TIE	6121	Computer Aided Design and Manufacturing (CAD/CAM)	
TIE	6230	Quality Systems	
EMB	503	Financial and Management Accounting	
TIE	6134	Operations Management	
TIE	6000	Master's Thesis	

Electives

TIE	6221	Environmental Conscious Manufacturing	
TIE	6123	Materials Selection	
TIE	6124	Concurrent Engineering	
TIE	6132	Logistics	

Think in other terms

TIE	6133	Human Factor Engineering
TIE	6134	Operations Research
TIE	6231	Management of Technology
TIE	6232	Selected Topics in Advances in Manufacturing
EMB	502	Human Resource Management

Think in other terms

POST-GRADUATE DIPLOMA (PGD) IN INDUSTRIAL AND MANUFACTURING ENGINEERING

1.0 ENTRY REQUIREMENTS

The normal entry requirement for the Post-Graduate Diploma in Industrial- and Manufacturing Engineering shall be:

1.1 A Bachelor's degree in related Engineering disciplines as considered by Senate on the recommendation by the Department and Faculty of Industrial Technology.

OR

1.2 A Bachelor's degree in Science as considered by Senate on the recommendation by the Department and Faculty of Industrial Technology.

2.0 Post-Graduate Diploma (PGD) Structure: Full-time

The PGD programme will require two semesters of full-time work consisting of core and elective modules with credit points totalling not fewer than 24 credits (6 modules). These modules may be chosen from the MEng modules in Section 6.

3.0 Post-Graduate Diploma (PGD) Structure: Part-time

The PGD programme taken on a part-time basis requires the candidates registering for at least 9 credits per semester in order to complete the programme in 2 years. The dissertation will take at least 6 months before submission for oral examination.

4.0 Transfer to the MEng Programme

A Post-Graduate Diploma student may transfer to the MEng programme as long as the candidate satisfies the entry requirements of the MEng and provided the modules are passed at levels acceptable for the award of MEng degree.

Think in other terms

MASTER OF ENGINEERING IN MANUFACTURING ENGINEERING AND OPERATIONS MANAGEMENT

First Semester Core Modules

TIE 6120 Computer Control of Manufacturing Systems
The module gives an analysis of microprocessor controlled servo loops, adaptive control, state space methods in controlling analysis of NC machines, robots and their controllers and programmable controllers. 3 Credits: 2 Lab; Prerequisites: (TIE 3114, TIE 3214) - Industrial Instrumentation and Control or equivalent.

TIE 6121 Computer Aided Design and Manufacturing (CAD/ CAM)
The module explores design process and design models; Representation of drawings from 2D to 3D; (wireframe, surface and solid modelling); Techniques of geometric modelling; Elements of interactive computer graphics; Standards for CAD; Computer assisted numerical control programming (manually and automated); Principles of CAD/CAM; Integration of design and manufacturing; Simulation or practical sessions in programming; Automated material handling and storage devices as well as Interfacing between **CAD and CAM.** 3 credits: 2 Lec; 2 Lab; Prerequisites: TIE 2109, - Computer Applications, TIE 1002 Engineering Drawing or equivalent.

TIE 6122 Manufacturing Technology
The module looks at conventional and non conventional machining processes; Plastics manufacturing processes; Additive manufacturing techniques and laser engineering; 3 Credits: Lec;, 2 Lab Prerequisites: TIE 5105 - Manufacturing Processes III or equivalent.

TIE 6134 Operations Management
The module examines corporate Operations Strategy; Process strategies; Tactical issues: aggregate production planning, master production scheduling; Operational issues: material requirements planning, manufacturing resource planning, scheduling, lot sizing; Capacity planning from aggregate to shop floor levels; Expert systems and manufacturing automation and case studies. 3 Credits: 2 Lec;, 2 Lab.

EMB 503 Financial and Management Accounting
(see Executive MBA programme)

Think in other terms

ELECTIVES

TIE 6123 Materials Selection

The module looks at functional requirement of engineering materials; Selection for various properties e.g.; static strength, stiffness, toughness, corrosion wear, temperature resistance etc; Effect of material properties on design; Effect of manufacturing processes on design; Reliability of engineering components; Role of design in achieving reliability; Role of design materials and manufacturing in achieving reliability; Economics of materials; The selection process and case studies.3 Credits: 2 Lec;, 2 Lab Prerequisites: , - Materials Technology II TIE 2204 - Engineering Design or equivalent; TIE 2207.

TIE   6124   Concurrent Engineering

The module examines definitions for concurrent engineering and driving forces; Schemes for CE: Axiomatic design, DFM guidelines, Design science, Design for assembly, Taguchi method for robust design, manufacturing Process Rules, Quality Function Deployment, Failure-Mode and Effect Analysis and value Engineering. 3 Credits: 2 Lec, 2 Lab.

TIE   6132   Logistics

The module focuses on supply chain management: an overview; The role of purchasing; Partnership with suppliers; Distribution management; Process tools   for   supply   chain management; Outsourcing; Lean supply; Regional logistics and global logistics as well as some case studies; 3 Credits: 2 Lec;, 2 Lab.

TIE 6133   Human   Factor Engineering

The module is on work Study: method study, time study, motion economy; Ergonomics: man-machine inter-action, work conditions; Industrial psychology; Biomechanical models of human at work and case Studies. 3 Credits: 2 Lec; 2 Lab.

TIE 6130 Operations Research

The module covers O/R advanced concepts: integer and mixed programming, network flows programming dynamic programming, goal programming; New O/R directions and applications: in different areas of Industrial/Manufacturing Engineering. 3 Credits: 2 Lectures 2 Lab Prerequisites: - Engineering Mathematics II & III SMA 2116, SMA 2217 or equivalent.

Second Semester Core Modules

TIE   6220   Automation & Robotics

The module explores industrial Robots: An introduction to industrial robots; Classification of robots and their geometries; Robot end-effectors (tooling and grippers); Safety considerations; Programming Industrial Robots: Robot motion control; resolution, repeatability, accuracy and control; Future trends; Robot Animation Teaching Simulation; Robotics Sensing: Robot sensor technologies; Image acquisition; Computer vision systems: Image processing; Robot

Think in other terms

programming using sensors; Automated Assembly: Image processing; transfer and parts presentation; Requirements for general purpose assembly; Some problems with assembly; Design considerations in automated assembly; principles of high volume manufacturing systems; Choosing, specifying and justifying a robot system: Evaluation methods for robot capital investment; Evaluation of manufacturing costs and the hierarchy of evaluation adjustification. 3 Credits: 2 Lec…, 2 Lab; Prerequisites: Dynamics TIE 2106 and 2206 and Instrumentation and Control, TIE 3114, TIE 3214 or equivalent.

TIE   6230   Quality Systems
The module looks at total quality management: overview, principles, levels of adoption; Pioneering works of Deming, Juran, Crosby, Ishikawa, Imai, Shingo and Fiegenbaum; International Standards: Malcom Baldridge, ISO 9000, ISO 14 000; Cost of quality; Quality function deployment; Quality loss function; Total quality tools and techniques as well as case studies; 3 Credits: 2 Lec;, 2 Lab Prerequisites: - Engineering Mathematics III SMA 2217 or equivalent.

EMBA 503   Financial and Management Accounting
The module looks at financial accounting: Record-keeping and double entry; The preparation of the Profit and Loss Account and Balance Sheet; Concepts of profit measurement and the valuation of as- sets; Company Accounts; Legal and Regulatory Framework; Analysis of Company Reports; Accounting for changing price levels; European harmonisation of Accounting: Taxation; Auditing; Management Accounting: Analysis and classification of costs; Absorption and activity based costing; Cost volume profit analysis; Budgeting and Variance Analysis; Budgetary Control and investment appraisal. 3 Credits: 2 Lec;, 2 Lab;

TIE   6000   Master's Thesis

6 Credits

ELECTIVES

TIE   6221   ENVIRONMENTAL CONSCIOUS MANUFACTURING
This module examines cleaner production concepts; Eco-design; Explosive and toxic gases, liquid and metallic poisons; airborne dust-causes and prevention; Physiological effects of vitiated and contaminated air; Compiling of a monitoring   strategy,   management   systems   for environmental control; Environmental auditing and case studies. 3 Credits: 2 Lec, 2 Lab.

TIE   6231   Management of Technology
The module looks at knowledge; Technology; Technology transfer; Research and development infrastructure, interaction, and cooperation; Technology and its environment - social,

human, political factors; managing innovation and technology dynamics as well as change dynamics. 3 Credit: 2 Lec, 2 Lab.

TIE   6232   Selected Topics in Advances in Manufacturing
The module looks at constraints management; Lean production; Synchronous manufacturing; Business process re- engineering; Time-based competition; JIT, Agile Manufacturing; Value chain concept; The elements of value; Value chain system models as well as selected readings from journal articles. 3
Credits: 2 Lec, 2 Lab.

EMBA 502   Human Resource Management
(*See Executive MBA programme*)

MASTER OF ENGINEERING IN MANUFACTURING SYSTEMS AND OPERATIONS MANAGEMENT

MODULE SYNOPSES

Semester I
Core Modules

TIE6110   Manufacturing Information & Database Systems
The module looks at manufacturing Information Systems: Introduction to manufacturing information and data systems; Manufacturing information (Definitions, structure & flow) Database management systems and database models (hierarchical network, relational database, physical structure of databases); Manufacturing application of databases (manufacturing database, relational database design, query language); Manufacturing resource planning systems; Workshops - introduction to SQL (Using ORACLE); data retrieval (database queuing); computer aided database design; table creation and maintenance; SQL views; MRP software. Manufacturing Data Systems: Shop floor data collection systems (bar-codes, file-tronic labels); Computer aided process planning; (definitions, structure & classification); factors affecting design and implementation of CAPP; Data exchange standards (IGES, PDES, STEP); Electronic data inter-change EDI; Networks (seven layer model multi-drop and multiplexed system) (transmission lines). Management of Manufacturing Information and data Systems: Strategic implications of MIDS (value chain, is strategic planning); Information economics and management of change (human factors, tools and   techniques). 3 Credits: 2 Lec., 2 Lab. Prerequisites: TIE 2109 and 2210 - Computer Applications I & II or equivalent.

TIE   6111   Design, Analysis And Control of Manufacturing Systems
The module explores classification of manufacturing systems; Shop scheduling of many products; Flow line design; Assembly lines; Transfer lines and general serial systems; Flexible manufacturing systems; Group technology; Cellular manufacturing system design; Facility layout; Machine setup and operation sequence; Material handling systems; Automated storage and retrieval systems (warehousing); Analytical queuing models (queuing theory) and Metaheuristics expert systems as applied to manufacturing systems. 3 Credits: 2 Lec., 2 Lab Prerequisites: - Manufacturing Systems I & II TIE 3112, TIE 3212 or equivalent.

TIE   6134   Operations Management
The module examines corporate Operations Strategy; Process strategies; Tactical issues: aggregate production planning, master production scheduling; Operational issues: material requirements planning, manufacturing resource planning, scheduling, lot sizing; Capacity

planning from aggregate to shop floor levels; Expert systems and manufacturing automation and case studies. 3 Credits: 2 Lec., 2 Lab.

ELECTIVES

TIE 6120 Computer Control of Manufacturing Systems
The module gives an analysis of microprocessor controlled servo loops, adaptative control, state space methods in controlling analysis of NC machines, robots and their controllers and programmable controllers. 3 Credits: 2 Lec; 2 Lab; Prerequisites: - Industrial Instrumentation and Control TIE 3114, TIE 3214 or equivalent.

TIE 6121 Computer Aided Design and Manufacturing (CAD/CAM)
The module examines design process and design models; Representation of drawings from 2D to 3D; (wireframe, surface and solid modelling); Techniques of geometric modelling; Elements of interactive computer graphics; Standards for CAD; Computer assisted numerical control programming (manually and automated); Principles of CAD/CAM; Integration of design and manufacturing; Simulation or practical sessions in programming; Automated material handling and storage devices and interfacing between CAD and CAM 3 Credits: 2 Lec;, 2 Lab; Prerequisite: - Computer Applications I & II, TIE 2109, 2210, TIE 1002 Engineering Drawing or equivalent.

TIE 6132 Logistics
The module looks at supply chain management: an overview; The role of purchasing; Partnership with suppliers; Distribution management; Process tools for supply chain management; Outsourcing; Lean supply; Regional logistics; Global logistics and case studies. 3 Credits: 2 Lec;, 2 Lab.

TIE 6133 Human Factor Engineering
This module covers work Study: method study, time study, motion economy; Ergonomics: man-machine inter- action, work conditions; Industrial psychology; Biomechanical models of human at work and case studies. 3 Credits: 2 Lec;, 2 Lab;

TIE 6130 Operations Research
This module explores O/R advanced concepts: integer and mixed programming, network flows programming, dynamic programming, goal programming; New O/R directions and applications: in different areas of Industrial/Manufacturing Engineering. 3 Credits: 2 Lec;, 2 Lab; Prerequisites: - Engineering Mathematics II & III SMA 2116, SMA 2217 or equivalent.

Think in other terms

Semester II
Core Modules

TIE   6220   Automation & Robotics

The module focuses on industrial Robots: An introduction to industrial robots; Classification of robots and their geometries; Robot end-effectors (tooling and grippers); Safety considerations; Programming Industrial Robots: Robot motion control; resolution, repeatability,   accuracy and   control; Future trends; Robot Animation Teaching Simulation; Robotics Sensing: Robot sensor technologies; Image acquisition; Computer vision   systems: Image   processing; Robot programming using sensors; Automated Assembly: Image processing; transfer and parts presentation; Requirements for general purpose assembly; Some problems with assembly; Design considerations in automated assembly; principles of high volume manufacturing systems; Choosing, specifying and justifying a robot system: Evaluation methods for robot capital investment; Evaluation of manufacturing costs and the hierarchy of evaluation ad justification. 3 Credits: 2 Lec;, 2 Lab; Prerequisites: Dynamics TIE 2106 and 2206 and Instrumentation and Control, TIE 3114, TIE 3214 or equivalent.

TIE 6210   Systems Modelling and Simulation

The module gives an introduction to Simulation and Modelling; Basic simulation and modelling methodology; sampling, data collection, analysis and visual output modelling complexities and decision making simulation; Basic simulation topics: random numbers; Statistical functions, experimentation; Applied statistical methods for analysis and m o d e l - ling; Software for simulation modules; Approaches to structuring stimulation; Simulation Examples: Queuing Systems; Inventory Systems; Investment Decisions; Planning and Control; Maintenance; Analysis of Simulation Models; Output Analysis for a Single Model; Comparison and Evaluation of Alternative System Designs. 3 Credits: 2 Lec;, 2 Lab; Prerequisites: - Introduction to Computers SCS 1101, Computer

Applications TIE 2109, SMA 2217 - Engineering Mathematics III or equivalent.

TIE   6211   Manufacturing Strategy

The module focuses on content of corporate strategy: strategy formulation at the interface between functions; linking manufacturing with corporate marketing decisions; order-winners and qualifiers; Bench- marking; Choice of process: continuous processing, batch, line, jobbing, project; Technol-ogy strategy; flexibility, technology push versus pull strategies; manufacturing strategy and technological opportunities; Focused manufacturing: steps to achieve focus; plant within a plant configuration; focus and product life cycle; Process positioning; core elements of the business; strategies considerations; pan of process and product technology; product volume;

Levels of vertical integration; Joint ventures, non-equity-based collaboration, long-term contracts, customer-vendor relationships and JIT production. 3 Credits: 2 Lec;, 2 Lab.

TIE   6230   Quality Systems
The module highlights total quality management: overview, principles, levels of adoption; Pioneering works of Deming, Juran, Crosby, Ishikawa, Imai, Shingo and Fiegenbaum; International Standards: Malcolm Baldridge, ISO 9000, ISO 14 000; Cost of tools and techniques and case studies. 3 Credits: 2 Lec;, 2 Lab; Prerequisites: SMA 2217 - Engineering Mathematics III or equivalent.

TIE   6000   Master's Thesis (6 Credits)

ELECTIVES

TIE   6231   Management of Technology
The module explores knowledge; Technology; Technology transfer; Research and development infrastructure, interaction, and cooperation; Technology and its environment: - social, human, political factors; Managing innovation and technology dynamics and change dynamics. 3 Credits: 2 Lec; 2 Lab;

TIE   6232   Selected Topics in Advances in Manufacturing
The module examines constraint management; Lean production; Synchronous manufacturing business process re- engineering; Time based competition; JIT, Agile Manufacturing; Value chain concept; the elements of value; Value chain system models and selected readings from journal articles. 3 Credits: 2 Lec; 2 Lab.

EMB 502   Human Resource Management

Think in other terms

FACULTY OF MEDICINE

Dean

Dr R Gwini, MSc Clin. Epi (University of Zimbabwe), MMed (University of Zimbabwe), MD (Vinnitsa Medical School, Ukraine), AFRI Fellow, ECSACOP Fellow

Bio-Statistician

Mr C. Mapfumo, PGD Project Planning & Mngt (University of Zimbabwe), BSc Statistics & Geog. (University of Zimbabwe), BSc Special Hon. Statistics (University of Zimbabwe), MSc Biostatistics (University of Zimbabwe)

Assistant Registrar

Mrs S. P. Dube, STC (Gweru Teachers' College), BA Hons in Philosophy (University of Zimbabwe), MEAPPS (Zimbabwe Open University)

Chief Technician

Mrs J. Dlodlo, Dipl. in Histology (University of Zimbabwe), Med Lab. Tech, Spec. Dip. (University of Zimbabwe), OND Med. Lab. Carmarthen (WALESW, UK)

Chief Nursing Officer

Mrs F. Mantula, BSc Nursing (Zimbabwe Open University), MBA (NUST), MPH University, South Africa).

Chief Nursing Officer

Ms G. Ngundu, Dipl in General Nursing (Harare Hospital), Operating Theatre Dipl. (Mpilo School of Nursing), PGD HIV/AIDS Mngt (Mpilo School of Midwifery), PGD Public Health (University of KwaZulu Natal, South Africa)

Chief Secretary

Mrs I. Hlabangana, BSc Hon Human Resource Mngt (Lupane State University), HND in Office Mngt (Bulawayo Polytechnic), ND in Secretarial Studies (Bulawayo Polytechnic)

Acting Faculty Computer Technician

Ms T. Marindire, NC in Electronic Engineering, HEXCO (Bulawayo Polytechnic)

Telephonist

Ms T. Beja, Pitman Secretarial Computers (Foundation College), Front Office Management (Speciss College)

FACULTY REGULATIONS

BACHELOR OF MEDICINE AND BACHELOR OF SURGERY (MBBS)

1.0   PREAMBLE

1.1   These Regulations should be read in conjunction with the General Academic Regulations for Undergraduate Degrees hereinafter referred to as General Regulations.

1.2   Undergraduate Degree Programme in the Faculty of Medicine shall be offered as follows: Bachelor of Medicine and Bachelor of Surgery (MBBS).

2.0   ENTRY REGULATIONS

2.1   Applicants to the Faculty of Medicine MBBS Programme of study may be accepted provided they have satisfied the entry requirements prescribed under the General Regulations for acceptance to the University and the specific Faculty requirements as follows:

2.1.1   Applicants to MBBS Programme should have passed at least 5 subjects at 'O' Level at Grade C or better. These should include Mathematics and English Language.

2.1.2   MBBS Programme Applicants should have at least 3 'A' Level passes in Chemistry (Mandatory subject) and in any two of the following subjects: - Mathematics, Biology Physics or their approved equivalents.

2.1.3   MBBS Programme Applicants can be admitted on the basis of an appropriate Undergraduate Degree, normally at the First or Upper Second Class Degree Classification.

2.1.3.1 Appropriate Degrees will be those with substantial cover in the biomedical or chemical sciences. Any requests by such candidates for exemptions from any part of MBBS programme will not normally be considered, but may be granted by Senate on advice from the Faculty Board.

2.1.3.2 Applicants with other science degrees may be granted by Senate on advice from the Faculty Board provided the applicant has the required subjects at 'A' Level (Biology, Chemistry, Physics or Mathematics or their approved equivalents).

2.1.3.3 Applicants can be admitted on the basis of an appropriate Undergraduate Degree (Special/Mature Entry) subject to availability of vacancies. The special/mature entry should not exceed 20% of each intake.

2.1.4 Applicants to the Faculty Programme may also be required to satisfy a Faculty Panel in an interview.

3.0   STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

3.1   The Bachelor of Medicine and Bachelor of Surgery (MBBS) Degree Programme is a five and a half year programme, which includes clinical attachment beginning Year 3.

3.2   The Biomedical Science modules will include Anatomy, Physiology, Biochemistry and Pathology. The Biomedical Science modules will lead to Pathology (Histopathology, Chemical Pathology, Medical Microbiology, Haematology and Immunology). The Biomedical Science modules will be the teaching and administrative responsibility of the relevant departments (Anatomy, Physiology, Biochemistry, Pharmacology and Pathology). Teaching will include early exposure to appropriate clinical cases.

3.3   Clinical Pharmacology and Introductory to Clinical Skills will be taught at the beginning of the year.

3.4   The final 2.5 years of the programme will be taught and administered by the clinical departments.

3.5   The Clinical Study Area will cover Medicine, General Surgery and Specialty surgical disciplines (Orthopaedics, Urology, Paediatric Surgery, Ear, Nose and Throat, Plastic and Reconstructive Surgery, Maxillofacial, Neurosurgery, Ophthalmology,) including Anaesthetics, Community Medicine, Psychiatry, Paediatrics, Obstetrics and Gynaecology, Clinical Pharmacology, Oncology Radiology and Imaging.

4.0   ASSESSMENT OF CANDIDATES
4.1   Attendance
Students are expected to attend all practical classes. Students who fail to attend a minimum of 80% of lectures may be barred from writing the examinations.

4.1.1 During clinical rotations the student who does not satisfy the requirements enlisted in the log book may be barred from writing the examinations or may be allowed to write the examination as a first sitting.

Think in other terms

4.2 **Examinations**

4.2.1 Professional or barrier examinations will be held at the end of each module. At the end of each Part (Year) of the MBBS programme the students will need to have passed the set examinations before they can proceed.

4.2.2 The setting of the examination papers and modes of assessment shall be the responsibility of the Panel of Examiners of each Department. The Panel of Examiners for each Department shall normally consist of the Lecturers who taught or supervised the modules. The Panel will be assisted and advised by at least one External Examiner who is a specialist in the subject area examined. The Chairperson or Head of the Department or the Deputy will chair the Panel.

4.2.3 The Panel of Examiners for each Department shall meet at least by the end of each Part as appropriate.

4.2.4 The Faculty Board of Examiners shall be chaired by the Dean or the Deputy Dean of the Faculty of Medicine. The Board will consist of the Chairpersons or Heads of each Department, the available External Examiners and nominated members from the Department. The Board should have one member nominated by the Medical and Dental Practitioners Council of Zimbabwe who may also be an External Examiner.

5.0. DETERMINATION OF RESULTS OF MODULES

5.1 All modules will be assessed by continuous assessment and final written examinations at the end of each module.

5.2 To be eligible for Examinations, a student will be required to have a minimum continuous assessment score of 50%. This Continuous Assessment (CA) may consist of assignments, tests, essays, field work, laboratory work and projects. CA will contribute 30% of the overall mark. CA overall marks shall normally be published a month before the final examinations.

5.3 A student who obtains a CA mark below the minimum acceptable mark will not be allowed to sit for the examinations. The student shall be required to meet the minimum CA requirements before being allowed to sit for the next available examination. The student may write as first sitting during supplementary examinations.

5.4 The final written examinations will normally be accompanied by an associated oral and/or laboratory practical examinations. In the clinical study modules students will

Think in other terms

have to pass the practical clinical examination and at least score 40% on the written examinations separately.

5.5 In the Medical Placement period, the total assessment will be made up of the following:

Supervisors' combined assessments: 20%,
Oral examination with presentation: 20%
Report (typed and bound):   60%.

6.0.   SUPPLEMENTARY EXAMINATIONS

In line with General Academic Regulations, supplementary examinations will be allowed at the end of each module, provided the student has satisfied the examiners in at least half of the combined total assessments, usually modules as indicated above. If the student is to be allowed to supplement in any module his/her overall mark for that module should be at least **40**% and his/her aggregate mark for that part of the programme should be at least **50**%.

7.0.   REPEATING MODULES

On failing supplementary examinations, the student shall be allowed to repeat the failed modules only. Regarding modules taught over 2 years. The student shall be granted one year to repeat the module.

8.0.   PROCEEDING AND DISCONTINUING

The student shall be granted permission to repeat all modules in the programme should they fail more than 50% of the modules. The student shall be granted permission to repeat the failed modules twice only. Failure to pass the student shall be requested to withdraw from the Programme.

Medical Placements

All sites to be used for Medical Placements such as: hospitals, clinics or general practice surgeries, must be approved by the Department.

9.0.   AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

9.1 The marking system used for each total assessment being considered shall be:

Think in other terms

75% and above: Distinction (D)
65-74%   : Honours   (H)
50-64%   : Pass   (P)
0 - 49%   : Fail   (F)

9.2 There shall be no overall degree classification on the certificate. There shall be a degree classification on the transcript. The degree transcript may be awarded "with a Distinction" or ''with Honours". For Honours, a candidate must have obtained a minimum of four (4) Honours in the core biomedical modules and at least two (2) Honours in the clinical final examinations. For a Distinction, a candidate must have obtained a minimum of two (2) distinctions in the core biomedical modules and at least two (2) Distinctions in the clinical final examinations.

9.3 The Distinction or Honours classification shall apply to **each** separately examined subject or area of specialisation.

10.   **NOTIFICATION OF RESULTS**

Notification of results shall be within one month of sitting for examinations.

DEPARTMENT OF ANATOMY AND PHYSIOLOGY

Lecturer and Chairperson

Professor J V C Feliu, Doctor in Medicine (Havana), 1st General Surgery (Havana), General Surgery (Havana)

Senior Secretary

Mr M. Kunene, BSc (LSU)

Technicians

Mr D Marange, National Diploma (UZ), Specialist Diploma (UZ)

Mr T Nyirenda, BSc (UZ), MSc (Wits, South Africa)

Mr S Ndlovu, National Diploma (UZ)

ACADEMIC STAFF

Lecturers

Dr R Dangarembizi. , BSc (NUST), MSc (Witswatersrand), PhD (Witswatersrand)

Dr Y B C Malango, MBChB (UZ), FCS Ortho (ECSA),

Mr S Chengetanai, BSc (UZ), MSc (Witswatersrand)

Miss N Mukonowenzou, BSc (NUST), MSc (Witswatersrand)

Technical Assistant

Miss M Mlala, 'O' Level

Think in other terms

PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
MBB 2001	Anatomy	250
MBM 2002	Physiology	280

PART II

Module Code	Module Description	Credits
MBM 2001	Anatomy	250
MBM 2002	Physiology	280

TOTAL CREDITS FOR THE PROGRAMME

Part I	530
Part II	530

Total minimum credits: **1060**

Think in other terms

MODULE SYNOPSES

PART I

Semester I

MBM 2002   Physiology   280 Credits

The module is an introduction to physiology, cell structure and function, transport across the cell membrane; homeostasis and control systems; the nerve cell, resting membrane potential (RMP), stimulus-response characteristics, the neuro-muscular junction; mechanism of contraction and relaxation; muscle performance; neuronal and central synaptic transmission; organisation of reflexes; sympathetic nervous system, parasympathetic nervous system, body fluids and blood, Starling's law of ultrafiltration; properties and functions of the constituents of blood.

Semester II

The module focuses on gastrointestinal motility and secretions, absorption and malabsorption. The kidney: the nephron; regulation of acid-base balance; tubular function; micturition; endocrine functions of the kidney;   Hormones: the hypothalamus; posterior and anterior pituitary; endocrine pancreas; thyroid gland; adrenal glands; calcium homeostasis; adrenal medulla; male and female reproductive systems; the menstrual cycle, contraception, menopause; pregnancy, parturition and lactation.

PART II

Semester I

The module explores the functions and divisions of the cardiovascular (CV) system, distribution of blood pressure and volume, control of blood pressure, CV reflexes, cardiac physiology, the heart as a pump, regional circulation, CV response to exercise, haemorrhage, circulatory shock, hypertension; Functions of the respiratory system, the pulmonary circulation, inspiration, expiration, lung volumes, exchange and transport of gases, voluntary and automatic control of respiration, exercise, fatigue, hypoxia, altitude; deep sea diving. Thermal balance, thermoregulatory set points, acclimitization to heat and cold, aerobic exercise, anaerobic exercise, $VO_{2MAX,}$ exercise performance, exercise and metabolism, health benefits of exercise, central and peripheral fatigue.

Semester II

The module explores the brain and cranial nerves: cerebrovascular physiology, cerebrospinal fluid, the blood-brain barrier, the cerebrum, diencephalon, brain stem, cerebellum, limbic system, basal ganglia, cranial nerves; The spinal cord and spinal nerves, nerve plexuses, reflexes, the reflex arc; Pathways and integrative functions – somatosensory system, touch, pain; temperature; proprioception; vision; audition; vestibular apparatus; smell and taste. Motor pathways, descending control of movements, level of processing, motor control; Higher order processing and integrative function, language, cognition, memory; Brain and behaviour – sleep, seizure activity, physiological assessment of the PNS and CNS, EMGs, brain imaging techniques; CT, MRI, proteomics, genomics as well as gait analysis.

DEPARTMENT OF BIOCHEMISTRY AND PHARMACOLOGY

Lecturer and Chairperson

Ms P Musiwaro, BSc (University of Bradford), MSc (University of Bradford)

Senior Secretary

M Kunene, BSc (LSU)

Technician

Mr D Marange, National Diploma (UZ), Specialist Diploma (UZ)

ACADEMIC STAFF

Associate Professors

Prof B Masola , BSc (UZ), MSc (London)

Lecturers

Mr D Sibanda , BSc (UZ), Mphil (UZ)

Miss T Mpofu , BSc (Rhodes University), MSc (Rhodes University)

Technical Assistant

Miss S Tshuma

Think in other terms

PROGRAMME SUMMARY

PART I

Module Code	Module Description	Credits
MBM 1001	Biochemistry	70

PART III

Module Code	Module Description	Credits
MCP 4006	Medical and Clinical Pharmacology	70

PART IV

Module Code	Module Description	Credits
MCP 4006	Medical and Clinical Pharmacology	70

TOTAL CREDITS FOR THE PROGRAMME

Part I	70
Part III	70
Part IV	70

Total minimum credits: **210**

Think in other terms

MODULE SYNOPSES

PART I

Semester I

MBM 1001   Biochemistry   **70 Credits**

The module looks at biomolecules: Water as solvent, introduction to macromolecular chemistry, structure and function; Enzyme activity and kinetics. Cell Biology and Metabolic Energy: Introduction to major cell structures and processes; The cell membrane, Energy concepts, glycolysis, the citric acid cycle and ATP. Food and Digestion: Macronutrients and micronutrients. Digestive enzymes and absorption processes in the GIT; Lipid uptake and transport; Diarrhoea. Nutrient Metabolism: The Embden –Meyerhof pathway to the citric acid cycle; Anaerobic metabolism, the Cori cycle; Fatty acid oxidation and the ketone bodies. Amino acids and the citric acid scycle; The urea cycle. Human Genetics: Introduction to genetic concepts, genome projects, human chromosomal mapping; Human diversity.; inheritance and genetic diseases.; genetic responses to infectious agents and evolutionary genetics.

PART I

Semester II

The module explores the anabolic pathways: gluconeogenesis, glycogen metabolism; Fatty acid synthesis, synthesis of triacylglycerides, membrane lipids and cholesterol; Amino acid synthesis; Haem synthesis; Nucleotide salvage and biosynthesis. Hormonal Regulation and Tissue Specialisation: Regulatory strategies within cells and between cells; Metabolic specialisation – the brain, muscles, the liver, adipose tissue; The central metabolic roles of the liver and metabolic adaptations.

Think in other terms

DEPARTMENT OF COMMUNITY MEDICINE

Lecturer and Chairperson

Dr H Gunguwo, MSc. Clin. Epi (UZ), MBChB Hons (UZ), Dip. HIV Mgt (CMSA).

Senior Secretary

Ms Lilian Ncube, Nat.Dip. Secretarial Studies (Hre Poly)

ACADEMIC STAFF

Lecturers

Dr A Familusi, MSc in Health Services & Public Health Research (University of Aberdeen), MBChB (Obafemi Awolowo Iniversity Ile-Ife)

Dr M Fallala, M.Med. Family Medicine (Stellenbosch), MBBS (Moscow)

PROGRAMME SUMMARY

PART IV

Module Code	Module Description	Credits
MCP 4002	Community Medicine	90

TOTAL CREDITS FOR THE PROGRAMME

Part IV	90	

Total minimum credits: **90**

Think in other terms

MODULE SYNOPSES

MCP 4002 Community Medicine   **90 Credits**

The module focuses on infectious diseases: prevention, control and surveillance of diseases caused by viruses, bacteria, fungi, protozoa and helminthes; research methods, data analysis and presentation skills; palliative care, herbal and traditional remedies.

DEPARTMENT OF MEDICINE

Lecturer and Chairperson

Dr M. Ndlovu, M.Med Medicine (UZ), MBChB (UZ)

Senior Secretary

Mrs M. Nyoni, Advanced Diploma in Office Technology and Administration (Chinhoyi University of Technology)

ACADEMIC STAFF

Lecturers

Dr R Gwini, MSc Clin. Epi (UZ), M.Med (UZ), MD (Vinnitsa Medical School, Ukraine), SAFRI Fellow, ECSACOP Fellow

Dr M Dixon, MBBS (London). DTM & H. (Liverpool), FRC

Dr T I Gutu, M.Med (Medicine), UZ MBChB (UZ)

Dr S Kajawo, M.Med Internal Medicine (UCT) FCP (SA), Certificate in Clinical Nephrology (SA), Diploma in Internal Medicine (SA), The ISN-ANIO Clinical Nephropathology Certificate Program (CNC), MBchB (UZ)

PROGRAMME SUMMARY

PART III

Module Code	Module Description	Credits
MCP 3201	Clinical Clerkship	45

PART IV

Module Code	Module Description	Credits
MCP 6001	Medicine	150

PART VI

Module Code	Module Description	Credits
MCP 6001	Medicine	130

TOTAL CREDITS FOR THE PROGRAMME

Part III	45
Part IV	150
Part VI	130

Total minimum credits: **325**

MODULE SYNOPSES

MCP 6001 Medicine I   **150 Credits**

The module focuses on history-taking, clinical signs and symptoms, examination and diagnosis of various disorders; Infectious and non-infectious diseases of the respiratory system, heart diseases, diseases of the digestive system, liver disease, hepatobiliary disorders including hypertension, splenomegaly, diabetes mellitus, nutritional disorders; Relevant ethics; appropriate imaging for pathological conditions, radiological techniques and basic physics as well as cost-effective imaging.

MCP 6001 Medicine II   **130 Credits**

The module examines history-taking, clinical signs and symptoms, examination and diagnosis of the following: renal, endocrine, haematological, neurological, rheumatological, dermatological, ophthalmological and oncological diseases and disorders; review of systematic medicine; appropriate, cost-effective imaging techniques and procedures, imaging algorithms; legal requirements in cases of sudden deaths, suspected poisoning and cremation requirements law.

DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

Lecturer and Chairperson

Dr J Moyo, M.Med (Obs & Gynae) (UZ), MBChB (UZ)

Senior Secretary

Ms Lilian Ncube, Nat.Dip. Secretarial Studies (Hre Poly)

ACADEMIC STAFF

Lecturers

Dr T Gunguwo, FCOG (SA), MBA (ZOU), Dip. Pers Mgt (IPMZ) MBChB (UZ)

Mr F M Chiwora, M.Med (Obs & Gynae) (UZ), MBChB (UZ)

PROGRAMME SUMMARY

PART V

Module Code	Module Description	Credits
MCP 5002	Obstetrics and Gynaecology	115

TOTAL CREDITS FOR THE PROGRAMME

Part V   115

Total minimum credits: 115

Think in other terms

MODULE SYNOPSES

MCP 5002 Obstetrics and Gynaecology   **115 Credits**

This module explores obstetric history-taking, clinical signs and symptoms and examination, normal and abnormal pregnancy, the module of normal pregnancy (labour, delivery, operative procedures, post-delivery care); gynaecological history-taking, clinical signs and symptoms, examination, contraception, infections, fistulae and incontinence, abnormal menstruation and sub-fertility, tumours, menopause, surgical techniques; relevant ethics; appropriate and cost-effective imaging techniques; the requirements of the law in Obstetrics and Gynaecology e.g. rape and sexual assault cases evaluation and reporting; maternal deaths legal aspects and reporting procedures.

DEPARTMENT OF PAEDIATRICS

Lecturer and Chairperson

Dr W Ndebele, M.Med Paeds (UZ), MBChB (UZ),

Senior Secretary

Mrs M Nyoni, Advanced Diploma in Office Technology and Administration (Chinhoyi University of Technology)

ACADEMIC STAFF

Lecturers

Dr T. P. Thatha, Diploma in Allergology (SA), Fellowship of the College of Paediatricians (FCPaed), MB.Ch.B (UZ),

Prof M O Ikeogu, D.Med (Bonn), FRCA (Eng), DA (Copenhagen), MRCP (Paeds), DCH (Eng)

Dr P Gapu, MBchB (UZ)

Dr Linos Sibanda, MBChB (University of Zambia)

Dr C Mahlanze, MBChB (University of Zambia)

PROGRAMME SUMMARY

PART V

Module Code	Module Description	Credits
MCP 5001	Paediatrics	150

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PART VI

Module Code	Module Description	Credits
MCP 5001	Paediatrics	150

TOTAL CREDITS FOR THE PROGRAMME

Part V	150
Part VI	150
Total minimum credits:	**300**

MODULE SYNOPSES

MCP 5001   Paediatrics   150 Credits

Two approaches will be used in this module: Problem oriented approach learning and Systems based learning. The two approaches are complementary and can be reflected in evidence-based clinical approach. The first is meant to give practical overview of relevant conditions based on signs and symptoms while the second deals with specific details of the conditions relevant to the problem. Both the problem oriented and systems based approach must be presented in such a way that allows integration of the various components of a morbid state. It is important to recognise the effect of age and growth on clinical presentation and treatment of diseases in children. There is an inverse relation between age and mortality and morbidity. Emphasis will have to be laid on the major causes of morbidity and mortality on children particularly those which are avoidable. This enables the student to concentrate on the more serious diseases and learn them in some detail.

Think in other terms

DEPARTMENT OF PATHOLOGY

Lecturer and Chairperson

Dr B. Zambuko, M. Med (UZ), MBChB, (UZ)

Senior Secretary

R.S Kondongwe, BSc (GZU).

Technician

Mr A Munengami, National Diploma (UZ), Specialist Diploma (UZ).

Mr Maunga, BSc (UZ)

ACADEMIC STAFF

Lecturers

Dr R K H Chigangacha, MMed (UZ), MBChB, (UZ)

Dr G.A Mavondo,(PhD),(Kwazulu Natal), MSc (UZ),Specialist Diploma (UZ),General Diploma (UZ)

Dr Mhlanga C, (PhD),(Kwazulu Natal) MSc (UZ)**,** Specialist Diploma (UZ), General Diploma in Medical Laboratory Technology, (UZ),   Diploma (UZ),

Dr M. Mzingwane, (PhD), (UZ), MSc (UZ), BSc Hons (NUST)

Dr B. Muringani, (PhD), (Walter Sisulu University), MSc (UZ), Specialist Diploma (UZ), General Diploma (UZ), (Clinical Biochemistry, Specialist (UZ) Diploma Medical Laboratory Technology,(UZ) General Diploma -Medical Laboratory Technology,(UZ)

PROGRAMME SUMMARY

PART III

Module Code	Module Description	Credits
MBM 3001	Chemical Pathology	260
MBM 3001	Haematology	
MBM 3001	Immunology	
MBM 3001	Medical Microbiology	
MBM 3001	Histopathology	

TOTAL CREDITS FOR THE PROGRAMME

Part III   260

Total minimum credits: 260

MODULE SYNOPSES

MBM 3001 Pathology   **260 Credits**

Chemical Pathology

The module will look at the introduction to Clinical Biochemistry; Quality assurance; Water and electrolytes homeostasis; Acid-base balance and associated disorders; Renal function and non-protein nitrogenous compounds; Plasma proteins abnormalities; Carbohydrates metabolism and associated disorders; Lipids, lipoproteins and apolipoprteins metabolism and diseases; Clinical enzymology; Gastrointestinal and pancreatic dysfunction; Macronutient nutritional assessment;

Vitamin Nutritional Assessment; Trace Elements Nutritional Assessment as well as liver function clinical lab assessment. It will also look at: Nervous system; General endocrinology diseases; Thyroid hormones dysfunction; Parathyroid hormone abnormalities; Adrenal gland hormones disorders; Reproduction endocrinology abnormalities; Biochemical assessment in pregnancy; Neonatal and paediatric clinical lab assessment; Geriatric clinical lab assessment; Tumour markers and oncology; Immunoassays; Molecular biology techniques; Polymerase chain reaction (PCR; Genetic therapy and testing; Therapeutic drug monitoring (Toxicology) and Side room/bedside testing techniques.

Histopathology

This is a concise module on general pathology; principles, inflammation, tissue repair, haematology, immunology, genetic pathology, neoplasia, infections and environmental diseases, Atherosclerosis, Thrombosis, ischaemia and infarction.

Immunology

The objective of the module is to introduce the physiological functions of the adaptive and innate aspects of the immune system. This involves the introduction of the key players, which are the cells, primary and secondary organs. The student should understand where the cells are produced, where they mature and how they interact with each other in the module of the immune response. The interactions involve membrane bound ligands and receptors. Specificities of the normal immune function in specialized compartments such as the mucosal surfaces, the central nervous system and the privileged sites shall be discussed. Basic knowledge about development and mechanisms involved in innate and adaptive immunity (antibody-dependent and cell-dependent immunity) as well as the role of the complement cascade shall be introduced. The understanding shall be assessed by written continuous assessment tests. Practical sessions will be conducted and assessed.

General Microbiology

The module focuses on scope and historical perspective; Classification; microscopy; prokaryotic and eukaryotic cell structures and function; Morphology and staining characteristics; Bacterial and fungal physiology and metabolism; Bacterial genetics; Isolation and identification; Viral properties, structure and function; Classification of parasites – protozoa, trematodes, cestodes, nematodes; structure, lifecycle, nutrition and reproduction of parasites. It firther looks at clinical microbiology; Mechanisms of infection; Antibiotics, antifungals, antiviral agents and anti-

parasitic agents; Pathogenic bacteria and associated diseases - pathogenesis, clinical signs and symptoms, laboratory diagnosis, control and treatment; fungal diseases, laboratory diagnosis and treatment; viral infections, laboratory diagnosis and treatment; Tropical diseases, laboratory diagnosis and treatment; Opportunistic infections and nosocomial infections and prions.

DEPARTMENT OF PSYCHIATRY SOCIAL AND BEHAVIOURAL SCIENCES

Lecturer and Chairperson

Dr N Mawere, Dip.(Mental Health (UZ), M.Med Psychiatry (UZ), MBChB (UZ)

Senior Secretary

Mrs M Nyoni, Advanced Diploma in Office Technology and Administration, (Chinhoyi University of Technology)

ACADEMIC STAFF

Lecturers

Mrs T Mukwidigwi, Post – Graduate Diploma in Tertiary Education, (Bindura University of Science Education), BSc (Hons) in Sociology, (UZ), MSc in Sociology and Social Anthropology (UZ), BSc (Hons) in Sociology, (UZ)

Mr T Luzane, Dip in Ed (University of Zambia),   B. Ed. (UZ), MSc IN public health (MPH) with Loma Linda University, California, (USA), Health Education Advanced Leadership Programme for Zimbabwe (HEALZ)

PROGRAMME SUMMARY

PART II

Module Code	Module Description	Credits
SBS 2100	Social and Behavioural Sciences	40

PART IV

Module Code	Module Description	Credits
MCP 4005	Psychiatry	25

Think in other terms

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TOTAL CREDITS FOR THE PROGRAMME

Part II	40
Part IV	25

Total minimum credits: **65**

MODULE SYNOPSES

SBS 2100 Social and Behavioural Sciences   **40 Credits**

The aim of Social Behavioural Sciences is to equip medical trainees with behavioural and social science-derived knowledge, skills, and attitudes required to practice medicine effectively, accurately describe the influence and potential implications of culture and community context on health behaviours, beliefs and outcomes, as well as how physicians should appropriately integrate this knowledge into patient care, managing the potential impact of changes in governmental and private-sector health policies, advocacy on behalf of individuals and groups of patients in relation to the policy's intended consequences, access to patient information within medical records, including the Electronic Medical Records, understand the consequences of emerging forms of clinical recording, use of appropriate sources of information that identify and explicate a significant public health issue; be able to analyze data and information to reach a defensible conclusion, carefully noting specific limitations to inferences made.

MCP 4005 Psychiatry   **25 Credits**

The module aims to equip students with appropriate skills based on a sound knowledge base in an environment which is conducive to application of such theory to clinical psychiatric practice; to demonstrate proficiency in conducting comprehensive client assessments, diagnosing and formulating holistic management plans; to consolidate theoretical knowledge on psychopathology, therapeutic and psychological interventions through lectures and clinical instruction in an environment that avails live examples; to demonstrate understanding of the various therapeutic modalities as unique to different psychiatric disorders; to exhibit professional skills in interaction with mentally ill, their families and the community; to demonstrate understanding of dealing with children and adolescents with psychiatric disorders as a unique group with special needs as well as to exhibit professional, ethical behavior in response to the demands of the Mental Health Act and Forensic Psychiatry requisites. It is an introduction to Mental Health: Schools of psychopathology. General psychiatry, psycho-pharmacology, mental retardation, forensic psychiatry, clinical and medical ethics, rehabilitation/occupational therapy, the Mental Health Act, admissions, discharge and follow up, roles of family, social welfare and community in psychological support and rehabilitation.

Think in other terms

DEPARTMENT OF SURGERY AND ANAESTHETICS

Lecturer and Chairperson

Prof E O Enwerem, FWACS (Urol) FICS, FCS (ECSA) MBBS (Ib)

Senior Secretary

Ms L Ncube, Nat. Dip. Secretarial Studies (Hre Poly)

ACADEMIC STAFF

Lecturers

Mr M S Magara, FCS (Gen Serg) ECSA, MBChB (UZ)

Mr C Msasanure, FCS (Ortho) ECS, MBChB (UZ),

Mr M Ntoto, M.Med (Surgery) (University of Kinshasa), MBBS, (University of Kinshasa)

Mr S G Mungazi, M.Med (Gen Surg) (UZ), MBChB (UZ)

Mr T Mukosera, M.Med (Gen Surg) (UZ), MBChB (UZ)

Dr N C Lenge Katwamba, M.Med (Anaesthetics), (University of Kinshasha),Doctor of Medicine, (University of Kinshasa)

Dr N S Dube, M.Med (Anaesthetics) (UZ), MBChB (UZ)

PROGRAMME SUMMARY

PART IV

Module Code	Module Description	Credits
MCP 6002	Surgery and Anaesthetics	150

PART VI

Module Code	Module Description	Credits
MCP 6002	Surgery and Anaesthetics	130

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TOTAL CREDITS FOR THE PROGRAMME

Part IV	150
Part VI	130

Total minimum credits: **280**

MODULE SYNOPSES

PART IV

MCP 6002 Surgery and Anaesthetics **150 Credits**

The module examines history-taking, clinical signs and symptoms, examination; general surgery: all systems, theatre, operative care; trauma and Orthopaedic surgery: ATLS, controlling bleeding, systematic approach to injuries, fractures, arthritis, sepsis, TB, contractures, backache surgical specialties (Urology and Ear, Nose and Throat surgery); relevant ethics; appropriate imaging techniques: Relevant physics, imaging machinery and techniques: X-Ray machines, ultrasound, CT and PET scans, magnetic resonance imaging. Preparing and educating the patient; cost-effective imaging; physiology and stages of general, local and regional anaesthesia, the golden rules of anaesthesia, commonly encountered problems, the pre-op visit, operative

Think in other terms

care, regional anesthetic methods, intravenous anaesthesia, inhalation anaesthesia, equipment foe anaesthesia, special situations, medical constraints, ICU care as well as pain control.

PART VI
MCP 6002 Surgery and Anaesthetics   **130 Credits**

This module focuses on surgical specialties: Neurological surgery: aneurisms, tumours, thromboses, abscesses. Ophthalmology: infectious disorders of eye, cataract, glaucoma, trachoma; endocrine surgery: disorders of thyroid, parathyroid, adrenal glands, tumours; plastic surgery: Skin grafts, flaps/Z-plasty, contractures, reconstruction; paediatric surgery: correction of congenital disorders e.g. hydrocephalus, maldescended testis, imperforate anus, and cleft lip/palate. Review of general and orthopaedic surgery and trauma; appropriate, cost-effective imaging techniques and procedures; imaging algorithms; relevant aspects of the law in medicine as perceived and practiced by the surgeon shall be taught e.g. Table deaths, deaths from unnatural causes, trauma victims and completing affidavit for the courts

DEPARTMENT OF NURSING AND MIDWIFERY SCIENCES

Senior Lecturer and Chairperson

Dr C.N. Chaibva, Dip in Nursing Administration (Parirenyatwa Hospital), Dip in Midwifery, Dip in General Nursing (Mpilo Hospital), BAdEd (UZ), Dip in Adult Education (UZ), MSc in Nursing Science- Midwifery/MCH (UZ), PhD in Health Studies (UNISA)

Secretary

H. Moyo, Dip in Secretarial Studies, (Byo Polytechnic), Bcom HIR, 2016 (ZOU)

ACADEMIC STAFF

Lecturers

Dr J.A. Chamisa, RGN (Mpilo Hospital), Dip. Midwifery, (Mpilo Hospital) BSc Bad Ed (UZ) MSc in MSC/Midwifery, (UZ), PhD in Health Sciences (UNISA)

Mrs C. Gwatiringa, Diploma in Mental Health/Psychiatry Nursing (Ingutsheni Hospital), Dip in General Nursing (Mpilo School of Nursing), Diploma in Nursing Administration/Community Nursing (DNA) (Parirenyatwa Post Basic School), Diploma in Midwifery (Mpilo Maternity Hospital), MSc NS (UZ), MBA Executive (NUST)

Mrs Y. Chauraya, Dip in Midwifery, (Nurses Council of Zimbabwe, Dip in General Nursing (Harare Central Hospita), International Certificate in Paediatric Nursing, 2001 (Dina Academic School of Nursing, Petach Tikva, State of Israel), BSc in Nurse Education, 2005 (ZOU), MSc in Nursing Science (UZ)

UNDERGRADUATE DEGREE PROGRAMME:

SPECIAL REGULATIONS

BACHELOR OF SCIENCE HONS DEGREE IN MIDWIFERY (BSC HON MWB)

1.0   PREAMBLE

The program is specifically designed to develop a graduate midwifery practitioner capable of applying the recommended essential competencies for midwifery practice. The graduate midwife should develop critical analytic skills necessary for making informed decisions in the provision of evidence based practice. He/she should be capable of providing woman-centred care and respectful care in both hospital and community settings; and promote culturally sensitive care as well as apply reflective thinking. The aim of the Bachelor of Science Honours Degree in Midwifery is to upgrade midwifery diploma holders. The module recognises prior learning experiences as a registered nurse and midwife and provides a framework with which one can enhance his/her professional practice. The degree programme has been developed to build upon and enhance midwifery practice; it also supports career pathways for the midwife in clinical practice, education, research as well as leadership and management.

2.0   ENTRY REGULATIONS

2.1   To be eligible for admission the candidate must have at least 5 'O' level passes including English, Mathematics and Science. An 'A' level qualification will be an added advantage.

2.2   Have a midwifery qualification (Registered General Nurse with a diploma in midwifery or a Registered Midwife with a diploma certificate).

2.3   Be registered with the Nurses Council of Zimbabwe and have a current Practising Certificate. Have at least 2 years' work experience post midwifery qualification.

3.0   ASSESSMENT OF CANDIDATES

3.1 Assessment and evaluation shall be based on continuous assessment (CA), written formal examinations and a final year research project.

Think in other terms

3.1.1 Continuous Assessment (30%)

The student's learning outcomes are assessed after each teaching unit. Continuous assessment (CA) will contribute not less than 30% of the overall mark and shall consist of various exercises such as assignments, case studies, unit tests, clinical practicum and seminars. To be eligible for examinations, a student shall be required to have a minimum continuous assessment score of 50%.

3.1.2 Final Examinations (70%)

The final examinations shall comprise one written paper and practical assessments. The minimum final examination pass score shall be at least 50%. The written examinations will contribute 60% while the practicum will be 10%

3.1.3 Research Project (100%)

The assessment score for the final year research project shall be 100%.

3.2 Examinations

3.2.1 The General Academic Regulations for undergraduate degrees shall apply.

3.2.2 Formal examinations will be conducted at the end of each semester for all modules.

3.2.3 The student should attend a minimum of 80% sessions to be eligible for examinations

3.2.4 Where a module has a theoretical and a practical component, the student must pass both independently.

3.2.5 Each module shall be marked out of one hundred percent (100%).

4.0 DETERMINATION OF RESULTS OF MODULES

A candidate who fails to satisfy the Examiners in terms of these General Academic and Faculty Regulations may be required by the Senate to write Supplementary Examinations, Repeat, Discontinue and Withdraw.

5.0 SUPPLEMENTARY EXAMINATIONS

A candidate who scores less than an overall examination mark of 40% and above will be allowed to sit for a supplementary examination. All supplemented modules shall be awarded a maximum pass grade of 50%.

6.0   REPEATING MODULES

A candidate who scores an overall examination mark of less than 40% but has passed at least 50% of the modules in that part will not be allowed to proceed but may be allowed to repeat.

7.0   PROCEEDING AND DISCONTINUING

A candidate who fails more than half of the modules for any part of the programme or obtains an overall aggregate mark of less than 40% should discontinue.

8.0   AWARDING OF A DEGREE AND CLASSIFICATION OF THAT DEGREE

To be awarded the degree, the student must pass all the modules constituting the programme including the final year project.
The following marking scheme shall be adopted:

75% and above   -   1 (First Division).

70% - 74%   -   2.1 (Upper Second Division).

60% - 69%   -   2.2 (Lower Second Division).

50% -59%   -   P (Pass)

Below 50%   -   F (Fail

10.0   NOTIFICATION OF RESULTS

 Notification of results shall be within one month of sitting for examinations.

Think in other terms

PROGRAMME SUMMARY

YEAR I

Module code	Module Description	Credits
Semester One		
PLC 1101	Conflict and Transformational Leadership	10
MWB 1101	Anatomy of the Female and Male Reproductive Systems	15
MWB 1102	Physiology of the Reproductive Systems	15
MWB 1103	Embryology	15
MWB 1104	Applied Biochemistry	12
MWB 1105	Applied Biophysics	12
MWB 1106	Microbiology and Parasitology	12
Semester Two		
MWB 1201	Psychology in Reproductive Health	12
MWB 1202	Sociology in Reproductive Health	12
MWB 1203	Philosophical Basis of Midwifery	12
MWB 1204	Professional Issues in Midwifery	12
MWB 1205	Theories and Models of Midwifery Care	12
MWB 1206	Research 1	15

YEAR II

Module code	Module Description	Credits
Semester One		
MWB 2101	Normal and Abnormal Pregnancy	15
MWB 2102	Normal and Abnormal Labour	15
MWB 2103	Normal and Abnormal Puerperium	15
MWB 2104	Normal New-born and Neonate	15
MWB 2105	Abnormal New-born and Neonate	15
MWB 2106	Health Assessment	15

Semester II	**Module Description**	**Credits**
MWB 2201	Abortion Care Needs for Women	15
MWB 2202	Pharmacology for Midwives	12
MWB 2203	Biostatics and Epidemiology	15
MWB 2204	Sexual and Reproductive Health Issues	15

Think in other terms

MWB 2205	Research II	15

YEAR III
Semester One

MWB 3101	Community Midwifery	12
MWB 3102	Mental Health Issues	12
MWB 3103	Child Health and Immunisation	12
MWB 3104	Approaches to Midwifery Education	12
MWB 3105	Leadership and Management	12

Semester Two

MWB 3201	Financing and Marketing Health Services	12
MWB 3202	Health Policy and Planning	12
MWB 3203	Research Project	60
TOTAL CREDITS		**512**

Think in other terms

FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION

Think in other terms

A/Dean
Dr Mabhena Mpofu, PhD (University of Fort Hare), M Ed (ZOU), B Ed (UZ), CE (Gwanda ZINTEC)

Senior Assistant Registrar
Mrs C V Ngwenya, MEd (MSU), PGDSSM (Stellenbosch), BEd (UZ), CE (UCE)

Chief Secretary
M Moyo, HND Office Management, ND Secretarial Studies, Diploma in Management, NC Secretarial Studies

Chief Technician
Mr C Masango, BSc (BUSE)

Think in other terms

FACULTY REGULATIONS

1.0   PREAMBLE

1.1   The Faculty of Science and Technology Education seeks to offer world-class programmes in identified areas of science, technology, engineering, mathematics (STEM) and design education. The Faculty aims to prepare quality practitioners, educators and professionals for the secondary and post-secondary school education sector, suitable for serving in a wide variety of environments for teaching, training and skills development. The Master's and Doctoral programmes offered in the Faculty shall prepare technologically-inclined senior professionals for leadership in raising the level of scientific and technological appreciation among the general populace.

1.2   These regulations should be read in conjunction with the General Academic Regulations for Undergraduate Degrees of the University, and the General Academic Regulations for Postgraduate Diplomas, Masters Degrees by Module work, Master of Philosophy Degrees and Higher Doctorate degrees (both hereinafter referred to as the **General Academic Regulations**).

2.0   PROGRAMMES OFFERED IN THE FACULTY

The Faculty of Science and Technology Education at NUST is made up of three departments which offer the programmes listed below:

2.1   **Department of Art, Design and Technology Education (ADTE)**
2.1.1 **Undergraduate**
2.1.1.1 Bachelor of Design Education Honours (BDesEd Hons)
2.1.2 **Postgraduate**
2.1.2.1 Master of Design Education (MDesEd)

2.2   **Department of Science, Mathematics and Technology Education (SMTE)**
2.2.1 **Undergraduate**
2.2.1.1 Bachelor of Science Education Honours (BScEd Hons) (in Specialist subject)
2.2.2 **Postgraduate**
2.2.2.1 Postgraduate Diploma in Science and Technology Education (PGDSTE)
2.2.2.2 Master of Science Education (MScEd)

2.3   **Department of Technical and Engineering Education and Training (TEET)**
2.3.1 **Undergraduate**
2.3.1.1 Bachelor of Technology Education Honours (BTechEd Hons) (in Specialist subject)
2.3.1.2 Short Modules in Engineering and technology
2.3.2 **Postgraduate**
2.3.2.1 Postgraduate Diploma in Higher Education (PGDHE)
2.3.2.2 Master of Technology Education (MTechEd)

Think in other terms

2.3.2.3 Diploma in Engineering and Technology Education (Short modules)

2.4   **Faculty Higher Degree Programmes**

In addition, the Faculty offers the following faculty-wide and cross-disciplinary higher degrees by research:

2.4.1   Master of Philosophy (MPhil)

2.4.2   Doctor of Philosophy (PhD)

3.0   FACULTY REGULATIONS FOR UNDERGRADUATE DEGREES

3.1   Entry Qualifications

3.1.1   Applicants for all programmes in the Faculty must have at least five 'O' level passes including English Language and Mathematics.

3.1.2   Applicants for normal entry must have a minimum of two 'A' level passes including the subject intended for study.

3.1.3   Applicants for special entry in undergraduate programmes must have an approved post-secondary school diploma or certificate in the subject of their specialization and in education. They must also normally have a minimum of **two** years teaching or related experience.

3.2   Programmes and mode of study

3.2.1   All undergraduate programmes consist of taught modules, Industrial Attachment/Work-based experience (work-based learning) and a final year project.

3.2.2   Programmes shall be delivered in any of the following modes: full-time, block-release, part time or parallel sessions and shall include one or more of face-to-face, online and blended learning approaches.

3.2.3   Where appropriate, bridging modules shall be offered to candidates prior to embarking on a programme.

3.3   Assessment

3.3.1   Undergraduate programmes

3.3.1.1 Unless specified otherwise, all theory taught modules, Industrial Attachment/Work-based experience and the final year project shall bear a continuous assessment component (40%) and an examination (60%).

3.3.1.2 Assessment of modules with a practical component, unless specified otherwise, shall be weighted as follows: continuous assessment 20%; practical 20% and examination 60%.

3.3.1.3 The continuous assessment component must normally consist of at least **two** distinct and appropriately weighted pieces of work submitted by the students including assignments, tests, presentations, reports, projects, portfolios, etc.

3.3.1.4 The practical component shall normally consist of at least **two** separate and appropriately weighted submissions of laboratory/workshop/studio/fieldwork reports, tests, assignments, products, artefacts, portfolios, etc.

3.3.1.5 In order to pass a module, a candidate must attain a score of at least 35% in all the components of assessment, i.e. the continuous assessment, the practical assessment and in the examination, whichever applies to him/her.

3.3.1.6 Assessment of the Industrial Attachment/Work-based experience (WBE) shall consist of continuous assessment (assessment reports from university and the candidates' workplace) and the examination component (work-based experience file, log book, and analytical report)

3.3.1.7 The minimum overall pass mark in each module and in aggregated part or programme marks shall be 50%.

3.3.1.8 The grading system for each module and part aggregate shall be as stated in the General Regulations.

3.3.1.9 Except where it is specified otherwise, the General Regulations of the University concerning pass and fail, proceeding to the next part, carry over modules, repeat, withdrawal and discontinue shall apply.

3.3.1.10   For degree classification, the programme part weightings and credit allocations shall be as follows:

Part I   10%
Part II   20%
Part III   20%
Part IV   50%
Total   100%

3.4   Award of the degree

3.4.1   Candidates for each degree programme must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.

3.4.2   For the degree to be awarded, the total number of credits must be satisfied i.e. 480 credits for the honours Bachelor degree and 288 credits for the Masters degree.

3.4.3   The classification of the degree programmes shall be as in the General Academic Regulations.

3.4.4   Higher degrees by research only shall not be classified.

4.0   FACULTY REGULATIONS FOR TAUGHT POSTGRADUATE DEGREES

4.1   Entry Requirements

4.1.1   Applicants for postgraduate study programmes must have, in addition to the basic requirements for admission into the University, the minimum qualifications required by the appropriate programmes.

4.1.2   These qualifications normally comprise a relevant first degree in a specified study area and a specified period of work experience.

4.2 Programmes and Mode of Study

4.2.1   The programmes on offer include Postgraduate Diplomas and Masters by Module work.

4.2.2   The programmes will be offered on any of these modes: full time, part time and block release sessions.

4.2.3   Masters by module work programmes shall consist of a dissertation component whose weighting shall normally be 25% of the overall degree aggregate.

4.2.4   The taught component of the Masters by module work shall consist of common modules in education and professional studies, as well as specialist teaching subject modules.

4.2.5   The mode of study for programmes by research only shall be guided by the University's General Academic Regulations for Postgraduate programmes.

4.3 Assessment

4.3.1   Assessment of the taught masters programmes by module work and dissertation shall normally follow the provisions of the General Regulations.

4.3.2   All taught modules shall bear a continuous assessment component (40%) and an examination (60%).

4.3.3   To proceed from Part I to Part II, a candidate must pass at least six (75%) of the modules studied.

4.3.4   The determination of the overall degree aggregate and credit allocation for a taught Masters programme with a dissertation component shall be:

Part I	Taught modules	50%
Part II	Taught modules	25%
	Dissertation	25%

4.4 Award of the degree

4.4.1   Candidates for each degree programme must satisfy the examiners in all the prescribed modules and in all requirements for the programmes in which they seek to be awarded the degree.

4.4.2   For the Masters degree to be awarded, candidates must obtain 288 credits.

4.4.3   The classification of the degree programmes shall be as in the General Academic Regulations.

4.4.4   Higher degrees by research only shall not be classified.

5.0 KEY TO MODULE CODES

The following code ranges shall be used for creating and identifying all modules in the Faculty:

00-19   Education and professional studies
20-24   Art and Design
25-29   Design and Technology
30-34   Mathematics
36-39   Biological Science
40-44   Chemistry
45-49   Mechanical Engineering

Think in other terms

50-54   Electrical and Electronic Engineering
55-59   Civil and Construction Engineering
60-64   Accounting, Business Management, Economics
65-69   Hotel, Tourism and Wildlife management
70-74   Physics
75-79   Computer Science and Engineering
80-84   Technical graphics
85-89   Wood science & Technology
90-94   Clothing, Textile & Fashion Design
95-99   Environmental Science

6.0   REGULATIONS FOR HIGHER DEGREES
6.1   Introduction
These regulations apply to the research degrees of Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) degrees offered by the faculty. The regulations should be read in conjunction with the university's general regulations for postgraduate programmes, and the relevant faculty and/or university guidelines for higher degrees.

6.2   Faculty Research focus areas
The Faculty encourages inter-disciplinary and cross-departmental research. Candidates may select research topics which interlace with one or more of the following current themes and focus areas of the Faculty:

6.2.1   Science, technology, engineering and mathematics (STEM) education curricula and assessment processes (from early childhood to tertiary and higher education).

6.2.2   Technical and vocational education and training (TVET), design and technology (D&T) education, policy, planning, theory and practice, implementation and evaluation.

6.2.3   STEM, TVET, D&T pedagogy, teacher-student interaction, student engagement, learning outcomes.

6.2.4   Teacher and student emotional development, motivation, discipline, learning styles, self-efficacy and epistemological beliefs.

6.2.5   Leadership, management, supervision, policy, standards and quality in science and technology (S&T) education planning, delivery and evaluation.

6.2.6   Quantitative and qualitative research, design-based research, research-based practice in STEM education.

6.2.7   Work-integrated learning, industrial attachment, experiential learning, service to community.

6.2.8   Information and communication technologies (ICTs) in STEM education, Mobile learning, E-learning, digital pedagogies, Technology-enhanced learning.

6.2.9   Gender, inclusiveness, social support, science and technology literacy, group learning, student support and help-seeking, learning environments, resources and the digital divide.

Think in other terms

6.3 Learning outcomes for research candidates
6.3.1 General outcomes
In general, the expectations of the Faculty for research candidates are that they go through an independent but properly guided process of enquiry and intellectual engagement in which they acquire critical and relevant skills relating to problem-solving and competent application of innovative and cutting-edge knowledge. Such skills may be summarized in the following sub-headings:

- Systematic, scientific research capability
- Communication and interactive engagement
- Personal organization and efficiency
- Depth of knowledge

The guidance provided to the candidate will be through one or more Supervisors suitably qualified and preferably more experienced in the area of research than the candidate. The guidance may also include customized lectures, seminars, workshops, conferences, laboratory and field work.

6.3.1 Academic outcomes
All candidates for research degrees should be able to identify a research or design problem or opportunity, develop and defend a research proposal, carry out scientifically approved data collection procedures, systematically analyse results and make necessary conclusions and recommendations on their findings. Competence in research skills and scholarly engagement will be measured primarily through a written dissertation or thesis, an oral defence of the research, and supported by conference presentations and/or journal publications, practical designs and products.

6.4 Master of Philosophy (MPhil)

6.4.1 Admission
6.4.1.1 In addition to the general requirements for admission into the university, all applicants to the research degree must be in possession of:
6.4.1.1.1   a relevant honours degree awarded in the first or upper second class division, or
6.4.1.1.2   the relevant postgraduate diploma awarded with a distinction or merit
6.4.1.2 Applicants must submit a research proposal together with their application for consideration in determining their acceptance into the degree programme.
6.4.1.3 Admission into the programme will be subject to the availability of suitable Supervisors.

6.4.2 Programme of Study
6.4.2.1 The duration of the programme will be a minimum of 12 months full-time or 18 months on part-time. Normally the programme will not exceed three years in duration.

6.4.2.2 Candidates will be expected to pursue a mini-research project in a study area selected from Section 2.0 above or any related topic.

6.4.2.3 Candidates will normally be guided by two supervisors, at least one of whom should be a full or part-time academic staff member in the faculty.

6.4.2.4 Candidates will be expected to attend research-related sessions provided for master's students as part of their research training.

6.4.2.5 The study programme will be composed of the following units:

- PST6311 Advanced Research Methods and Practice
- PST6411 Tools for Basic and Applied Research
- PST7000 Dissertation

Exemption to the taught components, PST6311 and PST6411, will be negotiated and granted to candidates with approved equivalent qualifications.

6.4.2.6 The dissertation will be of specified length as agreed between the candidate and the Supervisor(s), but will generally be expected to be no less than 75000 words.

6.4.3 **Assessment**

6.4.3.1 Candidates will be expected to pass both the taught modules and the dissertation before being awarded the degree.

6.4.3.2 Assessment of the thesis will be determined by progress and competence in accomplishing all stages of the research project, to the satisfaction of the candidate's supervisors, the Faculty Higher Degrees Committee and the appointed examiners of the dissertation.

6.4.3.3 The stages of a research project will consider, but not be limited to, the following:

- Research proposal development and defence,
- sourcing, presentation and analysis of relevant literature,
- developing an appropriate research design,
- data collection, analysis and interpretation,
- generation of new knowledge,
- oral examination and/or defence of study outcomes,
- and production of a written dissertation report of approved standard.

6.4.3.4 Appointment of examiners for the dissertation will be done in accordance with the University General regulations.

6.5 **Doctor of Philosophy (PhD)**

6.5.1 **Admission**

6.5.1.1 Candidates must:

6.5.1.1.1   Have successfully completed, or about to complete, the Master of Philosophy degree, or

6.5.1.1.2   Possess a relevant Master's degree in approved areas of study relevant to the faculty's requirements.

6.5.2 Programme of Study

6.5.2.1 The duration of the programme will be a minimum of 2 years on full-time study and a maximum of 5 years part time study. The candidate will be expected to complete the degree within 7 years.

6.5.2.2 The programme will be composed of two units:

PST7000 Thesis

PST7001 Research colloquium

6.5.2.3 The thesis will be a scientific report of minimum 120 000 words, and at least one journal article, developed in close liaison with the appointed supervisors.

6.5.2.4 The research colloquium will consist of a variety of research-related professional engagements in general or in the candidate's research area including but not limited to the following: attendance and participation in faculty-supported workshops, seminars, lectures, conferences, funded and unfunded projects, publications, designs, patents, etc.

6.5.3 Assessment

6.5.3.1 Assessment of the degree will be determined by progress and competence in accomplishing all stages of the research project, to the satisfaction of the candidate's supervisors, the Faculty Higher Degrees Committee, external examiners and Academic Board.

6.5.3.2 Internal assessment of a research project will consider, among others, the following processes: Research proposal development and defence, sourcing, presentation and analysis of relevant literature, developing an appropriate research design, data collection, analysis and interpretation, generation of new knowledge or product, oral examination and/or defence of findings and conclusions, and production of a written thesis report of approved quality and standard.

6.5.3.3 At least three External Examiners will be appointed to examine the thesis report in accordance with the University General regulations.

6.5.4 Award of the degree

6.5.4.1 The award of the degree will be subject to the successful and satisfactory completion of the research colloquium, the thesis report and the journal article.

6.5.4.2 The degree shall be awarded in the fail or pass grade.

DEPARTMENT OF ART DESIGN AND TECHNOLOGY EDUCATION

Lecturer and Chairperson
M. Dlodlo (Nxumalo), Bed. (University of Zimbabwe), MA in Education Studies University of Surrey

Lecturer
F.N. Tlou, BA Ed (University of Sierra Leone), MED CA (University of Zimbabwe), PhD (University of Fort Hare)

Secretary
P. Dube, NC Secretarial Studies, ND Secretarial Studies, HND- Office Management – (Bulawayo Poly).

APPLIED ART & DESIGN
PROGRAMME SUMMARY

YEAR I

Module Code	Module Description		Credits
PDT1120	History of Design		10
PDT1121	Traditional & Contemporary Art		10
PDT1123	Modelling & Materials		10
	3 Education Modules	30	
PDT1220	Drawing & Anthropometrics		10
PDT1221	Design Analysis		10
PDT1222	Fine Art Studio		10
	3 Education Modules	30	

YEAR II

PDT2122	Electronic Imaging		10
PDT2124	Practical Development of Designs		10
PDT2127	Design Processes		10
	3 Education Modules	30	
PDT2222	Fine Art Studio II		10
PDT2223	Set Designs		10
PDT2224	Product Development		10
	3 Education Modules	30	

YEAR III

PST	Industrial Attachment	120

YEAR IV

PDT4122	Design Media		10
PDT4123	Visual Inquiry		10
PDT4121	Principles of Marketing		10
	Education Modules	20	
PST4020	Final Year Project		20
PDT4221	Design Enquiry		10
PDT4224	Personal Development		10

Think in other terms

PDT4227	Graphics Designs	10
	3 Education Modules	20
Total		**480**

CLOTHING TEXTILES & FASHION DESIGN

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description		Credits
PDT1190	Fibres Yarns & Fabrics		10
PDT1191	Textile & Fabric Design		10
PDT1193	Fabric Production		10
	3 Education Modules	30	
PDT1290	Testing of Yarns & Fabrics		10
PDT1291	Finishing & Finishes		10
PDT1294	Preparation Processes		10
	3 Education Modules	30	
YEAR II			
PDT2190	Life Style and Fashion Design		10
PDT2192	Textile Modelling		10
PDT2195	Fashion Modelling		10
	3 Education Modules	30	
PDT2290	Clothing Factory Practice		10
PDT2291	Fashion Design		10
PDT2292	Textile Design Techniques		10
	3 Education Modules	30	
YEAR III			
PST	Industrial Attachment		120
YEAR IV			
PDT4191	Principles of Marketing		10
PDT4192	Textile Designs		10
PDT4194	Research in Clothing & Textiles		10
	2 Education Modules	20	
PST4020	Final Year Project		20
PDT42292	Textiles & Fashion Products		10
PDT4224	Personal Development		10
PDT4222	Fashion Graphic Designs		10
	2 Education Modules	20	
Total			**480**

Think in other terms

DESIGN AND TECHNOLOGY

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description		Credits
PDT1126	Foundations of Design & Technology		10
PTE1145	Engineering Drawing I		10
PDT1147	Modelling & Materials		10
	3 Education Modules	30	
PDT1225	Design Proposals		10
PTE1253	Electronic Eng. Circuits & Devices		10
PTE1256	Workshop Technology & Safety		10
	3 Education Modules	30	

YEAR II

PDT2126	Development of Designs		10
PDT2127	Design Processes		10
PDT2128	Theories of Design & Technology		10
	3 Education Modules	30	
PDT2224	Product Development		10
PDT2226	Contemporary Designs & Technology		10
PDT2227	Aesthetics, Ergonomics & Energy		10
	3 Education Modules	30	

YEAR III

PST	Industrial Attachment		120

YEAR IV

PDT4126	Tool Technology		10
PDT4127	Practical Technology		10
PDT4129	Design & Technology Products		10
	2 Education Modules	20	
PST4020	Final Year Project		20
PDT4227	Graphic Designs		10
PDT4228	Mechanisms Structures & Designs		10
PDT4229	Power Sources & Control		10
	2 Education Modules	20	
Total Credits			**480**

Think in other terms

TOTAL CREDITS FOR EACH UNDERGRADUATE PROGRAMME

Year I   120

Year II   120

Year III   120

Year IV   120

Total Minimum Credits: 480

MODULE SYNOPSES

PDT1120   History of Design   10 Credits
The module is a survey of art, architectural, fashion, textile and graphic designs, a historical study of design techniques, development of designs from Industrial Revolution, contribution of the art movements and industrial revolution to design, a history of portrait, fashion photography and textile designing and a contribution of art to design.

PDT1121   Traditional and Contemporary Issues   10 Credits
The module is a study and exploration of the critical theory and its application in design, art movements and their role in the development of designs, critical thinking, creativity, innovation and inventions as well as evaluation of contemporary works of designs.

PDT1126   Foundations of Design and Technology   10 Credits
The module looks at issues of definition and scope, nature of design and technology activity, capability and creativity, action knowledge, cognitive processes, development of skills and personal qualities, learning by researching, sustaining learning through motivation and engagement of the learner, contexts: breadth, depth, balance and relevance, transferability of knowledge to design situations and a frame work for progression from one level to another.

PDT1147   Modelling and Materials   10 Credits
The module examines materials classification and their structure, atomic bonding in materials, crystallisation, dislocations, plastic deformation, temperature measurement, phase diagrams, solidification, liquidification, vaporization, alloy formation, types of material, composite, selection and their applications i.e. wood, plastics, ceramics and other alloys. It also looks at materials for Modelling, theories of models and model making, imagination, creativity, innovation and invention, image formation, model making and realization, problem solving, visual patterns, models, prototypes and artifacts. The module also looks at material selection for designs, experimentation with a range of materials, costs of models for designs, classification of properties and analysis of materials for design models and product development, testing and evaluating materials, directory of design materials as well as an analysis of design case studies.

PDT1190   Fibres, Yarns and Fabrics   10 Credits
The module examines the classification of textile fibres; broad outline of production methods of the main man-made fibres; physical and behavioural characteristics, fibres to Yarns, Fibres preparatory processes, carding, intermediate stage-processing and spinning within the various systems, filaments and their preparation and classification.

Think in other terms

PDT1191   Textile and Fabric Design   10 Credits
In this module students should develop a critical appreciation of design through the study of contemporary, historical and multicultural design sources and processes as well as explore a range of traditional, contemporary and experimental textile and fabric design processes and techniques such as design principles, contemporary fashion design, home based and industrial. It also looks at clothing manufacturing processes, textile applications, designing to specification, application of colour and environmental issues.

PDT1193   Fabric Production   10 Credits
The module looks at woven, knitted and non-woven structures, their production, processes, design and analysis advances and future trends, selection of fabrics as well as product design and development.

PDT1220   Drawing and Anthropometrics   10 Credits
The module looks at drawing through perception, importance of drawing skills, mark and image making, principles and skills of drawing: observation, still life drawing and analysis of drawings. There is also an exploration of drawing techniques; pen, pencil and wash, anatomy and anthropometrics principles of anthropometric drawing, importance of anthropometrics in design, drawing from models and the importance of measurements in anthropometrics.

PDT1221   Design Analysis   10 Credits
The module is about analyzing a design into: design brief, search and order information on a design problem. There is also an appraisal of situations with specific requirements taking into account human needs, aesthetic, technical and environmental factors. Students generate and explore ideas and concepts, evaluate ideas, selection and modelling of a design proposal develop a design proposal, design techniques, technology and technology processes as well as historical & contextual, cultural contexts relativity.

PDT1222   Fine Art Studio I   10 Credits
This module articulates fine art ideas to give students an opportunity to work imaginatively in painting, drawing, sculpture printmaking and photography. Students should develop subject knowledge through fine art activities and contemporary art. Line drawing, life drawing and free hand sketching, intermediate line drawing, life drawing and sketching, perception and application in use of colour in a variety of media are also examined.

PDT1225   Design Proposals   10 Credits
The module is about identifying needs through practical design activity, design concepts, design case studies, preparing design brief, investigating, writing specification and modelling.

PDT1290 Testing Of Yarns and Products 10 Credits

This module focuses on yarns- linear density, count, twist, regularity, strength, effects of moisture; fabrics-physical analysis for mass and unit production as well as fabric sett; ends and picks and modules per unit length, count of yarn from fabrics, Fabric products-abrasion, resistance / piling, air water and moisture/ vapour permeability.

PDT1291 Finishing and Finishes 10 Credits

The module is about the finishing processes for various textile materials, application of finishes for enhancement and performance; product and garment after care-labelling and applied finishes selection of laundering processes.

PDT1293 Preparation Processes 10 Credits

The module explores the preparation processes for various textile applications of colour, printing, fastness and principles of colouration.

PDT2122 Electronic Imaging 10 Credits

The module looks at constructivist theory of design, electronic imaging and designing, corel draw, computer Aided Drawing, digital imaging, digital drawing and photography and scanning, uploading and down loading electronic images as well as combing digital images and colour for imaging.

PDT2124 Practical Development of Designs 10 Credits

This module provides students with a professional context to study and put into practice art and design skill. Students undertake activities such as painting, drawing, sculpture, printmaking and photography. Students develop skills through project work in fine art, textiles, graphic design, photography, sculpture or ceramics.

PDT2126 Development of Designs 10 Credits

The module is about generating and recording possible solutions and assessing possible solutions through a variety of techniques. Students will develop a detailed project proposal for production of final product as well as identifying resources needed for the realization of a solution and costing together with implementation: organizing resources, making the product using appropriate hand tools and machines tools/ equipment. The module also looks into testing and evaluation, efficient use of materials, energy and other resources for production, testing and evaluation: Devise appropriate tests for assessing products as well as suggesting possible solutions.

PDT2127 Design Processes 10 Credits

Students apply the design process considering its application in identification of a need or opportunity leading to a design brief, analysis of and research into the design brief which results in a specification. There is also generation and appraisal of design ideas, modelling of ideas, product development and planning, realization, testing and evaluation. The design process

stages: Identifying need, Conception, sketching and drawing, design brief, specification, research, generating possible solutions, modelling, review design, improve and make, present for testing and evaluation are also looked at. Methods are also examined step by step working from conception to final production as well as problem solving.

PDT2128   Theories of Design and Technology   10 Credits
The module looks at theories: Socio-cultural learning theories, Constructivist theory, critical theory, institutional theories. Also it looks at the nature of knowledge and its place in education, meanings and areas of design & technology and their justification, components of design & technology, and curriculum content and experiences for the learner, technological literacy and capability as well as STEM and Professional Development of teachers on delivery.

PDT2190   Life Style and Fashion Design   10 Credits
The module is about people's life styles; the psychology of clothing, comfort in dress and clothing and has an analysis and characteristics of sports and dress textiles and fabrics; sports fashion.

PDT2192   Textile Modelling   10 Credits
The module is about textile design techniques; colour theory, colour media, colour separation and there will be exercises in designing textiles for fashion wear.

PDT2195   Fashion Modelling   10 Credits
The module has a history of costumes, fashion designs, art movements that influence fashion design as well as images for fashion modelling, fashion drawing, pattern making using ICT and clothing vs. fashion.

PDT2222   Fine Art Studio II (Visual Communication)   10 Credits
The module explores the principles and elements of design; Perception; texture, line, harmony, rhythm, motion; Principles of design and perception; texture, line, form, harmony, rhythm, motion style; The concept of form and style; Elements of design; colour theory, painting, variety of visual media, processing and identifying and understanding properties of colour, use of colour as a tool for designs, impact of colour upon the viewer; Visual literacy: cultural and environmental factors; Advanced line drawing, life drawing and sketching, incorporating any one of the following electives calligraphy, photography, theatre design, and interior decoration.

PDT2223   Set Designs   10 Credits
The module looks at spatial designs and approaches in interior design, stage design and exhibitions; commissioned designs, major design projects: planning specific site designs, producing installations and designing environments.

PDT2224   Product Development   10 Credits
The module looks at the application of the design process in the development of design products; development of drawing skills through imagination, origination, creativity and realizing of own ideas through products; Mini design projects and production of designs.

PDT2226   Contemporary Design and Technology   10 Credits
The module recognises and examines rational approaches to design; Conservation of resources, obsolesce and the role of recycling; Effects of designs upon society, Differences between individual, small batch and mass production and how each affects means of production, products and the people involved.

PDT2227   Aesthetics, Ergonomics and Energy   10 Credits
The module examines aesthetics; use of design elements, effects of light and shade and rendering on solid forms, surface finishes; Aesthetic sensibility and vocabulary: harmony, conflict, static & dynamic; Significance of style and influence of fashion and design on designs; Ergonomics: Understand the influence of ergonomics in design; Interpreting and applying anthropometric data in designs; Energy: sources of energy, influence of infinite supplies; fossil fuels, regenerative forms of energy, storage of energy, methods of conservation and transmission and mechanisms; Control and control techniques: basic principles, semi-automatic and automatic control, input and output, feedback & amplification and the principles employed in CAD/CAM.

PDT2290   Clothing Factory Practice   10 Credits
In this module students shall be exposed to standard fashion practice during clothing production; Safety management systems; factory operations; factory practice; effects of practice and factory equipment.

PDT2291   Fashion Design   10 Credits
This module outlines the concept of fashion, fashion trends, contemporary fashion, National, regional and international fashion designers and their collection; Emerging artists and their collection; Studio practice in fashion design and application of design principles.

PDT2292   Textile Design Techniques   10 Credits
The module focuses on visual research and drawing techniques, innovation, creativity design techniques; printing, knitting, embroidery and appliqué. Students are encouraged to develop personal ideas.

PDT4122   Design Media   10 Credits
The module highlights contemporary design practice. It is a project based module to offer students the opportunity to explore and experience with some of the visual effects of information communication technology; apply the design process in developing visual designs; define objectives, identify constraints through synthesis of design solutions, a presentation of designs

using ICT; producing still and animated electronic designs; evaluation of design work and digital images in galleries, museums, electronic devices and other art and design centres.

PDT4123   Visual Inquiry   10 Credits
This module is on visual research; Approaches in visual research; Concepts, testing and evaluation of visual objects and images; Types of research in design; Developing own designs; Research strategy in design; Involving the consumer in designing and design research; Research methods in design and an inquiry by design.

PDT4124   Design Marketing   10 Credits
The module looks at combining design skills, creative ability and analytical skills. Hence students will carry out market research and develop new products; Study consumer behaviour in selling and advertising design products; Design management and the role of competition in design; Textile Design and Fashion Marketing, Textile and fabric merchandizing; visual merchandizing, retail merchandizing   and their effects; Merchandising techniques; Sales, fashion shows, exhibitions of textiles and fashion designs.

PDT4126   Tool Technology   10 Credits
This module helps students in understanding the cutting action of lathe, end milling, drilling, sawing and hand cutting; Maintenance of hand and machine tool cutting edges, cutting action of drills, lathe tools and hand tools; Tool technology, selecting tools and materials; Processes: marking, cutting shaping, joining and assembling methods; Temporary and permanent fixing; Applying finishes according to material use; Testing: non-destructive testing, including strain gauges and photo elasticity; Understanding tensile, compressive, shear, bending, torsion and impact.

PDT4127   Practical Technology   10 Credits
The module explores technological Design and Production; Effect of developments on designs and manufacture of artifacts; Terms: invention, innovation and evolution; Use of CAD (computer aided design) for the storage of and retrieval of data and manipulation of images to aid design production and management and features of CAM (computer aided manufacture) in the control of machines.

PDT4129   Design and Technology Products   10 Credits
This module gives students experience in carrying out design research in their special areas. Students should take leading position in conducting mini research on a topic of interest to produce a product or system.

PDT4192   Textile Designs   10 Credits
The project offers a critical evaluation of African textiles designs and styles; fashion designs function and dress; Ornamentation, use of colour, embroidery, appliqué ornamentation and equipment for ornamentation.

Think in other terms

PDT4194   Research In Clothing, Textiles And Fashion   10 Credits

This is a project based enquiry that shall provide students with an opportunity to critically evaluate emerging technologies in textile, clothing and fashion design. Research shall be conducted and presentations made on a topic selected from either clothing, textiles or fashion design. Focus shall provide the means to examine the parameters of each aspect and technologies used in detail. Students shall acquire understanding of the design process and develop in-depth drawing and colour expertise alongside technical skills.

PDT4221   Design Enquiry   10 Credits

This is a design enrichment module in Research & Development (R&D). It provides students with an opportunity to investigate, designs and design concepts; Testing and evaluating designs; Design co-operation, meaning of, activities and side effects; Research strategy formulation; approaches to designs and design settings, research quality and research methods in designing.

PDT4227   Graphics Designs   10 Credits

The module looks at the nature and history of graphic design, Fundamental of computer graphics Two dimensional drawing (2-D), Three dimensional drawing (3-D) in graphic design; ICT for designing; photo realism, retracing radiosity and particle tracing Digital drawing, digital photography; Developing designs from digital images; Computer design software and tools for graphic design; Advertising designs and print media; Development of graphic products, magazines, packing and posters; Designing using software e g; CorelDraw, Publisher, Photoshop and other software: Colour, textures, human visual system; Design influences and methodology; Marketing methods in the commercial world; Practice in the use of CAD and Corel Draw; Production of graphical products; Costing, storage, retrieval, modification, of drawings and integration of data for costing, stock control; Drawing conventions for engineering, electrical and architectural designs; Recording information: Techniques, for recording, and manipulation of design information ideas, and processing; Free-hand sketching and drawing, annotation, recording information: bar charts, pie charts, 2D & 3D charts, graphs, tables, pictograms, ideograms etc and analyzing data and other information.

PDT4224   Personal Development   10 Credits

The module involves studying the environment, identifying design problems in specialist areas of study and coming up with solutions to the problems. The module draws together previous, relevant subject experience and provides a context within which a student can work at a level of a professional designer. Students are expected to analyze a brief and translate it into a detailed specification based on investigations on existing competitor products and produce a model or prototype as a solution to the problem.

PDT4228   Mechanisms, Structures and Designs   10 Credits
The module examines terms and their meaning: load, effort, mechanical advantage, velocity; Methods of converting linear to rotary motion, use of cams, cranks and ratchets; Converting and transiting methods; Friction and lubrication, hydraulic and pneumatic systems for linear motion; Structures: frame and mono structures, on buildings, bridges, cranes, furniture etc; Problem solving, problem solving, forces of equilibrium; Bow's notation for the resolution by graphical means and presentation drawings.

PDT4229/PTE4253   Power Sources & Control   10 Credits
The module focuses on the characteristics of AC and DC; Principles of step down/up; Voltage and current regulation; Application of Ohm's Law, Measuring voltage, current and resistance; Electronics and Control; Types of switches, transistors, Darlington Pair, capacitors, diodes, sneers, LEDs photodiodes, resistors, transducers; Calculating resistance of series and parallel resistors.

PDT4292   Textiles and Fashion Products   10 Credits
The module looks at textiles and leather products;; Images and imaging of textile products; Industrial Products; Oriental, Western and African textile products; Quality, purposes and prices; Fashion involvement, emotions, Impulse buying and Hedonic consumption tendency.

MASTERS PROGRAMME

APPLIED ART AND DESIGN

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description		Credits
PDT6120	Design and Human Culture		18
PDT6122	Materials & Technologies		18
	2 Education Modules	36	
PDT6223	Advanced Visual Communication		18
PDT6224	Product Design		18
	2 Education Modules	36	

YEAR II

PDT6320	Design Project I		18
PDT6323	Law & Intellectual Property		18
	Mini Dissertation	18	
	1 Education Module		18
PDT6420	Design Project II		18
PDT6424	Assessment in Design Projects		18
	Mini Dissertation	18	
	1 Education Module	18	
TOTAL CREDITS			**288**

CLOTHING TEXTILES & FASHION DESIGN

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description		Credits
PDT6191	Dress Culture and Human Behaviour		18
PDT6193	Visual Merchandising and Display		18
	2 Education Modules	36	
PDT6290	Contemporary Issues in Textile & Apparel Des		18
PDT6294	Textile performance Evaluation		18
	2 Education Modules	36	
YEAR II			
PDT6320	Design Project I		18
PDT6394	Textile and Apparel Product Design		18
	1 Education Module	18	
	Mini Dissertation	18	
PDT6420	Design Project II		18
PDT6424	Assessment in Design Projects		18
	Mini Dissertation	18	
	1 Education Module	18	
TOTAL CREDITS			**288**

Think in other terms

DESIGN AND TECHNOLOGY

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description		Credits
PDT6126	Nature of Design and Technology		18
PDT6128	Graphic Products		18
	2 Education Modules	36	
PDT6225	Workshop Technology & Management		18
PTE6253	Electrical Power Sources		18
	2 Education Modules	36	

YEAR II

PDT6320	Design Project I		18
PDT6329	CAD/CAM Applications		18
	Mini Dissertation	18	
	Education Module	18	
PDT6420	Design Project I		18
PDT6424	Assessment in Design Projects		18
	Mini Dissertation	18	
	1 Education Module	18	
TOTAL CREDITS			**288**

TOTAL CREDITS FOR EACH MASTERS PROGRAMME
Year 1   144
Year II   144
Total Minimum Credits   288

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MODULE SYNOPSES

PDT6120   Design and Human Culture   18 Credits

The module is designed to build in the students, an awareness of cross-cultural issues that inform and affect the production, consumption and perception of design and its products. In this module students explore and analyze the reciprocal influence between design and human culture. Topics to be covered include: design as culture embodiment, design and cultural determinism, cultural fundamentalism in design, bio-mimicry and human design culture, multiculturalism and mono culturalism in design, cultural nostalgia and archaism in design, trans cultural fusion and hybridization, and cultural diversity and globalization in design practice. This, it is hoped, shall empower the students to be able to design socially compatible and emotionally rewarding designs that fit in the context of the diverse cultures of the global consumer market.

PDT6122   Design Materials and Technologies   18 Credits

This module explores the materials, tools and technologies used for design production in art and design studios and workshop. The module encourages familiarisation with the traditional use of these materials and technologies as well as exploration of new or improvised uses of the materials. Topics to be covered include; the general classifications of art and design materials including ceramics, metals, polymeric, composite materials etc., the properties of commonly used art and design materials that include paper, woods, clays, stones, metal, rubber, textiles and fibre glass; the manufacturing processes of these art and design materials; and the use of both computerized and manual approaches to art and design production. A series of small projects designed to expand students' horizons in art and design production while maintaining fidelity to effective use of art and design materials shall be done by students.

PDT6125 Small, Medium and Large Scale Designs (Elective)   18 Credits

This module looks at design situations, small, medium and large scale designs, infrastructural designs, design policy, on site designs and case studies.

PDT6126 Nature of Design and Technology Knowledge and Skills   18 Credits

This module is concerned with the nature of design and technology and significant issues that contribute to knowledge, skills and development of positive attitudes through design and technology processes. The module identifies theories of constructivism in design and entrepreneurship in product design. The module addresses global trends in technological management change.

PDT6128   Graphic Products   18 Credits

The module explores design influences and methodology the concepts of market-pull and producer-led design, influences of style and fashion upon design, need of designers to consider physical, cultural and aesthetic needs, production techniques and marketing methods used in the

Think in other terms

commercial world, drawing software, recognising the advantages of accuracy, ease of storage/retrieval, ease of modifying drawings, the production of many originals and the integration of data for costing, range of drawing conventions, including engineering, electrical and architectural. It also looks at recording information free-hand sketching, annotation, bar and pie charts, 2D and 3D charts, graphs, tables, flow charts, pictograms and ideograms; modelling and testing construct two and three dimensional models; drawing systems assembled, exploded and cut-away, orthographic in first and third angle projection, dimensioning, isometric, Plano metric using 45/45, perspective using one and two point; presentation ability to enhance the visual impact of an illustration by the use of thick and thin line techniques, tone, colour, shadows, reflections and material representation; geometry loci to determine the path of movement of linkages, development (net) of basic geometric forms including prisms, cylinders, pyramids, cones and their frustums, Mechanisms methods for transmitting and converting linear and rotary motion including cranks, ratchets and simple cams, Materials general knowledge of the characteristics of card, paper and other modelling materials, general knowledge of wood, metals, plastics, concrete, brick, fabrics, glass and ceramics, being able to select them for appropriate use according to their characteristics, properties and performance.

PDT6191   Dress, Culture and Human Behaviour   18 Credits
The module explains the complete phenomenon of bodily adornment is explored in relationship to values, attitudes, activities and beliefs; the dress as an expression of self and reflection of society and global cultures; effects of dress on human behaviour at personal, interpersonal and social organizational levels. Students develop analytical skills to help them understand the role played by clothing in different times, places and contexts.

PDT6193   Visual Merchandising Display   18 Credits
The module aims at communicating fashion image through display and promotions – related media. The module focuses on design and display techniques to create effective visual presentations and provides an understanding of visual merchandising industry including the principles and elements of display, the development and design of language for product presentation, design construction of pros, styling and working to an industry brief, for creative displays that support retail sales and exhibition industries.

PDT6223 Advanced Visual Communication and Digital Design   18 Credits
In this module students shall explore technological visual communication, drawings, including digital design. Students shall have an opportunity to painting, graphic design use of ICT for drawing, painting, rendering techniques and digital design. They shall interact with Corel draw, Photo shop or other art software for drawing and painting including 3D drawing, printing and digital image product making. Topics to be covered include fine art drawing and painting using technological media, tools and techniques. The module is intended to expose students to a variety of technological and graphic designs.

Think in other terms

PDT6224   Product Design   **18 Credits**
In this module students shall explore and interrogate the processes of designing products from their initial conception to the final solution. Different approaches to the product design process shall be studied. Topics to be covered include ideation, rapid visualization, rendered drawings, prototyping, problem solving, three dimensional modelling, technical/work drawings, and product realization. The module shall take students through projects that involve real life problems and issues they identify in their society and encourage them to design ideas, concepts or products that solve these problems.

PDT6225   Workshop Technology and Management   **18 Credits**
The module explores Industrial manufacturing plant planning, structures, equipment, tool, materials, equipment and machinery supplies for manufacturing, planning and setting up plants for manufacturing: machinery, equipment and tools for processing. Management: of space and resources (time, equipment, tools, materials), product management, management of control systems, technology marketing and information system management

PDT6229/PTE6253 Electronics, Power Sources and Circuits   **18 Credits**
This module is about Power sources characteristics of AC and DC current, principles of step down/up, rectification, voltage and current regulation, Ohm's Law, electronics and control transistors (NPN and PNP types), Darlington Pair, capacitors, diodes for rectification and protection against back emf, zeners for voltage reference, LEDs and photodiodes, resistors including stability, tolerance and power rating transducers including thermistors, strain gauges and LDRs. Circuits, Operational amplifiers, functions of AND, OR, NAND, NOR and XOR their truth tables and equivalent circuit diagrams.

PDT6292 Contemporary Issues in Textile and Apparel Design   **18 Credits**
This module is concerned with significant issues that impact the textile and apparel industry and solutions, theories of entrepreneurship in the textiles and apparel sector, quality theory and practice, global competitiveness, strategies of life cycle management, capacity planning and forecasting, managing technological change. It also looks into intellectual property management and Design Protection (Functions of designs in business and organizations, quality assurance, creating high performance designs, consultation and training in use of designs; adapting designs to changing environment and results based- design frameworks.)

PDT6294   Textile Performance and Quality Analysis   **18 Credits**
This module exposes students to textile science, performance enhancement and methods of analyzing and predicting the behaviour of the resultant products. The module is also about characteristics of fabrics and fabric mechanical properties, principles and applications of KES and FAST fabric evaluation systems, dimensional stability, surface modification techniques, oil/water repellency, waterproofing, coating, lamination, microscopy and surface analysis as well as textile colouration and finishing.

Think in other terms

PDT6320   Design Project I   **18 Credits**

In consultation with advisor, the student conducts design project for concentrated design study. The elements of the study shall include, but not limited to, Design processes, literature search, experimental design, design case study research, brain storming models in design, design project proposal preparation and presentation.

PDT6323   Law and Intellectual Property   **18 Credits**

The aim of the module is to develop an awareness of the need for legal protection of designs and art works. National, regional and international laws are examination and application; Intellectual property rules for securing and enforcing legal rights for inventions, designs, and artistic works; Trademarks: trademark registration and protection of symbols, names and slogans used to identify goods and service; Patenting: inventors exclusive rights to creations on machines, technological improvements and manufactured goods; protection of exclusive control of intangible assets, use of products in the marketplace, patenting procedures and government databases as well as copyrights: Understanding of protecting the act of creation and unpublished works and protecting against infringement, notice of trademarks and litigation.

PDT6329   CAD/CAM Applications in Design and Technology   **18 Credits**

The module looks at the following topics: Application of CAD/CAM in Design and Technology manufacturing systems for mass production; Interactive computer graphics and simple examples of CAD: Introduction; Hardware for CAD/CAM; Software for CAD/CAM; Computer Plotting and Display; Interactive Graphics; Simple Examples of Computer-Aided Drafting, Design and Analysis; CAD/CAM of elements and systems; Modelling of Elements and Systems; Manipulation of System's Transfer Function-- Introductory Finite Element Matrix Analysis; Elementary Numerical Methods of Solution; Analog and Hybrid Computer Application.

PDT6394   Textile and Apparel Product Design   **18 Credits**

This module advances the knowledge of designing textiles and apparel as two or three dimensional art forms with emphasis on conceptualisation, expression, media, techniques, lighting, space, movement and function as influential factors, experimentation with colour and design and surface decoration methods, the use of CAD in the production of a prototype fabric and other designing software packages, use of 3D software, 3D product visualization, designing and texture mapping, colour reduction, preparation of patterns and pattern grading, garment analysis, product development and material utilisation.

PDT6420   Design Project II   **18 Credits**

The module is about the development of possible solutions, creativity, using software for design, developing the chosen solution, critical analysis and further development of design to meet

Think in other terms

specifications, continued application of design processes; testing and evaluation, exhibition and oral presentation of design.

PDT6424   Assessment of Design Projects   18 Credits
The module will highlight exhibitions and Displays, assessing products / artefacts, assessing digital visual products, preparing check lists for assessment, designing assessment reports as well as apply a variety of research based assessment techniques for diverse learners. There will be a one-to-one assessment on individual growth, assessment of achievement of objectives, knowledge and skills, processes, creativity, innovation, design criticism, techniques, strategies, materials and technologies to meet instructional purposes as well as an engagement of students in assessment. Methods of assessment will include journals or sketch books, observation, Interviews, group discussion, critiques and assessing design projects.

DEPARTMENT OF SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION

Lecturer and Chairperson
Dr M Mpofu, BEd (University of Zimbabwe), MEd (Zimbabwe Open University), PhD (University of Fort Hare)

Secretary
S Nguwaya, HEXCO National Diploma in Secretarial Studies (Bulawayo Polytechnic), HEXCO National Certificate in Secretarial Studies (Bulawayo Polytechnic)

ACADEMIC STAFF

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Dr L Sibanda, BEd (University of Zimbabwe), MEd (Midlands State University), PhD (University of Fort Hare)

AJP Sibanda, MEd (University of Zimbabwe), BEd (University of Zimbabwe)

I Mpofu, MScEd (University of Zimbabwe), BEd (University of Zimbabwe)

L Mpofu, MSc Finance and Investment (NUST), B Comm Accounting (NUST), B Accounting (UNISA), PGDHE (NUST), ACMA (CGMA)

UNDERGRADUATE DEGREE PROGRAMME

SPECIAL REGULATIONS

1.0. ENTRY REGULATIONS

1.1. Admission requirements

1.1.1. **Special entry (In-service):** Relevant teaching diplomas (and approved certificates) in the specified subjects; five 'O' Level passes including English Language and Mathematics.

1.1.2. **Normal entry (Pre-service):** At least 2 'A' Level passes in relevant subjects of specialisation, and five 'O' Level passes including English Language, Mathematics and a science subject.

1.2. Programme of study

1.2.1. Special entry candidates shall pursue a four-year programme of study on block-release, consisting of a prescribed number of modules in specialist subjects and in education and professional studies, including work-based experience and a final year research or design project. The work-based experience shall be in the third year of study.

1.2.2. Normal entry candidates shall pursue a four-year full-time programme of study in which the third year shall be spent wholly on Industrial Attachment/Work-based experience in an institution or organization relevant to their degree programme.

1.2.3. Normal entry candidates shall study additional elective modules in education and professional studies as prescribed by the department.

1.2.4. Candidates shall be required to obtain a total of 480 credits to be awarded the degree.

2.0. STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULE

2.1. PROGRAMMES OFFERED BY THE DEPARTMENT

2.2. Undergraduate

2.2.1. Bachelor of Science Education Honours (BScEd Hons) in one of the following subject areas:

Accounting and Business Studies, Biology, Chemistry, Computer Science, Mathematics and Statistics, Physics, Environmental Science.

2.2.2. Common Modules

All students in the programme shall study the given education and professional modules.

2.2.3. Specialist subject Modules

In addition to the common modules, candidates in the Department shall study prescribed modules under one of the given specialist subject areas.

Think in other terms

3.0. ASSESSMENT OF CANDIDATES
3.1. **Assessment**
3.1.1. Unless specified otherwise in the module synopses, all taught theory modules shall be assessed through continuous assessment in the form of assignments, tests, quizzes, short projects or oral and other presentations, and a formal 3-hour written examination.
3.1.2. The weighting of written examinations and continuous assessment shall be 60% and 40%, respectively.

4.0. Students enrolled in the pre-service programme will study the following additional bridging modules:

Pre-service bridging modules	Semester I	*PLC1101 Peace, leadership and conflict transformation I* *PST0113 Learning environments and resources* *PST0118 Theory of education I*
	Semester II	*PLC1201 Peace, leadership and conflict transformation II* *PST0203 Lesson presentation techniques*

ACCOUNTING AND BUSINESS STUDIES

PROGRAMME SUMMARY

YEAR 0   **Bridging modules PST0160 selected topics from A level syllabi**

YEAR I

Module Code	Module Description	Credits
PST1101	Theoretical Foundations in STEM Education	10
PST1102	Communication and Public Relations	10
PST1103	STEM Learning and Teaching strategies	10
PST1160	Financial Accounting 1A	10
PST1161	Principles of Management	10
PST1162	Microeconomics	10
PST1209	Introductory statistics	10
PST1212	Computer Applications in Education I	10
PST1213	Educational Technology	10
PST1260	Financial Accounting 1B	10
PST1261	Corporate and Business Law	10
PST1262	Macroeconomics	10

YEAR II

Module Code	Module Description	Credits
PST2104	Curriculum development and evaluation	10
PST2105	Testing, assessment and evaluation	10
PST2116	Science, Technology and Society	10
PST2160	Financial Accounting IIA	10
PST2161	Human Resources Management	10
PST2163	Management and Cost Accounting IA	10
PST2208	Leadership and Supervision in STEM Education	10
PST2211	Research Methods	10
PST2212	Computer Applications in education II	10
PST2260	Financial Accounting IIB	10

Think in other terms

PST2263	Management and Cost Accounting IB	10
PST2264	Auditing	10

YEAR III

PST3000	Work-based experience	120

YEAR IV

PST4010	Final Year Project	-
PST4109	Statistics for educators	10
PST4112	AutoCAD/CAD/CAM	10
PST4160	Financial Reporting I (Elective)	10
PST4161	Financial Management	10
PST4162	Entrepreneurship (Elective)	-
PST4163	Management and Cost Accounting II	10
PST4010	Final Year Project	20
PST4208	Project Development and Management	10
PST4215	Quality and innovation in STEM education	10
PST4261	Organizational Behaviour	10
PST4262	Strategic Management	10
PST 4263	Operations Management (Elective)	-
PST4264	Introduction to Taxation (Elective	10

TOTAL CREDITS FOR THE PROGRAMME
YEAR I   120
YEAR II   120
YEAR III   120
YEAR IV   120
Total minimum credits: 480

BIOLOGY

PROGRAMME SUMMARY

YEAR 0   **Bridging modules PST0135 selected topics from A level syllabi**

YEAR I

Module Code	Module Description	Credits
PST1101	Theoretical Foundations in STEM Education	10
PST1102	Communication and Public Relations	10
PST1103	STEM Learning and Teaching strategies	10
PST1135	Cell biology	10
PST1136	Biochemistry	10
PST1139	Biodiversity	10
PST1209	Introductory statistics	10
PST1212	Computer Applications in Education I	10
PST1213	Educational Technology	10
PST1236	Enzymes and Enzyme Biotechnology	10
PST1237	Gas exchange and Transport	10
PST1238	Genetics	10

YEAR II

PST2104	Curriculum development and evaluation	10
PST2105	Testing, assessment and evaluation	10
PST2116	Science, Technology and Society	10
PST2135	Cell and nuclear division	10
PST2136	Biostatistics	10
PST2139	Ecology and ecosystems	10
PST2208	Leadership and Supervision in STEM Education	10
PST2211	Research Methods	10
PST2212	Computer Applications in education II	10
PST2237	Bioenergetics	10
PST2238	Inherited change	10
PST2239	Human disease and immunity	10

YEAR III

PST3000	Work-based experience	120

Think in other terms

YEAR IV

PST4010	Final Year Project	-
PST4109	Statistics for educators	10
PST4112	AutoCAD/CAD/CAM	10
PST4135	Biotechnology (Elective)	10
PST4137	Plant Physiology	10
PST4138	Evolution and Selection	-
PST4139	Crop plant productivity I (Elective)	10
PST4010	Final Year Project	20
PST4208	Project Development and Management	10
PST4215	Quality and innovation in STEM education	10
PST4236	Agricultural biology (Elective)	10
PST4237	Regulation and control	10
PST4238	Reproduction, growth and development	10
PST4239	Crop plant productivity II (Elective)	-

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	120
YEAR II	120
YEAR III	120
YEAR IV	120

Total minimum credits: 480

Think in other terms

CHEMISTRY

PROGRAMME SUMMARY

YEAR 0   **Bridging modules PST0140 selected topics from A level syllabi**

YEAR I

Module Code	Module Description	Credits
PST1101	Theoretical Foundations in STEM Education	10
PST1102	Communication and Public Relations	10
PST1103	STEM Learning and Teaching strategies	10
PST1136	Biochemistry	10
PST1140	Mathematics for Chemists	10
PST1141	Inorganic Chemistry I	10
PST1209	Introductory statistics	10
PST1212	Computer Applications in Education I	10
PST1213	Educational Technology	10
PST1240	Chemical energetics	10
PST1242	Organic Chemistry I	10
PST1274	Modern Physics	10

YEAR II

PST2104	Curriculum development and evaluation	10
PST2105	Testing, assessment and evaluation	10
PST2116	Science, Technology and Society	10
PST2141	Inorganic Chemistry II	10
PST2142	Organic Chemistry II	10
PST2143	Chemical and ionic equilibria	10
PST2208	Leadership and Supervision in STEM Education	10
PST2211	Research Methods	10
PST2212	Computer Applications in education II	10
PST2140	States of matter	10
PST2241	Transition elements	10
PST2242	Polymers and polymerization	10

YEAR III

PST3000	Work-based experience	120

Think in other terms

YEAR IV

PST4010	Final Year Project	-
PST4109	Statistics for educators	10
PST4112	AutoCAD/CAD/CAM	10
PST4141	Nitrogen and sulphur	10
PST4143	Applications of analytical chemistry	10
PST4144	Electrochemistry	10
PST4010	Final Year Project	20
PST4208	Project Development and Management	10
PST4215	Quality and innovation in STEM education	10
PST4240	Nuclear chemistry	10
PST4243	Environmental chemistry	10
PST4244	Reaction kinetics	10

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	120
YEAR II	120
YEAR III	120
YEAR IV	120
Total minimum credits:	**480**

Think in other terms

COMPUTER SCIENCE

PROGRAMME SUMMARY

YEAR 0   **Bridging modules PST0175 selected topics from A level syllabi**

YEAR I
PST1101	Theoretical Foundations in STEM Education	10
PST1102	Communication and Public Relations	10
PST1103	STEM Learning and Teaching strategies	10
PTE1131	Engineering Mathematics I	10
PST1133	Mathematical Foundations of Computer Science	10
PST1172	Electricity and Magnetism	10
PST1209	Introductory statistics	10
PST1212	Computer Applications in Education I	10
PST1213	Educational Technology	10
PST1275	Introduction to Computers	10
PST1277	Business Information Systems	10
PTE1253	Electronic Circuits and devices	10

YEAR II
PST2104	Curriculum development and evaluation	10
PST2105	Testing, assessment and evaluation	10
PST2116	Science, Technology and Society	10
PST2176	Database Concepts and Data Processes	10
PST2177	Programming and Programme Design	10
PST2178	Operating Systems Concepts	10
PST2208	Leadership and Supervision in STEM Education	10
PST2211	Research Methods	10
PST2212	Computer Applications in education II	10
PST2277	Data Structures and Algorithms	10
PST2278	Systems Analysis and Design	10
PTE2254	Digital Electronics	10

YEAR III
PST3000	Work-based experience	120

YEAR IV

Think in other terms

PST4010	Final Year Project	-
PST4109	Statistics for educators	10
PST4112	AutoCAD/CAD/CAM	10
PST4175	Computer Communication and Networking	10
PST4178	Software engineering concepts	10
PST4179	Operating Systems & Comp Architecture	10
PST4010	Final Year Project	20
PST4208	Project Development and Management	10
PST4215	Quality and innovation in STEM education	10
PTE4254	Microprocessors & microcontrollers	10
PTE4276	Graphic Design	10
PST4277	Database design and management	10

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	120
YEAR II	120
YEAR III	120
YEAR IV	120
Total minimum credits:	**480**

Think in other terms

MATHEMATICS AND STATISTICS
PROGRAMME SUMMARY

YEAR 0   **Bridging modules PST0130 selected topics from A level syllabi**

YEAR I

Module Code	Module Description	Credits
PST1101	Theoretical Foundations in STEM Education	10
PST1102	Communication and Public Relations	10
PST1103	STEM Learning and Teaching strategies	10
PST 1131	Calculus I	10
PST 1132	Linear Algebra	10
PST 1134	Applied Statistics	10
PST1209	Introductory statistics	10
PST1212	Computer Applications in Education I	10
PST1213	Educational Technology	10
PST1231	Calculus II	10
PST1232	Discrete Mathematics	10
PST1234	Statistical Inference I	10

YEAR II

Module Code	Module Description	Credits
PST2104	Curriculum development and evaluation	10
PST2105	Testing, assessment and evaluation	10
PST2116	Science, Technology and Society	10
PST2132	Linear Programming	10
PST2131	Ordinary Differential Equations	10
PST2133	Probability Theory	10
PST2208	Leadership and Supervision in STEM Education	10
PST2211	Research Methods	10
PST2212	Computer Applications in education II	10
PST2230	Vector Analysis	10
PST2232	Advanced Linear Algebra	10
PST2233	Linear models	10
PST2203	Methods of Teaching Mathematics	-

Think in other terms

YEAR III

PST3000	Work-based experience	120

YEAR IV

PST4010	Final Year Project	-
PST4109	Statistics for educators	10
PST4112	AutoCAD/CAD/CAM	10
PST4131	Partial Differential equations and Fourier Series	10
PST4132	Real Analysis	10
PST4134	Survey and Sampling Methods	10
PST4010	Final Year Project	20
PST4208	Project Development and Management	10
PST4215	Quality and innovation in STEM education	10
PST4231	Numerical Methods	10
PST4233	Mechanics	10
PST4278	Computer Packages for Mathematics and Statistics	10

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	120
YEAR II	120
YEAR III	120
YEAR IV	120

Total minimum credits: 480

PHYSICS

PROGRAMME SUMMARY

YEAR 0   **Bridging modules PST0170 selected topics from A level syllabi**

YEAR I

Module Code	Module Description	Credits
PST1101	Theoretical Foundations in STEM Education	10
PST1102	Communication and Public Relations	10
PST1103	STEM Learning and Teaching strategies	10
PTE1131	Engineering Mathematics 1	10
PTE1147	Material science	10
PST1172	Electricity and magnetism	10
PST1209	Introductory statistics	10
PST1212	Computer Applications in Education I	10
PST1213	Educational Technology	10
PTE1231	Engineering Mathematics 11	10
PST1270	Oscillations and Waves	10
PST1274	Modern physics	10

YEAR II

PST2104	Curriculum development and evaluation	10
PST2105	Testing, assessment and evaluation	10
PST2116	Science, Technology and Society	10
PST2171	Mechanics and relativity	10
PST2172	Circuit theory	10
PTE2150	Analogue electronics	10
PST2208	Leadership and Supervision in STEM Education	10
PST2211	Research Methods	10
PST2212	Computer Applications in education II	10
PST2271	Solid state physics	10
PTE2246	Thermodynamics	10
PTE2254	Digital electronics	10

Think in other terms

YEAR III

PST3000	Work-based experience	120

YEAR IV

PST4010	Final Year Project	-
PST4109	Statistics for educators	10
PST4112	AutoCAD/CAD/CAM	10
PST4170	Quantum physics (Elective)	10
PST4172	Statistical mechanics	10
PST4173	Electromagnetism (Elective)	10
PST4010	Final Year Project	20
PST4208	Project Development and Management	10
PST4215	Quality and innovation in STEM education	10
PST4270	Atomic and nuclear physics	10
PST4271	Classical mechanics	10
PST4274	Energy physics	10

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	120
YEAR II	120
YEAR III	120
YEAR IV	120

Total minimum credits: 480

MODULE SYNOPSES

PST0113   Learning Environments and Resources
The module explores learning space organisation; displays, internal and external learning environments, field trips, educational technology and teaching/learning resources and learning outcomes. Assessment in this module will be by module work only. Students will produce a portfolio of teaching resources and assignments on designing learning environments.

PST0118   Theory of Education
The module has an introduction on contemporary theory, definition of philosophy, dominant philosophy and theory in science and technology education, linking theory to practice, educational psychology basics, sociology of education, theory and curriculum development, theory and human development.

PST0203   Lesson Presentation Techniques
Students will spend time conducting peer and micro-teaching session to sharpen their lesson presentation skills learnt in PST1101 to acquire teaching skills e.g. voice projection and regulation, posture, mannerisms, grooming and classroom control as well as an evaluation of peer and pre-recorded lessons. Assessment in this module will be by module work only. Students will produce portfolios of work done.

PST1101   Theoretical Foundations in Stem Education   10 Credits
The module focuses on psychology of education- Physical, cognitive and emotional development in children, adolescents and adults. Piaget, Brunner, Pavlov, Vygotsky, etc; Individual differences and learning styles; Pedagogy and andragogy; memory and understanding; Sociology of education- Human Social Interactions; society and community; urban and rural communities, agents of socialization; culture and education, inclusive learning; industrialization; globalization, citizenship; Durkheim, Weber, Mead, etc; Philosophy of education– theory and practice; trends in philosophy of education, humanism, progressivism, reconstructionism, empiricism, modernism, structuralism, critical theory, hermeneutics, constructivism, phenomenology; Rousseau, Karl Marx, John Dewey and Vygotsky, etc.

PST1102   Communication and Public Relations   10 Credits

Think in other terms

This module explores principles and theory of communication and media; conventions, appropriate use of voice, language and register; vocabulary and use of specialist/technical language; verbal/nonverbal communication; oral/written communication, bibliography and referencing; study skills; questioning and communication skills in education/training; business communication skills– letters, memos, reports, meetings, interviews; explanatory skills; diplomacy, tolerance and assertiveness; international communication, information technology and globalisation; public relations, theories and approaches, corporate image, advertising and marketing as well as conflict resolution.

PST1103   Stem Learning and Teaching Strategies   10 Credits
This module looks at instructional design and planning; Analysing learning situations and contexts; Prior learning; students' individual and collective needs; curriculum specifications, operational content, aims and objectives. behavioural approach to objectives; taxonomies of objectives; inputs to teaching and learning; Planning for different types of teaching and learning strategies for groups and individuals Selecting a strategy according to appropriate criteria; determining sequence, activities and organisation of training sessions; teaching methods – lecture, discussion, simulations, case studies, games, role play, projects, assignments, group-work, experiential learning, programmed learning, demonstration, effective questioning. Competence-based- education, performance criteria and range statements; work-based experience (WBE) preparation and coordination and specific subject teaching methods.

PST1209   Introductory Statistics   10 Credits
This module focuses on descriptive and inferential statistics in science, education and research, methods of summarizing and interpreting data, frequency distribution, measures of central tendency, measures of dispersion, fractiles, measures of strength and association. (X-ref SMA2204).

PST 1212   Computer Applications in Education I   10 Credits
The module explores word Processing: Creating a document, correction of text, deletion and insertion, saving documents, retrieving a document, using HELP facility, printing documents, mail merge; Editing and Manipulating Documents: mark block of text, find and replace, move block of text, tabulation, indentation, underline, justify, use Equation Editor; Spread Sheet: Creating a spread sheet (Excel), entering labels, saving, deleting and inserting rows and columns, decimal places, currency, use of functions e.g. Sum, Ave etc; Graphics: Produce graphs using MS word and excel, use of Title, Legend etc, Print graphs; Drawing: Draw diagrams using MS word and paint, copying diagrams, moving diagrams, Flipping/ Rotating diagrams, shading; Power Point; Creating slides, titles and subtitles, Slide Sort View, insert new slide, adding pictures to slides, change slide background, Send to back, change font, Fill effects, Add colour, Slide transition and slide show.

PST1213   Educational Technology   10 Credits

Think in other terms

The module looks at using appropriate technology for teaching and training; the chalk board; the white board; the overhead projector; the slide projector; the video recorder; use of video and television in the classroom; basic use of computers for producing training materials and presentation techniques using multimedia packages, e-learning fundamentals.

PST2104　　Curriculum Development and Evaluation　　10 Credits

This module explores the curriculum terminology and concepts; ideology and philosophy underpinning curriculum planning, development and evaluation; curriculum needs assessment model; the impact of social, economic, political, technological, psychological, philosophical and cultural, environmental influences on the curriculum; process and product models of curriculum development; objectives models e.g. Tyler, Wheeler; decision-making models e.g. Stufflebeam (CIPP); Designing/developing, delivering and evaluating a curriculum; curriculum change and innovation; strategies for change (Havelock's RD&D, SI, PS, L); evaluating the overall effectiveness of curricula; curriculum evaluation models; module design and production, varying modes of delivering the curriculum, including flexible, distance, open and resource-based learning, and independent study. Examples of curriculum projects in Zimbabwe and internationally and concept maps and hierarchies, concept analysis as well as the roles of CRADU, CDU, RCZ, SIRDC will be explored.

PST 2105　　Testing, Assessment and Evaluation　　10 Credits

The module focuses on the purposes and methods of assessment; formal/informal; formative/summative; norm/criterion referenced; objective/subjective; characteristics, strengths and weaknesses of a range of testing methods, examinations: processing and administration; item writing; examination results grading systems; item analysis; examination boards: HEXCO, ZIMSEC, etc; standardized tests; continuous and terminal assessment; portfolio and project assessment; the effects of assessing learners and teachers; evaluation; selecting and using appropriate approaches and tools for evaluating the effectiveness of learning sessions and programmes; quality control techniques and accreditation; trade testing and competency-based testing.

PST2116　　Science, Technology and Society　　10 Credits

The module outlines contemporary society and global culture; social stratification, western science and the scientific method in problem solving, science and technology for rural/urban environments, industrialization and automation; government policies on science and technology, appropriate technology in energy, water, sanitation and health issues; science and technology ethics and social responsibility.

PST2208　　Leadership and Supervision in Stem Education　　10 Credits

Think in other terms

The module highlights the administration of education; administrative tasks; school-based management; results-based management; power, authority, leadership and institutional governance; leadership styles; school effectiveness; change and improvement; quality control; delegation, decentralization, empowerment and models of supervision. X-Ref PST5208.

PST 2211   Research Methods   10 Credits

This module looks at the origins and purpose of research-based practice; the role of the teacher/trainer as a researcher and reflective practitioner; features and purposes of qualitative and quantitative research methods; types of research and designs; research and development (R&D); ethical issues and problems in educational, scientific and technology research; codes of conduct of various research institutions and organisations; accessing research information; data collection methods; populations and samples; proposal and report writing; research in curriculum development and preparation for final year project.

PST 2212   Computer Applications in Education II   10 Credits

The module looks at the Microsoft office applications for educators, the use of modern methods of instruction in Education - Recording of podcasts (adobe audition, audacity), internet and intranets in education, social media for educators, e-learning (synchronous and asynchronous), the interactive white board as a tool in modern education. The module will also cover fundamentals of cybercrime and how it can be managed.

PST 3000   Work-Based Experience   120 Credits

This module is on monitoring, assessment and evaluation of students' teaching in their respective work places by tutors and local supervisors. Students will produce a file, a log book and a written report on their experiences in their workplaces for their terminal assessment.

PST 4010   Final Year Project   20 Credits

This is a theoretical research, experimental or design project in the specialist subject of the candidate. The project counts as two taught modules and will be carried out during the whole final year.

PST 4109   Statistics for Educators   10 Credits

This module looks at the applications of descriptive and inferential statistics in education, Sampling theory, probability theory and distribution, the normal distribution, the binomial distribution, the Poisson distribution, applications of significance and hypothesis testing, X2 test, t-test, z-test (X-ref SMA2104)

PST 4112   AutoCAD/CAD/CAM   10 Credits

The module explores CAD, solid modelling, finite elements and other analysis methods, CAM, CNC machines, NC programming, CADACAM, introduction to CIM, introduction to computer-aided process planning, MRP, MRP II, process simulation, expert systems, robotics, sensing and vision systems.

Think in other terms

PST 4208   Project Development and Management   10 Credits
The module looks at project management in political, economic, social, technical, legal and environmental (PESTLE) issues; types of projects, the project life cycle; resources, time, costs, and quality; project planning, design and development; risks and contingency, the critical path method (CPM), project evaluation and review techniques (PERT); change management, research techniques and use of IT in project management, examples of projects in technical education; resources management, personnel, finance, time, materials, equipment and plant; investment, entrepreneurship and fundraising.

PST 4215   Quality and Innovation in Stem Education   10 Credits
The module looks at quality in education and training; collaboration and competition; quality circles; quality assurance; total quality management (TQM); quality control techniques; product development principles, organizational management structures and functions; processes of management; strategic planning and management, the role of research and development (R&D). Outcomes-based education (OBE).; Competency-based training, the competency model; elements of competence; performance criteria and indicators; range statements; skills and task analysis; job analysis; technical proficiency profiles; skilled and unskilled workmanship; trade testing; training assessment and measuring instruments.

Think in other terms

ACCOUNTING AND BUSINESS STUDIES SPECIALIST MODULES

PST 1160   Financial Accounting 1A   10 Credits
The module focuses on the principles and techniques of financial accounting and their application to the preparation of financial statements of the sole traders, partnerships, limited companies and non-profit making organisations. The role of the International Accounting standards and how to interpret them are also covered. Other topics to be covered include partnerships (excluding partnership changes), cash book, bank reconciliations, and presentation of financial statements, revenue, property plant and equipment

PST 1161   Principles of Management   10 Credits
The module explores the development of management as a function in business, organizational structures, decision making, communication, centralization and decentralization, delegation and leadership controlling and budgetary and non-budgetary controls. The role of operations management in the organization is also explored.

PST 1162   Microeconomics   10 Credits
The module explores microeconomic issues and problems, competition and monopoly, pricing, consumer demand, and producer supply; theoretical framework for microeconomic analysis; applying theory to practical domestic and international economic policy problems; introduction to supply and demand and the basic forces that determine equilibrium in a market economy, learning about consumer behaviour and analysing consumer decisions; firms and their decisions about optimal production, and the impact of different market structures on firms' behaviour; introduction to more advanced topics that can be analysed using microeconomic theory, e.g. international trade, the impact of uncertainty on consumer behaviour, the operation of capital markets, equity vs. efficiency trade-offs in economic policy and social insurance; introductory microeconomic theory, solving basic microeconomic problems and policy questions relevant to the operation of the real economy.

PST 1260   Financial Accounting 1B   10 Credits
The module is a continuation of financial accounting 1A and looks at partnership changes, statement of cash flows and the role of social accounting with regard to climate change as well as accounting for Non Profit making organisations and incomplete records.

PST 1261   Corporate and Business Law   10 Credits
The module explores the role of law in a system of governance, sources of law, contracts, case, agency, corporate governance and ethics, economic, political and legal systems, obligations and risk contracts for obligation sales and organization as a legal persona.

Think in other terms

PST 1262   Macroeconomics   10 Credits
The module is about economics at national level, the role of the central government, monopolies and oligopolies and consolidation of household behaviour.

PST 2160   Financial Accounting IIA   10 Credits
The module builds on the foundation laid by Financial Accounting I and looks at partnership conversion to a limited company, understanding the nature of current accounts for individual partners, published accounts, and comprehensive statement of cash flows and events after the reporting period.

PST 2161   Human Resources Management   10 Credits
The module examines the operative function of the human resources management, the role of the labour act, bargaining power of labour and labour as a factor of production. It involves leadership, values, employment planning, recruiting and selecting employees, training and compensating them, and evaluating their performance. It also significantly influences the corporate culture.

PST 2163   Management and Cost Accounting IA   10 Credits
The module aims at providing an understanding of the principles, concepts and techniques of management and cost accounting and helps the students develop an ability to apply this knowledge to practical situations as well as cost control and computation.

PST 2260   Financial Accounting IIB   10 Credits
The module is a continuation of Financial Accounting IIB, the module aims at exposing students to more accounting standards so as to interpret and apply them in various scenarios, financial analysis, ratio analysis and capital budgeting

PST 2263   Management and Cost Accounting IB   10 Credits
The module is a continuation of management and cost accounting IB and topics include standard costing, Economic order quantity, budgeting as well as capital budgeting.

PST 2264   Auditing   10 Credits
The module explores the role of audit as well as the nature and scope of auditing principles and the application international standards of Auditors; the role of external auditors is also covered in conjunction with code of professional conduct and standards for professional behaviour as well as internal control systems and ethical issues concerning audit engagements; auditing I equips

Think in other terms

students to be able to understand and apply the principles of accounting systems and internal controls, to explain the principles and concepts underlying the audit function, and to discuss the professional environment and legal framework in which the auditor operates.

PST 4160   Financial Reporting I (Elective)   10 Credits
The module focuses on accounting theory, application of various standards with a bias towards the disclosure in the published financial statements, the objectives of financial reports. The emphasis is on applying the principles learned in Financial accounting 1 and 2 in more applied situations as part of the process towards developing the ability to prepare financial reports. Students will be expected to apply the accounting rules contained in IFRSs and IASs dealing with reporting performance, non-current assets, including their impairment, inventories, disclosure of related parties to a business and construction contracts (and related financing costs),post-balance sheet events, provisions, contingencies, and leases (lessee only).

PST 4161   Financial Management   10 Credits
This module introduces the roles of the financial manager that is Investment, financing and dividend decisions. It covers the sources of finance, calculation of the cost of capital, the weighted average cost of capital. Investing decisions are also covered. It also addresses the working capital management techniques, like Economic order quantity, management of receivable and payables.

PST 4162   Entrepreneurship (Elective)   10 Credits
The module explores the nature of entrepreneurship; the evolving nature of entrepreneurship, understanding entrepreneurship in individuals, environmental assessment; preparation for a new venture; marketing research for new ventures, financial preparation for entrepreneurship ventures, developing effective business plans; sources of capital for entrepreneurs; assessment and evaluation of entrepreneurial opportunities, structuring and legal issues associated with new Business ventures; strategic planning for emerging ventures, entrepreneurship and the global environment (x ref CBU4109).

BIOLOGY
Specialist Modules

PST1135   Cell Biology   10 Credits
The module looks at microscope techniques, typical plant and animal cell ultra-structure, cell organelles, eukaryotic and prokaryotic cells, fluid-mosaic model of cell membrane, cell transport processes and water potential, etc.

PST1136   Biochemistry   10 Credits

The module explores structure, classification, formation and functions of macromolecules, carbohydrates, lipids, proteins and vitamins and the chemistry of water in living organisms.

PST1139   Biodiversity   10 Credits

The module examines the five-kingdom classification of living organisms, phyla, genus and species of a few typical examples, microscopic and macroscopic observations and drawings, maintenance of biodiversity and protection of endangered species.

PST1236   Enzymes and Enzyme Biotechnology   10 Credits

The module focuses on characteristics and classification of enzymes, mode of action, activation energy, factors affecting enzyme action, inhibitors, elementary enzyme biotechnology, enzyme and cell immobilization, synthesis of chemicals, drugs and food.

PST1237   Gaseous Exchange and Transport   10 Credits

The module looks at microscopic structure of trachea, bronchioles, alveoli, arteries, veins, capillaries and blood cells, the process of gaseous exchange in humans, tobacco and smoking-related diseases, e.g. coronary heart disease, the heart and the cardiac cycle; Plant transport, transpiration and translocation, symplastic pathways and mass flow hypothesis.

PST1238   Genetics   10 Credits

The module highlights structure of DNA and RNA, Watson - Crick Model, base pairing, structural formula of bases, replication of DNA, amino acid coding, transcription and translation, roles of mRNA, tRNA and rRNA.

PST2136   Biostatistics   10 Credits

The module outlines statistical distributions, regression, standard error, sampling, confidence intervals, measurement error, hypothesis and significance tests, Discrete and continuous probability distributions, point estimation/tests of hypothesis, z, t, X2 tests and distributions, design and analysis of experiments, principles and one-way ANOVA.

PST2135   Cell and Nuclear Division   10 Credits

The module looks at mitosis and its role in growth, repair and asexual reproduction, the cell cycle, DNA replication, uncontrolled cell division resulting in tumours and cancers; Meiosis and gamete formation, stages and sub-phases of meiosis, haploid and diploid cells and homologous chromosomes.

Think in other terms

PST2139   Ecology and Ecosystems   10 Credits
The module explores ecological organization, biosphere, biomes, habitats, niches, population, ecosystems, food chains and webs, biotic/abiotic environments, trophic levels and energy flow and nutrient cycles, e.g. Nitrogen; (X-ref ESH1203).

PST2237   Bioenergetics   10 Credits
The module examines energy needs in organisms, anabolic and catabolic reactions, biological oxidation and phosphorylation, structure, synthesis and role of ATP, aerobic and anaerobic respiration processes, glycolysis, Kreb's cycle, respiratory quotient, respirometry, lipid metabolism and regulation.

PST2238   Inherited Change   10 Credits
The module focuses on linking meiosis to variation in organisms, genetic transfer from parent to offspring, genotype and phenotype, Mendelian genetics, mono/dihybrid crosses, dominance, alleles, sex linkage, autosomal linkage, epistasis, X2 tests for test crosses, mutations and effects of the environment.

PST2239   Human Disease and Immunity   10 Credits
The module looks at infectious and non-infectious human diseases- cholera, malaria, tuberculosis, smallpox, measles, HIV/AIDS, cancers, sickle cell anaemia, causative and transmitting organisms (life cycles), social, biological and economic factors in prevention and control, global patterns, antibiotics, the immune system, phagocytes and lymphocytes, immune response, antibodies and vaccination.

PST4135   Biotechnology   10 Credits
The module examines molecular biology, microorganism cultures and industrial applications, DNA recombination, DNA libraries, gene transfer, penicillin production and use, monoclonal antibodies, bio- and genetic engineering, fingerprinting, gene technology in insulin production; Genetic screening and genetic counselling.

PST4137   Plant Physiology   10 Credits
The module examines conversion of light energy in plant cells, photoactivation, photolysis, cyclic/non-cyclic photophosphorylation, the Calvin cycle, photorespiration, C3 and C4 pathways, Kranz anatomy, CAM plants; Leaf structure, chloroplasts, investigation of limiting factors, absorption and action spectra and chromatography.

PST4138   Evolution and Selection   10 Credits
The module looks at principles of natural and artificial selection, variation, linking natural selection to evolution, Darwin's theory, environmental effects on populations, allele frequencies in populations, isolation and species formation and examples of artificial selection.

Think in other terms

PST4139   Crop Plant Productivity I (Elective)
The module explores plant sexual/asexual reproduction, pollination, double fertilization, fruit and endosperm (in maize) seed formation and dormancy, plant growth regulators, anatomy and physiology of C4 plants, arid (sorghum) and wet (rice) land plants, hybridization, inbreeding and genetic modification.

PST4236   Agricultural Biology (Elective)   10 Credits
The module looks at molecular, cellular and physiological structure of plants and animals; Experimental biology techniques, plant and animal diversity, breeding and cultivation, agricultural productivity of cultured plants, domestic animals, and beneficial microorganisms; pest, weed and disease control and environmental management.

PST4237   Regulation and Control   10 Credits
The module looks at homeostasis, metabolic wastes, detoxification and excretion, kidney structure and function; Nervous coordination, sensory and motor neurons, synapse, action potential; Endocrine system, negative feedback processes; Plant communication, auxins, gibberellins and abscisic acid, etc.

PST4238   Reproduction, Growth and Development   10 Credits
This module looks at histology of the mammalian ovary and testes, gametogenesis, hormonal control in the menstrual cycle, contraception and its implications, fertilization (in-vivo and in-vitro), embryo development, measurement of growth and growth rates.

PST4239   Crop Plant Productivity (Elective)   10 Credits
This module looks at plant-associated microbes; food crop challenges and benefits in association with microbes, soil and nutrient related factors to productivity, environmental factors; management of crops, harvest and storage; local, regional and international considerations in crop productivity.

CHEMISTRY
Specialist Modules

PST1136   Biochemistry   10 Credits
The module explores structure, classification, formation and functions of macromolecules, carbohydrates, lipids, proteins and vitamins and the chemistry of water in living organisms.

Think in other terms

PST 1140   Mathematics for Chemists   10 Credits
The module examines linear Algebra: matrices, operations, inverses, determinants, eigenvalues and solutions of linear equations; Functions: exponential and logarithmic; Calculus: idea of limit and continuity; differentiations and integration.

PST 1141   Inorganic Chemistry 1   10 Credits
In this module students will be introduced to the Periodic Tables; Chemical and Physical periodicity of elements generally; Relative atomic and molecular masses; the mole and Avogadro constant; empirical and molecular formulae; Atomic structure: electrons, protons and neutrons; nuclear structure; electronic structure and atomic orbitals; isotopes; Bonding: ionic, covalent and coordinate; molecular orbitals; hybridisation; molecular geometry and intermolecular bonding.

PST 1240   Chemical Energetics   10 Credits
This module covers enthalpy changes: Hg formation, combustion, hydration, solution, neutralization and atomization; bond energy; lattice energy and election affinity.

PST 1242   Organic Chemistry 1   10 Credits
This module looks at structural, displayed and skeletal formulae exemplified by alkanes, alkenes and arenes; Alkanes e.g. ethane; alkanes e.g. ethane; Arenes e.g. benzene and methylbenzene; Hydrocarbons as fuels.

PST1274 Modern Physics   10 Credits
This module focuses on electrons, beams of charged particles, energy of a photon, photo electrics emission of electrons, wave particle duality, energy levels in atoms, line spectra, nuclear atom, nucleus, isotopes, mass excess and nuclear energy and nuclear processes (X-Ref SPH1104).

PST 2141   Inorganic Chemistry 11   10 Credits
This module looks at group II: Similarities and trends in the properties of elements; Group IV: variation in melting points and electrical conductivities; bonding, molecular shape, volatility and hydrolysis of the tetrachlorides; bonding, acid/ base nature and thermal stability of the oxides; relative stabilities of oxidation states for the elements in their oxides and aqueous cations; Group VII: physical properties; reactivity as oxidising agents; reactions of the halide ion and reactions with aqueous sodium hydroxide.

PST 2142   Organic Chemistry 11   10 Credits
This module explores structure, nomenclature, synthesis and reactions of halogenoalkanes; carbonyl compounds; compounds; alcohols and carboxylic acids.

Think in other terms

PST 2143   Chemical and Ionic Equilibria   10 Credits
The module covers reversible reactions; dynamic equilibrium; Factors affecting chemical equilibria; The Haber process and contact process and Ionic Equilibria.

PST 2140   States Of Matter   10 Credits
The module covers Ideal gaseous state and ideal behaviour; Liquid state, simple kinetic molecular descriptions to explain changes of state; solid state and Lattice structure.

PST 2241   Transition Elements   10 Credits
This module examines the general physical and characteristic chemical properties of the first set of transitional elements, titanium to copper and colour of complexes.

PST 2242   Polymers and Polymerization   10 Credits
The module looks at addition polymerization as well as condensation polymerization.

PST 4142   Halogen Compounds   10 Credits
The module focuses on Halogenalkanes and halgenoarenes; nucleophilic substitution; hydrolysis; formation of nitriles, primary amines; elimination and relative strength of the C-Hal bond.

PST 4141   Nitrogen and Sulphur   10 Credits
The module explores nitrogen reactivity; use in formation of ammonia (NH_3), Nitric acid and fertilizers; Impact of nitrogen oxides and nitrates on the environment; Sulphur and formation of oxides resulting in acid rain formation as well as sulphur oxide as a food preservative.

PST 4143   Applications of Analytical Chemistry   10 Credits
The module explores the method of detection and analysis and application of chemistry in society.

PST 4144   Electrochemistry   10 Credits
This module covers redox processes; electrode potentials; standard electrode (Redox); standard cell potentials; batteries and fuel cells.

PST4240   Nuclear Chemistry   10 Credits
This module looks at the fundamentals of nuclear behaviour, nuclear properties, radioactive decay and nuclear reactions; applications of nuclear phenomenon, biological effects of radiation; nuclear analytical techniques-tracers, radioisotope dating and nuclear power.

PST 4243   Environmental Chemistry   10 Credits
The module emphasizes the atmosphere, chemical processes and reactions, carbon cycle, greenhouse effect, soils, soil and water associations, ion exchange, water cycle, water treatment, sewage, BOD values, waste management and industrial waste.

Think in other terms

PST 4244   Reaction Kinetics   **10 Credits**

The module looks at simple rate equations, orders of reaction; rate constants; effect of temperature on rate constants; activation energy and homogeneous and heterogeneous catalysts.

COMPUTER SCIENCE
Specialist Modules

PTE1131   Engineering Mathematics 1   **10 Credits**

The module covers introductory topics, indices and logarithms, formulae, mensuration, trigonometry, force and moments, estimating and costs; Series, arithmetic and geometric progressions, convergence, sum to infinity, gradient of a curve, the chain rule, tangents and normals, increasing and decreasing functions, rates of change, stationary points; Polynomials, discriminant, real roots, solving quadratic equations, domain, range, one-one functions, graphical illustrations; Calculus, differentiation, integration, applications of arc length, area, volumes, moments of inertia, centroids; Vector and scalar products; Equations of lines and planes; Matrices basic operations, rank, inverse Gaussian elimination, Cramer's rule; Determinants, Eigen values and Eigen vectors; Ordinary differential equations; Applications of First order differential equations: mechanical and electrical engineering problems; Elementary functions including Hyperbolic functions and their inverses, Differentiation technique; Leibnitz's Rule, Hospital's Rule; Applications of differentiation: maxima and minima, kinematics; Integration techniques, Reduction formula; Integration of complex functions, integration by substitution, trigonometric relationships, trapezium rule, graphical determination, integration by parts; Applications of Integration: arc-length, area, volume, moments of inertia and centroids.

PST1133   Mathematical Foundations of Computer Science   10 Credits

The module examines sets, relations, function; Discrete probability; Combinatory, Propositional logic, first-order predicate logic; Reasoning about programs, axiomatic semantics, pre/post-conditions, loop invariants, Order statistics, recurrence relations, application to searching and sorting, probability and programming in Haskell.

PST 1172   Electricity and Magnetism   **10 Credits**

The module highlights the static electricity fields, coulomb's law and the electric field; Motion of point of charge in electric field; Lines of force, electric dipoles in electric fields, electric flux; Gauss's law and its applications; Potential of a system, electric scalar potential; Capacitors in circuits, their energy, dielectrics and applications of static electricity.

PST1275   Introduction to Computers   10 Credits
This module outlines information Society, History of Computers; Data and Information; number system and arithmetic; data representation; basic computer components:-CPU, I/O units; Storage; Brief concepts of computer language and programming techniques; high/low level languages, compiler, interpreter, grammar, recursion, simple data structures (array, lists, trees, hash tables, queues & stacks) problem solving; Algorithms: Sorting, compression, numerical and encryption, operating system and its function:- process and memory management, I/O, data communication job control; Processing:-File structures, organization and access, databases; Fundamentals of Network, a simple program, initialization, printing, comments, keyboard, constants, assignments and expressions.

PST1277   Business Information Systems   10 Credits
The module looks at the business environments; organizations as systems: goal setting and decision making; IT strategy and information systems objectives; Frameworks used for analysis organizational systems; Types of information system: transaction processing, operational control, MIS, DSS and Expert Systems; The process of system development: the systems of life cycle, the phases within it and the activities and documentation appropriate to each phase; Other development strategies include 4GLs, prototyping and evolutionary development; The anatomy of a system: project organization and project management; The analysis and design of information systems, physical of information systems and implementation and post implementation activities.

PTE1253   Electronic Circuits and Devices   10 Credits
The module examines the introduction to volt-ampere characteristics of diodes, transistors with power and photo electronic devices; Maxwell's equation for static and harmonic varying current, displacement current, application of circuit theory, semi-conductors, diodes and transistors, logic gates, NAND, NOT, NOR, OR exclusively OR, Boolean algebra, combination logic, minimization, programmable logic devices, sequential logic, arithmetic operations and circuit memory elements.

PST2176   Databases Concepts and Data Processing   10 Credits
The module looks at database terms; Database management systems (DBMS), database models: Entity-relationship model; Database security; The relational model, comparison of files and database systems; The SQL language, database design, ER or relational mapping, normalization, aspects of physical database access: database transactions, embedded SQL(PL/SQL) , cursors, distributed databases; Client-server database systems, Higher-level and extended data models, Object-oriented data models are introduced; SQL3 and requirements of multimedia databases.

PST2177   Programming and Program Design   10 Credits
The module looks at the application of set theory to program specification; Program design through pseudo code; JSP; Klarner, O, Diagrams; Types of systems: generic system development

life cycle(SDLC) stages and design aspects; Programming languages and visual basic programming.

PST2178   Operating Systems Concepts   10 Credits
The module gives an overview of operating systems, operating system organization and services, computer design, the hardware and its interface, device management, I-O management: creating virtual device abstractions, Support for processes and threads, job scheduling, disk scheduling, file system; Protection(privacy) and security, process management, synchronization, file management, filing systems, interface and implementation; Backup and archiving, distributed operating systems and file systems; Case studies drawn from UNIX, MS-DOS, File and directory structure and Data transmission.

PTE2254   Digital Electronics   10 Credits
This module explores the Boolean algebra, Combinational logic; Minimization; Karnaugh mapping; Programmable logic devices; Sequential logic; Arithmetic Operations and circuit memory elements; Operational amplifiers, classification, parameters and basic building blocks.

PST 2277   Data Structure and Algorithms
The module focuses on problem solving, algorithms, compilation, variables, I/O, control structures, data structures, subprogram, files, data types, storage elements, control constructs, procedures, parameter passing and results, recursion, functional, imperative and logical programming, scope rules, extensibility, data structures:-pointers, linked lists, queues, stacks, tree and operations on them, divide and conquer, backtracking, space/time, trade-offs, data abstraction, sorting, hashing; System design approaches and computer arithmetic errors.

PST 2278   Systems Analysis and Design   10 Credits
This module gives an overview of system development life cycle, structured analysis and design, business systems and computer resources; Analysis phase and ad techniques used, data dictionaries, DFDs, database definitions and system maintenance, project planning and control; communication; Documentation and its standards; System security and integrity; prototyping and case studies of practical systems project.

PST 4175   Computer Communication and Networking   10 Credits
The module is on keeping information safe, active and passive attacks, digital signatures and cryptographic checksums, countering digital forgery and ensuring integrity; Types of networks; network topologies; network device types and characteristics and media access; Networking technology overview, End-to-end protocols; the Internet protocol Suite overview; UDP, TCP – connection established and adaptive retransmission, RPC; Congestion control, Resource allocation, Network performance and network management.

Think in other terms

PST4178   Software Engineering Concepts   10 Credits

The module looks at the software life cycle; The software development process, Design objectives, Function oriented and objectives oriented design methodologies; documentation, implementation strategies, debugging, anti bugging, introduction to specifications, verification and validation, elementary proof of correctness, code and design reading, structured walkthroughs, testing strategies, software reliability issues, configuration management, cast tools and team project assignment.

PST4179 Operating Systems and Computer Architecture   10 Credits

This module focuses on Von Neumann architecture; pipelining; buses; memory mapping; interrupts; registers; addressing modes; Overview of operating systems structures, Operating system organization and services, Computer design, the hard ware and its interfaces; Device management, I-O management, Job scheduling, Disc scheduling, file systems, Protection and security, process management, synchronization and communication; Memory management; Filing systems, UNIX, MS-DOS, File Directory; Buses, memory data representation; arithmetic operations, the ALU; Control: data path layout, controlling the fetch – decode-executive cycle, Instruction set design, Interfacing to the outside world as well as improving usability and performance.

PTE 4254   Microprocessors and Microcontrollers   10 Credits

The module covers the basic concepts of microprocessors; Architecture and operation; Instruction sets and assembly language programming; Subroutine, interrupts, programmed controlled I/O: I/O operations; I/O memory mapped; I/O ports; Programmable LSI ports and applications of microprocessor.

PST4276   Computer Graphics   10 Credits

The module looks at the nature and history of graphic design, Fundamental of computer graphics Two dimensional drawing(2-D), Three dimensional drawing (3-D) in graphic design; ICT for designing; photo realism, retracing radiosity and particle tracing Digital drawing, digital photography; Developing designs from digital images; Computer design software and tools for graphic design; Advertising designs and print media; Development of graphic products, magazines, packing and posters; Designing using software e g;, CorelDraw, Publisher, Photoshop and other software; : Colour, textures and the human visual system.

PST4278   Software and Hardware Systems   10 Credits

This module looks at application software; systems software; systems software and hardware; Reliable system/ software design concepts and development method; design management and development lifecycles phases; Review of system and software design methods: functional, object oriented, formal, prototyping; Function design method: SSADM; outline of version IV, object orientated method: object orientated analysis and design; Case study/project: design of a data-base retrieval system with OOD front-end and functional data-base design.

Think in other terms

PST4179 Operating Systems and Computer Architecture   **10 Credits**

The module explores Von Neumann architecture; pipelining; buses; memory mapping; interrupts; registers; addressing modes; Overview of operating systems structures, Operating system organization and services, Computer design, the hard ware and its interfaces; Device management, I-O management, Job scheduling, Disc scheduling, file systems, Protection and security, process management, synchronization and communication; Memory management; Filing systems, UNIX, MS-DOS, File Directory; Buses, memory data representation; arithmetic operations, the ALU; Control: data path layout, controlling the fetch – decode-executive cycle, Instruction set design, Interfacing to the outside world, improving usability and performance.

MATHEMATICS AND STATISTICS
Specialist Modules

PST1131   **Calculus I**   **10 Credits**

This module explores the functions: domain, range, injective, bijective and surjective; classes of functions, polynomials, rational, transcendental, algebraic , trigonometric, exponential , logarithmic , hyperbolic functions and their inverses; Limits and continuity of single variable functions, Differentiation : rules of differentiation, differentiation from first principles, Leibnitz's Rule, L'Hopital's Rule, Rolle's Theorem, Mean Value Theorem of differential calculus; Application of differentiation: Maxima and minima, Integration: indefinite and definite integrals, integration techniques; substitution method, integration by parts, tabular integration, trigonometric substitutions, reduction formulae; Mean value Theorem of Integral calculus; Application of integration: arc length, area, volume, moments of inertia and Centroids.

PST1132   **Linear Algebra**   **10 Credits**

The module looks at the complex numbers: geometric representation and algebra of complex numbers; De Moivres theorem polynomials and roots of polynomial equations, Roots roots of complex numbers; Matrices: Algebra of matrices, trace, rank of a matrix, determinants and inverses, solutions of simultaneous linear equations: Cramer's rule; Gauss Elimination and Gauss Jordan Elimination; Vectors: Addition and scalar multiplication of vectors, Vector projections, , Dot and vector product, Lines and planes, Scalar triple products and its application; Vector triple product, Vector spaces Definition of vector spaces and subspaces; Linear combination, Linear dependence and Independence, Basis and dimension Row and Column spaces; Eigenvalues and Eigenvectors of 2×2 Matrices.

PST1134   **Applied Statistics**   **10 Credits**

The module looks at discrete and continuous data, Descriptive statistics, initial data exploration, Measures of central tendency, dispersion and position; Measures of shape of distribution; Mean ,

mode and median of grouped data; Graphical representation of data: multiple and stacked bar charts, histogram, Stem and leaf, dot plots, Box and whisker; Discrete and continuous random variables, probability density functions: mean, expectation, variance and their properties; Cumulative probability density functions; Sampling methods(simple random, systematic, stratified, purposive/judgemental, cluster, convenience sampling; Introduction to hypothesis testing: definition of key terms; Parametric test : t-test and Z –test; Hypothesis testing for a single mean and proportion; Non-parametric tests: Chi-square tests; goodness of fit and test of independence ,Mann-Whitney, Wilcoxon, Runs, Kruskal Wallis test, Median test and sign test.

PST1231   **Calculus II**   **10 Credits**
The module explores functions of several variables(domain and range) and their derivatives, Limits and continuity of functions with several variables, Partial derivatives , higher order partial derivatives,   chain rule, directional derivatives, Double Integration: Changing of coordinate systems, Jacobians , Triple Integrals and Applications, Triple Integrals using spherical or cylindrical coordinates;   Application of triple integrals to find area and Volume, sequence and series, power series , convergence tests , Taylor's Theorem ,centre of masses and moments of Inertia maximum and minimum points and Lagrange's multipliers.

PST1232   **Discrete Mathematics**   **10 Credits**
This module looks at the real number system; Natural numbers, integers, rational, real numbers, decimal representations, irrationals, interval notation , inequalities and their solutions , absolute value; Set Theory: Introducing sets, set description, basic description and language, Operation on sets, Venn diagrams Theorems of Inclusion and operation on sets; De Morgans Laws, Indexed sets and power sets, Ordered pairs and Cartesian Products, set theorems and proofs; Relations: properties symmetric, antisymmetric, transitivity, Types of relations; partial order and equivalence relation; Logic and propositions: predicates , truth values, logical equivalence and quantifiers; Mathematical proofs: proof by mathematical induction, direct proof, proof by transposition/contrapositive, proof by contradiction; Mathematical structures and operations : binary operations and properties, groups and rings.

PST1234   **Statistical Inference I**   **10 Credits**
This module focuses on basic concepts of Statistical Inference : deductive inference population , sample parameters and statistics; Measurement scales and types of data; Point estimation: methods of finding point estimators(Method of Moments, maximum likelihood and Least Squares); Properties of point estimators (biasedness, consistency, efficiency and sufficiency);Sampling distributions,   Central Limit Theorem, Chi-Square student-t-test and F-distributors distribution of the minimum and maximum sample; Estimation: methods of estimation, properties of estimators and their sampling distributions; Interval estimation: samples, proportion and confidence intervals; Confidence interval between two means and between two proportions; Hypothesis testing using confidence intervals(Z-test and t-test); Hypothesis testing between two means and proportion: Matched t-test and correlated t-test.

Think in other terms

PST2132   Linear Programming   10 Credits
This module highlights linear programming, model formulation, graphical LP solution, Solution of Maximisation and minimisation models, degeneracy, feasible solution, optimality condition, Linear Programming applications to real-life situations, simplex, Simplex Tableau computations, Big M method; Computer solution with Excel solver and AMPL; Duality; sensitivity analysis, sensitivity analysis with Tora, Excel solver and AMPL; Transportation Models: transportation algorithm(North-west corner, Least cost method, Vogel's Approximation Method) , Balanced and unbalanced problems,   Assignment models(Hungarian); Network models : minimum spanning algorithm, shortest route algorithm, linear programming application and maximal flow models.

PST2131   Ordinary Differential Equations   10 Credits
This module outlines first order ordinary differential equations: separable , linear , Exact, integrating factor; Bernoulli Equations; Application of First Order differential equations, Second Order equations; Linear equations and linear differential operators; Linear independence, Wronskian; Ordinary Linear Differential Equations with constant coefficients and undetermined coefficients; Variation of parameters; Laplace transforms and applications; Predator-prey and Volterra-Litka equations; Series solution of ordinary differential equations; Frobenius method, Legendre polynomials and Bessel functions.

PST2133   Probability Theory   10 Credits
This module focuses on probability, Axioms, mutually and independent events, Probability tree diagrams , Law of total probability, Conditional probability, Baye's Rule ; Common discrete distributions: Bernoulli and Binomial Uniform, hypergeometric , Geometric, Poisson, Use of Binomial and Poisson tables; Common Continuous Distributions: Uniform, Normal, Exponential; Normal approximation to binomial and to Poisson etc; Use of Z- tables; Moment and probability generating functions; Properties of moment generating functions, Joint Probability Distributions and marginal distribution; Markov and Chebshev's inequalities.

PST2230   Vector Analysis   10 Credits
This module gives a review of algebra; Definition of vector –valued functions, Differentiation of vector functions: derivatives of vector functions, Limits and continuity of vector functions, partial differentiation of vector functions ,space curves ,Curvature and torsion, Scalar fields - directional derivatives of a scalar field ,gradient of scalar fields, Laplacian of a scalar field, Vector fields : divergence and curl of vector fields, Laplacian operator: Conservative solenoidal and irrotational vector fields, line and surface integrals, Integral theorems : Green's theorem, Gauss' divergence theorem , Stoke's theorem, and their applications and Orthogonal curvilinear coordinates.

PST2232 **Advanced Linear Algebra** **10 Credits**

This module looks at linear transformations operations on linear operators, change of basis, kernel and image of a linear mapping; Eigenvalues and eigenvectors, characteristic equation; Properties of eigenvalues and eigenvectors, orthogonality of eigenvectors, geometric and algebraic multiplicity of eigenvalues; Application of diagonalisation of matrices, quadratic and bilinear forms, Jordan, Normal form of a matrix , Quadratic forms; Orthogonal matrices and theorems; Method of Gramm-Schimdt, Unitary matrices , Inner product vector spaces and Cauchy Schwarz inequality; The Cayley Hamilton Theorem and its applications; Symmetric, Skew-Symmetric, Hermitian and Skew-Hermitian matrices definitions and properties.

PST2233 **Linear Models** **10 Credits**

This module covers regression: Simple linear regression model; Residual analysis; Scatter plots and correlation(product moment and Spearman Brown correlation coefficients ,Coefficient of determination , Least squares method; Full rank linear regression model, Multiple regression Model; General linear hypothesis; Stepwise methods; ANOVA(one and two way); Design Matrix, Quality of prediction and hat matrix; Matrix representation covariance matrix; Design and Analysis of Experiments, completely randomized design, randomized complete block design, Latin squares, factorial experiments; Time Series : seasonal ,trend, cyclical and random (residual) factor, Moving averages and   smoothing and predictions.

PST2203 **Methods of Teaching Mathematics** **10 Credits**

The topics covered in this module include Theories in the learning of Mathematics: Constructivism Learning theory, Realistic Mathematics Education Approach, Problem solving, The Japanese Lesson Study, Activity-based Facilitation and Project Method ;Philosophical issues in Mathematics: Forms of philosophies in Mathematics Education and their influence in Mathematics instruction; Forms of knowledge in mathematics: Conceptual Vs Procedural knowledge, Technological and Pedagogical Content Knowledge (TPACK Model);Inductive and Deductive reasoning; Assessment in Mathematics Education : Assessment tools and test construction in Secondary schools, Bloom's taxonomy and Test blue print(Specification grid); Contemporary issues in Mathematics: Gender differential, Attitudes and Mathematics anxiety, Culture and Mathematics (Ethnomathematics), ICT integration in Mathematics Education including use scientific calculator and graphing calculators.

PST4131 **Partial Differential Equations and Fourier series** **10 Credits**

The module gives a review of ODEs and Laplace Transforms Partial differentiation equations: Solving first order partial differentiation equations by integration and method of characteristics; Classification of second order partial differential equations with two independent variables; Derivation of the wave, heat, Laplace and Poisson equations; Solving second order Partial differentiation : change of variables, method of characteristics , separation of variables and Laplace transforms techniques; Fouries analysis: Fourier series and Fourier transforms, Fourier sine and cosine series; Half range Fourier series, convergence theorem; Integration and

differentiation of Fourier series;   Application of Fourier series to boundary value problems; Fourier transforms and inverse; Convolution theorem and its applications.

PST4132   Real Analysis   10 Credits

The module offers an introduction to Analysis : Review of real number system , countability of real number system , field axioms, order axioms; Completeness, supremum, infirmum, Limits of sequences; Neighbourhoods, limits and interior points, open sets, closed sets, convergence , Cauchy sequence , bounded sequences , subsequences, Bolzano-Weitrass theorem; Cauchy-Schwartz inequality, Pythagoras Theorem; Differentiability continuous functions , Uniform continuity , Intermediate value theorem; Integration : Riemann integrals, properties of Riemann Integrals, proofs on Riemann Integrals; Study of measure theory and the Lebesgue Integral, Fubini's theorem.

PST4134   Survey and Sampling Methods   10 Credits

The module explores sample survey and questionnaire design, postal and telephone questionnaires, interviewer-administered questionnaires; Errors in sample surveys; Ratio and regression estimators, separate and combined ratio estimators; Sampling methods, Simple random sampling, sample size estimation; Systematic sampling; Simple random and Systematic , Stratified populations and stratified simple random sampling; Optimum allocation and Neyman allocation; Cluster and multi-stage sampling; The module also looks at the application of computer based test statistics (System Application Statistics(ASA), Statistics Package for Social Sciences(SPSS) inference and Statistic.

PST4231   Numerical Methods   10 Credits

The module looks at the types and causes of errors : Error sources , strategies for reducing errors; Introduction to simple numerical methods for solving problems in Mathematics Science and Finance , Simpson and Trapezium rule;; Numerical methods for root-finding simple iterative method , the Newton –Raphson method , Bisection method, convergence of Bisection method, Regula Falsi or False Position method , Secant Method, Polynomial interpolation and splines; Solution of linear algebraic equations: direct and indirect methods; Numerical integration: Newton Cote's formulae, derivation of the trapezoidal and Simpson's rules, Romberg integration, Gaussian quadrature formulae; Numerical integration of ODE's, Euler and Taylor second order; Runge-Kutta methods.

PST4233   Mechanics   10 Credits

The module looks at particle kinematics: displacement , velocity and acceleration of a vector , radius of curvature normal and tangential acceleration, coordinate system(cartesian and polar system) , Particle dynamics : Newton's Laws of motion Projectile motion: particle launched at horizontal & inclined plan, Circular motion(vertical and Horizontal) , Work , Energy and Power momentum and collisions (direct impact) : Oscillations : Linear simple harmonic motion; Central forces and Orbits : Central Forces and Planetary Motion: Equations of motion for a particle in a

Think in other terms

central field, Potential energy of a particle in a central field, Conservation of energy and Kepler's law of planetary motion.

PST4278 Computer Packages In Mathematics and Statistics   10 Credits
This module will be a practical module, dealing with the use of computers to solve mathematical and statistical problems. It is designed to complement the understanding of some of the mathematical concepts through the use of mathematical packages; Spreadsheets, including formulae, data analysis and graphs Use of Mathematical packages including MATLAB, Autograph, Geogebra, Miscrosoft, Equation Editor etc; Solution of equations, Limits, Differentiation and Integration; Solution of first and second order differential equations; Solution of systems of linear equations; Statistical Packages: MINITAB, SPSS, Spreadsheets including data handling, descriptive statistics distribution, graphs etc.

PHYSICS
Specialist Modules

PTE1131   Engineering Mathematics 1   10 Credits
The module looks at introductory topics, indices and logarithms, formulae, mensuration, trigonometry, force and moments, estimating and costs; Series, arithmetic and geometric progressions, convergence, sum to infinity, gradient of a curve, the chain rule, tangents and normals, increasing and decreasing functions, rates of change, stationary points; Polynomials, discriminant, real roots, solving quadratic equations, domain, range, one-one functions, graphical illustrations; Calculus, differentiation, integration, applications of arc length, area, volumes, moments of inertia, centroids; Vector and scalar products; Equations of lines and planes; Matrices basic operations, rank, inverse Gaussian elimination, Cramer's rule; Determinants, Eigen values and Eigen vectors; Ordinary differential equations; Applications of First order differential equations: mechanical and electrical engineering problems; Elementary functions including Hyperbolic functions and their inverses, Differentiation technique; Leibnitz's Rule, Hospital's Rule; Applications of differentiation: maxima and minima, kinematics; Integration techniques, Reduction formula; Integration of complex functions, integration by substitution, trigonometric relationships, trapezium rule, graphical determination, integration by parts; Applications of Integration: arc-length, area, volume, moments of inertia and centroids.

PTE1147   Material Science   10 Credits
The module looks at materials classification and their structure; atomic bonding in materials, crystallization, dislocations, plastic deformation; temperature measurement; phase diagrams: solidification, liquidification, vapourization; alloy formation, types of material: composite, selection and their applications i.e. wood, plastics, ceramics and alloys; Structure and properties of metals and alloys; Review of principles, Diffusional processes; Constitutional phase diagrams;

Think in other terms

Lattice defects; Deformation of metals, fracture and fatigue, polymers and corrosion; (X-Ref SPH4104 & SPH4204).

PST1172   Electricity and Magnetism   10 Credits
This module explores simple electrostatic phenomena concept of an electric field, force between point charges, electric field of a point of charge, electric potential; Coulomb's law, Concept of magnetic field, electric current and resistance: electric conductors, Kirchoff's laws, Wheapstone's bridge, thermo-electricity; magnetic fields: Biot-Savart law, Ampere's law, Faraday's and Lenz's law; (X-Ref SPH1105).

PTE1231   Engineering Maths II   10 Credits
This module explores series, arithmetic and geometric progressions, convergence, sum to infinity, gradient of a curve, the chain rule, tangents and normals, increasing and decreasing functions, rates of change, stationary points; Integration of complex functions, integration by substitution, trigonometric relationships, trapezium rule, graphical determination and integration by parts.

PST1270   Oscillations and Waves   10 Credits
The module highlights simple harmonic motion dumped and forced oscillations; Waves: refraction of light, progressive waves, transverse and longitudinal waves, polarization, electromagnetic waves; Superposition: stationary waves, diffraction, interference and two – source interference patterns.

PST1274   Modern Physics   10 Credits
The module covers electrons, beams of charged particles, energy of a photon, photo electrics emission of electrons, wave particle duality, energy levels in atoms, line spectra, nuclear atom, nucleus, isotopes, mass excess and nuclear energy and nuclear processes (X-Ref SPH1104).

PST2171   Mechanics and Relativity   10 Credits
This module looks at the types of force, equilibrium of forces, center of gravity, Newton's law of motion, linear momentum ad its conservation, impulse turning effects of forces, energy conversion and conservation, work, potential energy, kinetic energy and internal energy; Power, gravitational field, force between point masses, field of a point mass, field near to the surface of earth and gravitational potential (X-Ref SPH1101).

PST2172   Circuit Theory   10 Credits
The module examines resistive Circuits: Ohms Law, Nodes, Branches and Loops, Kirchhoffs Laws, Series Equivalents and Voltage Division, Parallel Equivalents and Current Division, Wye-Delta Transformation; Analysis Method: Nodal Analysis, Circuit Containing Voltage Sources, Mesh Analysis, Circuit Containing Current Sources; Nodal versus Mesh Analysis; Network

Theorems: Linearity and Proportionality, Superposition, Thevenin Theorem, Norton Theorem, Maximum Power Theorem; OP AMPS: Operational Amplifiers, Role of Negative Feedback, Operational Amplifier Building Block Circuits, Interconnecting Op Amp Building Blocks; Virtual Short Principle for Op Amps; Energy Storage Elements: Capacitors, Energy Storage in Capacitors, Series and Parallel Capacitors, Inductors, Energy Storage in Inductors, Series and Parallel Inductors, DC Steady State, Practical Capacitor and Inductors; First- Order Circuits: Simple RC and RL Circuits without Sources, Time Constants, General First-Order Circuits without Sources, Circuits with DC Sources, Superposition in First-Order Circuits, Unit Step Function, Step and Pulse Responses; Second-Order Circuits: Circuits with Two Storage Elements, Second Order Equations, Natural Response, Forced Response, Total Response, Unit Step Response; AC Circuits; Sinusoids and Phasors; Sinusoidal Steady state Analysis; AC Power Analysis; Three Phase Circuits and Magnetically Coupled Circuits.

PTE2150   Analogue Electronics   10 Credits
The module is an introduction to stabilized power supplies, small-signal models of differential, single stage; Multistage and integrates circuit amplifiers, oscillators, wave shaping and switching circuits; High frequency effects; Stability and performance measurement (X-Ref SPH1202).

PST2271   Solid State Physics   10 Credits
The module explores crystal Structure and Defects: Unit cell, crystal systems, elements of symmetry, Miller indices, diffraction, imperfections-vacancies, colour centers, dislocations; Burger's vector; Lattice Vibration: Elastic waves; Density of states; Specifi c heat models of Eistein and Debye; Scattering of X-rays, neutrons and light by phonons; Free-electron Model: Free electron gas; Electrical conductivity; Heat capacity of free electrons; Fermi surface; Thermionic emission; Semi-conductivity: Fermi level, direct and indirect band gap semiconductors, conductivity, mobility and life times in intrinsic semiconductors, extrinsic semiconductors: p-type and n-type semiconductors; P-N juctions, light emitting-, zener -, tunnel diodes; Ohmic and non-ohmic contacts, Hall effect in semiconductors; Schottly barrier; Oxide and non-oxide semiconductors; Magnetism: Classifi cation as dia-, para-, ferro-, ferri- and antiferro-magnetics; Detailed study of the above; Domains and other macroscopic phenomena; Magnetic measurement techniques; Applications-magnetic bubbles, magnetic phase analysis of alloys, imaging etc; Dielectrics and Ferro-electrics: Electric polarisation, Mechanisms of polarisation-electronic, ionic orientational and space charge, derivation as a function of temperature and frequency; Claussius Mossoti equation; Ferro-electrics-classifi cation, ferro-electric domains, pyro-electricity, and piezoelectric materials and applications; Superconductivity: Theory of superconductivity, Meissner effect, flux quantization, types type II superconductors heat capacity and I applications (X-Ref SPH2202).

PTE2246   Thermodynamics   10 Credits
This module covers temperature scales, practical thermometers; Ideal gas: equation of state, kinetic theory of gases, pressure of a gas, kinetic energy of a molecule, work done by an ideal gas, thermal equilibrium, thermal conduction, convection, radiation; Laws of thermodynamics,

the working fluid and phase equilibrium, reversible and irreversible processes, The second law of thermodynamics and Entropy, The heat engine cycles, vapour power cycles, refrigeration cycles, Turbines and compressors, Cooling systems: air, water, additives; Communication and production; Design registration and protection (X-Ref SPH1203).

PTE2254   Digital Electronics   10 Credits
This module focuses on Boolean algebra, Combinational logic; Minimization; Karnaugh mapping; Programmable logic devices; Sequential logic; Arithmetic Operations and circuit memory elements; Operational amplifiers, classification, parameters and basic building blocks.

PST4170   Quantum Physics (Elective)   10 Credits
The module look at Schrödinger's theory of Quantum Mechanics: The wave function and its required properties;The probability densities; Solution of the time- independent Schrodinger equation for all known simple potentials including the harmonic Oscillator-Hermite polynomial Operator algebra: Hermiticity of Operators: Communicators; The Hamiltonian; The equation of Motion; The eigen values and eigen functions; Observables and expectation values; The one electron atoms: Spherical Harmonics; Quantum numbers; Selection rules; Angular momentum; The Zeeman Effect; The electron spin the Stern-Gerlach experiment; Addition angular momentum; The Spin Orbit interaction ;Total Angular Momentum ;Spin -Orbit Interaction and the Hydrogen Energy levels; Many –election atoms: Pauli exclusion principle, electronic states; bonding in molecules and solids, the classical free electron model and Fermi energy; (X-ref SPH 2101).

PST4172   Statistical Mechanics   10 Credits
This module highlights the statistical systems micro canonical, canonical and grand canonical ensembles; Phase space; Classical statistics: Liouville theorem; Entropy and thermodynamic probability; Partition function; Maxwell's velocity distribution function; Equipartition of energy; Quantum statistics, statistics of fermions, cryogenics and superconductivity.

PST4173   Electromagnetism (Elective)   10 Credits
The module looks at Capacitors, inductors, generators and eddy currents; Electromagnetism and electromagnetic induction (X-ref SPH2105).

PST4270   Atomic and Nuclear Physics   10 Credits
The module explores the Shell model, Fermi gas and collecture model; Nuclear decay: alpha decay, basic alpha decay processes, theory of alpha emission; Angular momentum and parity in alpha decay, alpha decay spectroscopy; The beta decay, Fermi theory of beta decay, energy release in beta decay, angular momentum and parity selection rules, forbidden decays, double beta decay, beta decay spectroscopy; Gamma decay: energetics of gamma decay, angular momentum and parity selection rules, internal convection, lifetimes of gamma ray spectroscopy,

nuclear resonance, fluorescence and Mossbauer effect, nuclear reaction; Neutron physics, nuclear fusion, accelerators and application of nuclear physics (X-ref SPH2205 & SPH4102).

PST4271   Classical Mechanics   10 Credits
The module covers fundamental forces: classification and unification; Inertia forces in linearly accelerating frame; Non – inertial systems; Lagrange's and Hamilton's formulation of mechanics; Generalized coordinates; Principles of least action; Lagrange's equation of motion and applications; Simple and double pendulum, inclined plane; Orbital mechanics; Equivalence of Lagrange and Newtonian mechanics; Lagrange's undetermined multipliers; Hamilton – Jacobi theory and relativity.

PST4274   Energy Physics   10 Credits
This module examines the sources of energy - primary and secondary; Solar energy, solar cells, solar panels; Other Non-conventional energy sources - wind, tide, chemical, geothermal etc; Efficiencies and application; (X-ref SPH4150 & SPH4250).

Think in other terms

MASTERS DEGREE PROGRAMME

SPECIAL REGULATIONS

1.0.   ENTRY REGULATIONS

1.1   Admission requirements

1.1.1   Applicants must have an approved Bachelor of Science Education Honours degree or its equivalent with subject specialisation in accounting, mathematics, science or technology subjects.

1.1.2   Alternatively applicants with a relevant bachelor's degree plus the Postgraduate Diploma in Science and Technology Education or its approved equivalent shall be considered.

2.0   STRUCTURE OF DEGREE PROGRAMMES AND SELECTION OF MODULES

2.1   Programme of study

2.1.1   The two-year block release or part time programme is composed of   prescribed core and elective modules as well as a research project culminating in a mini-dissertation of at least 10 000 words.

2.1.2   Candidates shall be required to study modules both in education and in the areas of specialization indicated below.

3.0   ASSESSMENT OF CANDIDATES

3.1   Assessment

3.1.1   All taught modules shall be assessed through module work and examination, unless specified otherwise in the appropriate module synopsis.

3.1.2   The dissertation shall count as three modules per semester for assessment purposes.

3.1.3   To be awarded the degree, candidates must complete a minimum of 288 credits.

Think in other terms

ACCOUNTING AND BUSINESS STUDIES

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PST6101	Philosophical issues in STEM education	18
PST6104	Science, Mathematics and Technology Curricular	18
PST6160	Advanced financial Accounting	18
PST6161	Applied Management Accounting	18
PST6205	Assessment in STEM education	18
PST6208	Quality Assurance	18
PST6260	Financial Management	18
PST6261	Strategic Management	18

YEAR II

PST6410	Dissertation	-
PST6311	Advanced research methods	18
PST6360	Advanced Auditing (Elective)	-
PST6361	Corporate Governance (Elective)	18
PST6411	Tools for basic and applied research	18
PST6410	Dissertation	72
PST6461	Applied Marketing (Elective)	-
PST6464	Advanced Taxation (Elective)	18

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
YEAR II	144
Total minimum credits:	**288**

Think in other terms

BIOLOGY

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PST6101	Philosophical issues in STEM education	18
PST6104	Science, Mathematics and Technology Curricular	18
PST6136	Molecular and cell biochemistry	18
PST6137	Advanced physiology	18
PST6139	Conservation Biology (Elective)	-
PST6205	Assessment in STEM education	18
PST6208	Quality Assurance	18
PST6237	Environmental Microbiology	18
PST6238	Molecular Genetics (Elective)	-
PST6236	Advanced Plant Physiology (Elective)	18

YEAR II

PST6410	Dissertation	-
PST6311	Advanced research methods	18
PST6339	Habitat ecology	18
PST6411	Tools for basic and applied research	18
PST6410	Dissertation	72
PST6437	Plant health and productivity (Elective)	18
PST6438	Advanced Genetics (Elective)	-

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
YEAR II	144
Total minimum credits:	**288**

Think in other terms

CHEMISTRY

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PST6101	Philosophical issues in STEM education	18
PST6104	Science, Mathematics and Technology Curricular	18
PST6140	Advanced Physical Chemistry	18
PST6141	Advanced Inorganic Chemistry	18
PST6205	Assessment in STEM education	18
PST6208	Quality Assurance	18
PST6242	Advanced Organic Chemistry	18
PST6244	Advanced Anal Chemistry	18

YEAR II

PST6410	Dissertation	-
PST6311	Advanced Research Methods	18
PST6336	Advanced Biochemistry (Elective)	18
PST6342	Molecular Chemistry (Elective)	-
PST6411	Tools for basic and applied research	18
PST6410	Dissertation	72
PST6440	Instrumental Chemistry Analysis (Elective)	-
PST6443	Materials Chemistry (Elective)	18

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
YEAR II	144
Total minimum credits:	**288**

Think in other terms

COMPUTER SCIENCE

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PST6101	Philosophical issues in STEM education	18
PST6104	Science, Mathematics and Technology Curricular	18
PST6175	Computational Discrete Mathematics	18
PST6179	Advanced Enterprise Architecture Programming	18
PST6205	Assessment in STEM education	18
PST6208	Quality Assurance	18
PST6276	Advanced Database and Data Mining	18
PST6278	Evolution Computing & Parallel Distributed Processing	18

YEAR II

PST6410	Dissertation	-
PST6311	Advanced research methods	18
PST6375	Simulation and Modelling (Elective)	18
PST6379	Interactive Computer Graphics	-
PST6411	Tools for basic and applied research	18
PST6410	Dissertation	72
PST6478	Information Systems Security and Auditing	18

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
YEAR II	144
Total minimum credits:	**288**

Think in other terms

MATHEMATICS AND STATISTICS

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PST6101	Philosophical issues in STEM education	18
PST6104	Science, Mathematics and Technology Curricular	18
PST6131	Non-linear Differential Equations	18
PST6134	Multivariate Statistics	18
PST6205	Assessment in STEM education	18
PST6208	Quality Assurance	18
PST6232	Metric Space and Topology	18
PST6234	Surveying Sampling Techniques	18

YEAR II

Module Code	Module Description	Credits
PST6410	Dissertation	-
PST6311	Advanced research methods	18
PST6331	Control Theory (Elective)	18
PST6411	Tools for basic and applied research	18
PST6410	Dissertation	72
PST6332	Functional Analysis (Elective)	18

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
YEAR II	144
Total minimum credits:	**288**

PHYSICS

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PST6101	Philosophical issues in STEM education	18
PST6104	Science, Mathematics and Technology Curricular	18
PST6170	Mathematical Methods in Physics	18
PST6171	Solid state physics	18
PST6205	Assessment in STEM education	18
PST6208	Quality Assurance	18
PST6270	Advanced Quantum Mechanics	18
PST6272	Advanced Electromagnetics	18

YEAR II

PST6410	Dissertation	-
PST6311	Advanced research methods	18
PST6371	Astrophysics (Elective)	18
PST6411	Tools for basic and applied research	18
PST6410	Dissertation	72
PTE6446	Advanced Thermodynamics	18

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
YEAR II	144
Total minimum credits:	**288**

Think in other terms

MODULE SYNOPSES

PST6101   Philosophical Issues In Stem Education   18 Credits
The module explores the nature of scientific/mathematical knowledge; science sub-culture; knowledge bases and knowledge management; indigenous knowledge and science; views and conceptions of STEM education; alternative views; paradigms and ideologies; positivist, post-positivist, modernist, postmodernist, functionalist, inductivist and feminist perspectives.

PST6104 Science, Mathematics and Technology Curricular   18 Credits
This module looks at local, national and international determinants of curricula; examples of historical developments e.g. Nuffield Science project (UK), Millennium Mathematics project (USA); pre-colonial, colonial and post-colonial developments in Africa; inclusive curricula; content and structure of educational programmes; planning, design, implementation and evaluation of national and institutional curricular.

PST6205   Assessment in Stem Education   18 Credits
This module covers testing, measurement and evaluation; categorising assessment; judging the quality of assessment tools and processes; measures of validity and reliability as well as examination systems and processes.

PST6208   Quality Assurance   18 Credits
The module highlights inputs, processes and products of science, mathematics and technology education; measures of quality in teaching, assessment and educational management; resource planning and mobilisation; accreditation, standards control; research and case studies in quality science and mathematics education.

PST6311   Advanced Research Methods   18 Credits
This module looks at paradigms in educational research; basic and applied research; qualitative and quantitative research methodologies; research proposals and abstracts; developing a research project report: the research process - research questions, literature review, methodology, findings and conclusions; feasibility and pilot studies, field work, research instruments and data analysis.

PST6411 Tools for Basic and Applied Research (Elective)   18 Credits
This module explores statistical and quantitative research designs; experimental, quasi-experimental, correlation, hypothesis testing; ANOVA, ANCOVA, data analysis using ICT software e.g. SPSS, SAS; Atlas.ti, etc; qualitative research designs; content and thematic analysis; qualitative data analysis (QDA) software and application of data analysis techniques.

Think in other terms

PST6410   Dissertation   36 Credits

A report of minimum 10 000 words is developed in a stipulated period thorough a supervised process. The dissertation is undertaken over 2 semesters and counts as 2 modules.

ACCOUNTING AND BUSINESS STUDIES SPECIALIST MODULES

PST6160　　Advanced Financial Reporting　　　　　　　　18 Credits
The aim of the module is to gain a comprehensive understanding of the advanced financial accounting concepts, and practices associated with International Financial Reporting Standards. A greater understanding of, accounting for Conceptual Framework, Employee Benefits, Share Based Payments and financial instruments is acquired through the study of this module as students develop integral knowledge of financial statements. Upon completion of this module students should be able to better assess the tools, definitions and acceptable practises of International Financial Reporting Standards.

PST6161　　Applied Management Accounting　　　　　　　18 Credits
The aim of the module is to explore the use of management accounting and accounting systems to link strategic leadership, resource management, and organisational performance. This module develops the ability to manage resources, create and sustain value, and develop a system of organisational score and goal-keeping tools. The ability to integrate these skills with accounting systems will enable the organisation to make performance-based decisions.

PST6260　　Financial Management　　　　　　　　　　　18 Credits
The aim of this module is to examine and integrate into practice a blend of global financial management strategies and case-based applications. Through intense case study analysis, this module focuses on topics that range from the acquisition, deployment and management of international financial resources, to financial planning and analysis. The student will learn how to devise strategies for identifying and developing international financial resources, and to effectively communicate these strategies with organisational team members, partners and governments. The student will also become adept at analysing an organisation for reorganisation and restructuring from a strategic perspective

PST6261　　Strategic Management　　　　　　　　　　　18 Credits
The student will be able to ascertain, measure and revise strategic goals associated with performance and develop a performance metrics system that will measure performance against the overall organisational strategic goals. In addition, ethical and moral dimensions of strategic financial decision-making will be explored. The student will be able to ascertain, measure, and revise strategic goals associated with performance and develop a performance metrics system that will measure performance against the overall organisational strategic goals. In addition, ethical and moral dimensions of strategic financial decision-making will be explored.

Think in other terms

PST 6360   Advanced Auditing (Elective)   18 Credits
The aim of this module is to dissect how management controls the entity and relationships with external partners to enhance organisational value. This module investigates the roles of audit and assurance in management control, and promotes organisational compliance with a focus on internal controls, risk management procedures, assurance and management information. The concept of due diligence, including the acquisition and the monitoring of activities of business partners is also analysed at both the national and international levels. The student will appreciate the nature and roles of assurance engagements and internal audits and develop an understanding of risk management and risk reporting in a global context.

PST6361   Corporate Governance   (Elective)   18 Credits
The aim of this module is to analyse the regulation of governance, recognise varying international governance practise, and examine the links between governance and corporate performance. This module will enable the student to gain a practical understanding of how governance structures can promote good decision making and performance, and increase the accountability of directors and managers. Key external regulations can affect organisations such as international tax and law, are highlighted extensively. The capacity to assess and monitor director remuneration will also be an acquired asset by the time module is complete.

PST6461   Applied Marketing (Elective)   18 Credits
The objective of this module is to examine the characteristics and goals for the social entrepreneur as well as an in-depth view into the practises of creating social value for individuals and communities. The student's ability to develop and implement social change will increase significantly as the student becomes acquainted with the theories of social entrepreneurship and learn how to identify the characteristics of the social entrepreneur. Upon completion of this recommended module, the student will also be able to evaluate the organisational structure, human resources, funding, marketing and stakeholder participation; all vital success factors in a social change project. The study of the theories and practice of creating partnerships for social change, the aptitude to resource initiatives to link community needs and the talent to develop a plan to implement social change will all be covered in this study of social entrepreneurship.

PST6464   Advanced Taxation (Elective)   18 Credits
The aim is to gain a comprehensive understanding of the regulations, concepts, and practices associated with local taxation. A greater understanding of taxation is acquired through the study of this module as you develop integral knowledge of the global taxation practices. Upon completion of this module students should be able to better assess the regulations, definitions, and acceptable practises of local and international taxation based on the different tax laws as required in many countries and economic trade areas.

BIOLOGY
Specialist Modules

PST6136   Molecular and Cell Biochemistry   18 Credits
The module look at the vast and complex array of chemical reactions occurring in living matter and the chemical composition of the cell; Life processes occurring at the molecular level, including the storage and transfer of genetic information and the interactions between cells and the viruses that infect them.

PST6137   Advanced Physiology   18 Credits
This module explores functions of biological macromolecules; physiology at the cellular level; cardiac, vascular and respiratory systems; the nervous, the endocrine systems and the immune system; control and maintenance of homeostasis.

PST6139 Conservation Biology   18 Credits
The module focuses on the loss of biological diversity; human impacts on biological diversity; management of species and ecosystems, captive breeding and reintroduction, genetic analyses, and habitat restoration; population viability analysis (PVA); minimum viable population (MVP) and trends in environmental security.

PST6236 Advanced Plant Physiology (Elective)   18 Credits
The module explores modern concepts and research in plant physiology, mineral nutrition, translocation, growth, and development of plants; Growth and differentiation of plants at molecular, cellular and organismal levels; Regulation of development; macromolecular interpretation of differentiation, dormancy, germination, flowering and senescence.

PST6237   Environmental Microbiology   18 Credits
The module is on bacterial and viral structure; composition and physiology of microbial communities in the soil, in water and the air; microbial interactions and processes; advances in virology and bacteriology; mechanisms of microbial parthenogenesis; immune system disorders; HIV/AIDS and cancer.

PST6336   Advanced Biochemistry   (Elective)   18 Credits
The module examines cell biology, molecular biology; molecular structure & function; components of biological systems; experimental and computer-based techniques of biochemistry and molecular biology; techniques required to analyse biomolecules STRUCTURAL AND CHEMICAL BIOLOGY, including nucleic acid structure and interactions, signaling proteins and membrane proteins, enzyme kinetics and drug discovery and protein design; From GENOME to PROTEOME, including all steps in eukaryotic gene expression from chromatin accessibility to translation and mRNA turnover. THE DYNAMIC CELL, including the dynamics of proteins and membrane-bound organelles in eukaryotic cells; CELL CYCLE, SIGNALLING AND

CANCER, including cell and molecular biology of signaling and cancer, DNA repair and apoptosis.

PST6338   Molecular Genetics (Elective)   18 Credits
The module looks at topics in molecular genetics of eukaryotic organisms, including: gene structure and expression, protein processing and folding, genome stability, and molecular evolution; molecular mechanisms of bacterial and plasmid genetic processes. Topics covered include genome organization, DNA replication, transcription and translation.

PST6339   Habitat Ecology   18 Credits
This module explores terrestrial and aquatic habitats; commercial organisms and their habitats; articficial environments; requirements for food, shelter, protection and reproduction; effects of soil erosion, pollution, global warming and climate change.

PST6437   Plant Health and Productivity   18 Credits
The module looks at the importance of nitrogen; organic matter molecules; microbial inoculants; microbiota; microbial community structure; metagenome; interactions between plants and mycorrhizal fungi; the future of crop and agricultural science; crop biotechnology; alternative agriculture and management of agrochemicals.

PST6438   Advanced Genetics   18 Credits
The module looks at pangenesis, epigenesis, and preformationism; positive and negative eugenics; the euphenics approach; cancer genetics; genetics and genomics of behavioural disorders.

CHEMISTRY
Specialist Modules

PST6140   Advanced Physical Chemistry   18 Credits
The module explores properties and characteristics of solids, liquids and gases from a fundamental level - utilising computation of individual atoms and bonds - right through to applied systems such as colloids and surfactants, relevant to minerals, food and formulation; Natural progression from atomic and molecular properties at a single atom or bond level through key thermodynamics to the properties of chemical systems, such as viscosity, phase behaviour and the interactions between solids and liquids; Surfaces and colloids - key to understanding important chemical systems due to their ubiquity in minerals processing, food and dairy industries, energy and oil, pharmaceuticals, water and waste processing.

PST6141   Advanced Inorganic Chemistry   18 Credits
The module helps students to draw and interpret molecular orbital diagrams for small molecules as well as explore the Crystal field theory and MO theory to describe the bonding in metal

Think in other terms

complexes; Ground states of transition metal complexes; Group properties of d-block metal complexes; Metal-ligand and metal-metal multiple bonding; Properties of the lanthanides and actinides and aspects of the coordination chemistry of these metals; Mechanistic pathways for inorganic reactions based on experimental data; Chemistry of selected biological metal centres.

PST6242   Advanced Organic Chemistry   18 Credits
The module covers the fundamental structural topics and basic mechanistic types; It can stand-alone; together, with Part B: Reaction and Synthesis, the two volumes provide a comprehensive foundation for the study in organic chemistry; Companion websites provide digital models for study of structure, reaction and selectivity for students and exercise solutions for instructors; Reactions, mechanisms and structure; Structure of Organic Molecules Organic Reaction Mechanism Organic Reaction Mechanisms Isomerism and Stereo-chemistry Spectroscopy Alkanes Cycloalkanes Petroleum, Petrochemicals and Alternative Fuels Alkenes and Dienes Alkynes alkyl Halides Organometallic Compounds Alcohols Polyhydric Alcohols Polyhydric alcohols Ethers and Epoxides Thiols and Thiothers Aldehyde Methylene Compounds Lipids Cyan Compounds Derivatives of Carbonic Acids Nitroalkanes, Diazoalkanes and Azides much more.

PST6244   Advanced Analytical Chemistry   18 Credits
This module is on spectroscopic methods for structure elucidation and practical uses; Complex Nuclear Magnetic Resonance (NMR) methods: recording techniques, analytical applications of exchange phenomena, double resonance, spin-lattice relaxation, Nuclear-Overhauser-Effect (NOE), analytical applications of two dimensional (2D) and multipulse NMR spectroscopy, shift reagents; Instrumentation of mass spectrometry: Principles and techniques of ion formation, focusing, collision, fragmentation, and reaction (soft ionization, desorption, and spray methods); Interpretation of mass spectra of organic and inorganic molecules; Mass analyzers and ion traps (time of flight and ion cyclotron resonance mass spectrometry); Coupling of separation with identification methods; Applications to analysis of large molecules and chromatography (selected chemical; analytical and biological applications); Fourier transforms in chemistry: introductory fourier mathematics; spectroscopic oscillators; noise and multiplex advantage; discrete fourier transform and applications to spectroscopy.

PST6336   Advanced Biochemistry (Elective)   18 Credits
The module focuses on cell biology, molecular biology; molecular structure & function; components of biological systems; experimental and computer-based techniques of biochemistry and molecular biology; techniques required to analyse biomolecules; STRUCTURAL AND CHEMICAL BIOLOGY, including nucleic acid structure and interactions, signaling proteins and membrane proteins, enzyme kinetics and drug discovery and protein design; From GENOME to PROTEOME, including all steps in eukaryotic gene expression from chromatin accessibility to translation and mRNA turnover; THE DYNAMIC CELL, including the dynamics of proteins and membrane-bound organelles in eukaryotic cells; CELL CYCLE, SIGNALLING AND

Think in other terms

CANCER, including cell and molecular biology of signaling and cancer, DNA repair and apoptosis.

PST6338   Molecular Genetics (Elective)   18 Credits
The module has topics in molecular genetics of eukaryotic organisms, including: gene structure and expression, protein processing and folding, genome stability, and molecular evolution; Molecular mechanisms of bacterial and plasmid genetic processes. Topics covered include genome organization, DNA replication, transcription, and translation.

PST6342   Molecular Chemistry (Elective)   18 Credits
The module examines to synthesize molecules with new biological or physical properties to address scientific or societal challenges; New catalytic conversions, lead compounds for future medicines or the next generation of conducting polymers; Working with chemical structures the possibilities are endless: in principle, every molecule can be made; Adaption of the 3D-structure to the desired properties and design an efficient synthesis method.

PST6440   Instrumental Chemistry Analysis (Elective)   18 Credits
This module looks at mass spectrometry, NMR spectroscopy and X-ray diffraction; Each of these techniques contains a number of key common themes (data collection, analysis and management); Measurement Principles and Electronics: Introduction to the analytical process; Basic electronics, Signals and noise; Basics of Spectroscopy; Introduction to Spectroscopic Methods; Components of Optical Systems; Atomic Spectroscopy; An Introduction to Optical Atomic Spectroscopy; Atomic absorption spectroscopy: Atomic Emission Spectroscopy; Molecular Spectroscopy – Electronic transitions; Introduction to UV-Vis molecular spectroscopy: Applications of UV-Vis spectroscopy: Fluorescence, phosphorescence and chemiluminescence; Molecular Spectroscopy – Vibrational excitation; IR absorption spectroscopy; Applications of Infrared Spectrometry and Molecular Spectroscopy.

PST6443   Materials Chemistry (Elective)   18 Credits
The module deals with properties & Reactions of Matter, Chemistry of Functional Materials, Physical Techniques in Action, Techniques and Concepts in Inorganic Chemistry; The design of nano-structured materials from novel combinations of molecular building blocks, templating molecules, nano-particles and various functional molecules.

Think in other terms

COMPUTER SCIENCE
Specialist Modules

PST6175 Computational Discrete Mathematics   18 Credits
This module looks at discrete models; Foundations; Basic concepts of sets and functions; Finite series; Logic; Propositional logic; Predicate logic; Combination circuits; Induction; Finite probability space, events; Conditional probability; Bayes' theorem; Integer random variables; Expectations; Varia Analysis and verification; Searching algorithms; Recursive algorithms; Relations; Discrete models; Foundations; Basic concepts of sets and functions; Finite series; Logic; Propositional logic; Predicate logic; Combination circuits; Induction; Finite probability space, events; Conditional probability; Bayes' theorem; Integer random variables; Expectations; Varia Analysis and verification; Searching algorithms; Recursive algorithms; Relations; Basic concepts; Properties of relations; Operations relations; Undirected graph, Directed graph, weighted graph, Euler circuits and Hamiltonian cycles; Graph isomorphism and representation Planar graphs; Trees; Different state machines; Input, Output, Initial state and the transition table.

PST6179 Advanced Enterprise Architecture Programming   18 Credits
This module gives an introduction to application server programming and business logic programming; Transaction processing, concurrency control, Event-driven programming, asynchronous method invocation, job scheduling, Inter process communication; Deployment of software components in application server; Business Interface development and deployment.

PST6276   Advanced Database and Data Mining   18 Credits
The module examines the data Models; The enhanced Entry Relationship (EER) Model, EER Models to Relational Databases, Database Design and Implementation design methodologies, Implementation methodologies, Physical Database design and tuning, Query process and Optimization; Algorithm for Query Processing and Optimization, Transaction Processing, Concurrency Control Techniques; Database Security and Distribution, Distributed Databases, Mobile Databases Machine Learning and Pattern Recognition as well as Data Mining.

PST6278 Evolutionary Computing and Parallel Distributed Processing   18 Credits
This module looks at the fundamentals of genetic algorithms, genetic programming; Conceptual simplicity and broad applicability of genetic algorithms; Features of evolutionary computation, evolutionary strategies, evolutionary programming; Hybridization and Optimization techniques; Heuristic level: knowledge representation, inference strategies; Man-machine interfaces; Fuzzy set theory; Decision: Classical, nonstandard and fuzzy logic; Data representation; Network configurations: single layer non-recurrent networks; Multilayer non-recurrent networks; Recurrent networks; Application for artificial neural networks: character and speech recognition, image analysis Parallel distributed processing; General framework; Distributed representation; Basic mechanisms and formal analysis.

PST6375   Simulation and Modelling (Elective)   18 Credits

This module covers the advances in simulation and modelling methodology; Modelling complexities and decision making simulation using system dynamics; Applied statistical functions, Experimentation, Applied statistical methods for analysis and modelling; Approaches to structuring simulations; Contrasting discrete, continuous and agent-based simulation.

PST6379   Interactive Computer Graphics (Elective)   18 Credits

This module explores the fundamentals of Computer Graphics: Structure of Images; Image formats, compression and dithering; Mesh Data Structures; shapes as vertices, edges and faces, using the indexed face set and the half-edge data structures; Transformational Geometry: Scale, rotation, translation, stretch and shear of a shape; Viewing; Perspective, the illusion of depth; Lighting; Rasterisation, convert mesh triangles to screen pixels; Texture Mapping; Visibility; GPU Programming; Colour Theory; Physical Simulation Animation; Parametric Surfaces; Implicit Surfaces; Quaternion Rotations; Skinning and Shadowing.

PST6479   Software Methodology (Elective)   18 Credits

The module gives an overview of Software Engineering, the Software Development Process; requirements analysis and specification phase; Design phase; implementation phase; maintenance; Engineering with a Programming Language; Software Engineering Paradigms; Engineering with existing software and a Software Engineering Project.

PST6478   Information Systems Security and Auditing (Elective)   18 Credits

The module looks at developing an Information Security Policy, Physical Computer Security, Biometrics and Digital Signatures, Network Intrusion Detection and Prevention System, Wireless and Mobile Network Security, E-commerce Security, Risk Management & Analysis, Biba Integrity Model, Nature of IS Audit, Audit responsibilities against fraud, IS audit guidelines and standards.

MATHEMATICS AND STATISTICS
Specialist Modules

PST6131   Non-Linear Differential Equations   18 Credits

This module looks at modern methods in the theory of nonlinear partial differential equations; Sobolev spaces; Weak solutions Existence results, Regularity results; Stochastic Processes and their applications; Solving marligale problems; Exist stance, uniqueness and ergodicity flow of solutions; Phenomenon of transitions on the Schlogl model; Pure jump Markov process, birth-death process and invariant measurement.

PST6134   Multivariate Statistics   18 Credits

This module is on the multivariate statistical methods; Multivariate techniques; Graphic models, Pre-analysis data, Pre-analysis data screening, Factorial analysis of variance, Analysis of

Think in other terms

covariance, Multivariate analysis of variance and covariance, Multiple regression, Path analysis, Factor analysis, Discriminant analysis, Logistic regression, SPSS data sets and Chi square distribution.

PST6232   Metric Space and Topology   18 Credits
This module looks at continuity and open sets for metric spaces; Closed sets for metric spaces; Closed sets for metric spaces; Topological spaces; Interior and closer; Topological structures and spaces; Hausdorff spaces; Compactness; Compactness in metric spaces; Products of compact spaces and the language of neighbourhoods.

PST6234   Surveying Sampling Techniques   18 Credits
The   module   looks   at   survey Sample Element Population Probability Non-probability Representative sample Sampling error Biased sample Sampling distribution Central limit theorem Sampling frame Simple random sampling Equal probability of selection method (EPSEM) Systematic   sampling Stratified   sampling Stratification   variable Clustered sampling Sample weights SPSS SAS STATA Convenience sampling Quota sampling Purposive sampling Referral sampling Network sampling Snowball sampling Sample size Random selection Type I and Type II errors Confidence intervals Attrition bias Sampling methods Equal probability of selection method or EPSEM Non-random sampling, Referral sampling, Sample size and sampling bias.

PST6332   Functional Analysis (Elective)   18 Credits
This module explores metric spaces; Definitions and examples; Inequalities of Holder, Minkowski, Cauchy-Schwarz; Open and closed sets, neighbourhoods; Convergence, completeness; Contraction Mapping Theorem; Applications to linear systems, integral equations, differential equations; Normed spaces; Definitions and examples; Banach space; Finite dimensional space; compactness and Riesz Lemma; Linear operators and functionals; Dual space; Second dual; Reflexivity; Weak convergence; Hilbert spaces; Definitions and examples; Cauchy-Schwarz inequality, Pythagoras' theorem; Orthogonal complements and direct sums; Orthonormal sets, Fourier series and orthogonal polynomials; Hilbert adjointoperator; Self adjoint operators; Eigenvalues and eigenfunctions and Operators.

PST6431   Control Theory (Elective)   18 Credits
The module looks at the types of control; Feedback control and open loop systems; Principle of superposition; Transfer functions; Block diagrams; State space formulation; Direct solution; Solution using laplace transform; Stability; Asymptotic stability; Routh stability creation; Liapunov' method; Nyquist stability creation; Controllability and observability criteria; Optimal control; Variational calculus; Free end conditions; Constraints; Optimal control with unbounded continuous controls; Band-bang control; Pontryagin's principles; Switching curves and transversality conditions.

Think in other terms

PST6434 Experimental Design and Regression Analysis (Elective)   **18 Credits**

The module explores theory and applications of statistics, which include, Experimental design and analysis: 2^k factorial experiments; Confounding, complete and partial confounding; Orthogonal contrasts; Fractional factorial experiments, aliasing; Multiple linear Regression: Variable selection and model building; Multiple coefficient of determination, r^2; Mullow's, C_p and S_p statistics; Covariance analysis; Stepwise regression methods; Forward selection, backward elimination and stepwise regression.

PHYSICS
Specialist Modules

PST6170   **Mathematical Methods in Physics**   **18 Credits**

The module has a complex Analysis: Multi-valued functions; Branch Points and cuts; Evaluation of Integrals; Singularities of functions; Dispersion relations; Fourier Series and Integral Transforms: Fourier series and Fourier analysis; Orthogonality, random process probability; Time-frequency domain; Signal processing; Fourier and Laplace transforms; Fast Fourier and Z transformation; Convolution and De-convolution; Auto and cross co-relation; Differential Equations: Higher order differential equations with constant and non-constant coefficients; Partial differential equations; Integral transform and Green function methods; Special Functions: Sturm-Lioville Theory; Legendre, Lagurre; Hermite and Bessel functions; Group Theory: Definition and examples of groups, The action of a group on a set; Theory of fi nite groups; Small oscillations and group theory; Compact and Lie groups; Applications of groups in quantum mechanics and spectroscopy (X-Ref MAPH5131).

PST6171   **Solid State Physics**   **18 Credits**

The module explores the rigid matter, or solids, through methods such as quantum mechanics, crystallography, electromagnetism, and metallurgy; Condensed matter in physics.

PST6270   **Advanced Quantum Mechanics**   **18 Credits**

This module looks at angular momentum and spin in Schrondiger Equation; Spin-spin, spin-orbit interactions; Thomas-Fermi model; Angular distributions from decay and collisions; Generalised Pauli principle; Properties of symmetry of states, Notion of Parity; Time reversal and charge conjugation (X-Ref MAPH5071).

PST6272   **Advanced Electromagnetics**   **18 Credits**

This module explores materials: electrical conduction and heat capacity are investigated by solid state physics; An early model of electrical conduction was the Drude model: To explain electrical and thermal conductivity Applied kinetic theory to the electrons in a solid; Materials containing immobile positive ions and an "electron gas" of classical, non-interacting electrons;

Think in other terms

Hall's effect in metals and electronic heat capacity; Arnold Sommerfeld combined the classical Drude model with quantum mechanics in the free electron model (or Drude-Sommerfeld model) perturbation meant to model the interaction between the conduction electrons and the ions in a crystalline solid. By introducing the idea of electronic bands; Here, the electrons are modelled as Fermi gas, a gas of particles which obey the quantum mechanical Fermi–Dirac statistics; Predictions for the heat capacity of metals; Conductors, semiconductors and insulators.

PST6371   Astrophysics (Elective)   18 Credits
The module looks at properties of materials are affected by their crystal structure. This structure can be investigated using a range of crystallographic techniques, including X-ray crystallography, neutron diffraction and electron diffraction. The sizes of the individual crystals in a crystalline solid material vary depending on the material involved and the conditions when it was formed. Most crystalline materials encountered in everyday life are polycrystalline, with the individual crystals being microscopic in scale, but macroscopic single crystals can be produced either naturally (e;g; diamonds) or artificially; Real crystals feature defects or irregularities in the ideal arrangements, defects that critically determine many of the electrical and mechanical properties of real materials.

PST6372   Nuclear Physics (Elective)   18 Credits
This module explores nuclear properties, Force between Nucleons, Nuclear model, Nuclear decay and Radioactivity, Detecting Nuclear radiation, alpha, beta and gamma decay, Nuclear reaction and calculation of Q values, Nuclear fusion and fission.

PTE6446   Advanced Thermodynamics   18 Credits
The module examines the systems, surroundings, state variables; Thermal equilibrium; The Zeroth law of thermodynamics and temperature; Thermodynamic equilibrium; Equation of state; Ideal gases; Thermodynamics Process; Reversible and irreversible processes; Scope of Thermodynamics, Macroscopic and Microscopic approaches.

Think in other terms

POSTGRADUATE DIPLOMA IN SCIENCE AND TECHNOLOGY EDUCATION (PGDSTE)

1.0 ADMISSION REQUIREMENTS
1.1 Applicants must hold a minimum of a bachelor's degree majoring in either accounting, mathematics, science or technology subjects.
1.2 Applicants must be employed as teachers in the secondary school at the time of applying and must have accrued at least one year's teaching experience.

2.0 PROGRAMME OF STUDY
2.1 Candidates shall pursue an 18-month programme of study consisting of three semesters (or stages) on block-release.
2.2 The programme consists of taught modules, work-based experience assessment and a research or design project.

3.0 ASSESSMENT
3.1 All modules shall be assessed through both module work and examination unless specified otherwise in the module synopsis.
3.2 The research project shall count as two modules for purposes of assessment and all the other modules shall be equal in weighting.
3.3 The weighting of written examinations and module work shall be 60% and 40% respectively.
3.4 Candidates must pass at least 66% of all modules in one stage before proceeding to the next stage. The pass mark in each module shall be 50%.
3.5 A candidate who fails one or two modules in the first year shall be required to carry that/those module(s) into the second year.
3.6 A candidate who fails more than two modules in Year 1 will be required to repeat and pass those modules before proceeding to the next year.
3.7 To be awarded the diploma, candidates must complete a minimum of 180 credits.

PROGRAMME SUMMARY

SEMESTER (STAGE) 1

Module Code	Module Description	Credits
PST5101	Theoretical foundations in STEM education I	10
PST5102	The teaching profession (Elective)	10
PST5103	Instructional design in STEM education	10
PST5104	Curriculum development and evaluation	10
PST5105	Assessment and evaluation in STEM education	10
PST5109	Statistics in Education	-
PST5119	Didactics & pedagogy (Elective)	10

SEMESTER (STAGE) II

PST5201	Theoretical Foundations ins STEM education II	10
PST5205	Designing assessment and grading tools (Elective)	10
PST5206	Learner backgrounds and characteristics (Elective)	-
PST5208	Leadership, Supervision & Management in S&T education	10
PST5211	Research Methods	10
PST5212	Computer Applications in STEM education	10
PST5213	Educational and Instructional Technology	10

SEMESTER (STAGE) III

PST5300	Work-based Experience (Practice in teaching)	20
PST5310	Research or Design Project	20
PST5312	Online learning principles and practice	20

TOTAL CREDITS FOR THE PROGRAMME

SEMESTER (STAGE) 1	60
SEMESTER (STAGE) 11	60
SEMESTER (STAGE) 111	60
Total minimum credits:	**180**

MODULE SYNOPSES

PST 5101   Theoretical Foundations in Stem Education I   10 Credits

The module explores the philosophical considerations, national goals, ideology and paradigms of educational practice; ethics, epistemology; educational policy, science and technology curriculum theory; modernism and postmodernism; positivism, determinism; Sociological considerations; society and socialization; family, culture and community influence, public schooling and social development and multi-cultural education.

PST 5102   The Teaching Profession   10 Credits

This module looks at the norms and values of the teaching profession, standards and benchmarks of professionalism;   teacher profiles; teacher-student interaction; staff relations; external relations; the school as an organization, introductory organizational behaviour, staff development, promotion; recruitment, probation, remuneration, termination of service; Quality issues and standards in science and technology education, quality control, quality management, quality assurance in teaching and assessing students.

PST 5103   Instructional Design in Stem Education   10 Credits

The module examines the methods and strategies of lesson delivery; Learner involvement and participation; group work, discussion, practical subjects, and project work; Curriculum, syllabus, schemes of work; taxonomy of educational objectives; setting objectives, lesson planning and preparation, learning documentation, delivery and evaluation of lessons and the types of lessons.

PST 5104   Curriculum Development and Evaluation   10 Credits

The module covers curriculum terminology and concepts; ideology and philosophy underpinning curriculum planning, development and evaluation; Curriculum needs assessment models; The impact of social, economic, political, technological, psychological, philosophical and cultural, environmental influences on the curriculum; Process and product models of curriculum development; objectives models e.g. Tyler, Wheeler; decision-making models e.g. Stufflebeam (CIPP); Designing/developing, delivering and evaluating a curriculum; Curriculum change and innovation; strategies for change (Havelock's RD&D, SI, PS, L); Evaluation as well as curriculum evaluation models;

PST 5105 Assessment and Evaluation in Stem Education   10 Credits

The module highlights the principles of assessment in science and technology studies; Learner performance measurement, standards, methods of assessment; formative and summative assessment; types, functions and structures of tests and examinations; Types of test questions; objective and subjective; assessment and the taxonomies of educational objectives; standardized tests; assessment for science and technical subjects.

Think in other terms

PST 5109   Statistics in Education   10 Credits
This module covers the descriptive and inferential statistics in science, education and research, methods of summarizing and interpreting data, frequency distribution, measures of central tendency, measures of dispersion, fractiles, measures of strength and association; (X-ref PST1209 and SMA2204).

PST 5119   Didactics and Pedagogy I   10 Credits
The module looks at the variety of science and technology lessons (Mathematics, biology, chemistry, physics, accounting, technical subjects, etc;); preparation of teaching documents and resources; designing and conducting experiments and practical lessons; supervision and assessment of projects; handling equipment and tools; peer teaching; peer and tutor evaluation of mock lessons; review of recorded lessons; using evaluation instruments; teacher reflection; case studies and journal/log book writing.

PST 5201 Theoretical Foundations in Stem Education II   10 Credits
The module focuses on understanding the learner; physical, social, mental and emotional development; Psychological perspectives, learning and cognition, the non-western science and technology learner; education ideologies, humanism, behaviourism, Gestalt theory, cognitivism and constructivism, neural learning, multiple intelligences; Guidance and counselling, inclusive education and discipline.

PST 5205 Designing Assessment and Grading Tools   10 Credits
This module is on item writing, structuring of examination questions and papers; Marking guides, scoring and recording; grading; criterion and norm-referenced testing; local and standardized tests; Continuous and terminal assessment, assessment of practical work, projects and field wok. Students are expected to set at least three original examination papers with marking guides in their teaching subjects.

PST 5206 Learner Backgrounds & Characteristics (Optional)   10 Credits
The module looks at the theories of human development, adolescent and adult learners, learner needs identification, needs hierarchies, motivation, mental intelligence, emotional intelligence, multiple intelligences, HBDI, neural learning, learning styles, small and large groups, learners with special needs as well as learning with technology.

PST 5208 Leadership, Supervision and Management in Stem Education 10 Credits
The module looks at the administration of education; administrative tasks; school-based management; results-based management; power, authority, leadership and institutional governance; leadership styles; school effectiveness; change and improvement; quality control; delegation, decentralization, empowerment and models of supervision; X-Ref PST2208.

Think in other terms

PST 5211 Research Methods **10 Credits**

This module looks at the teacher as researcher and reflective practitioner; qualitative and quantitative research methods; research and designs; ethical issues and problems in educational, scientific and technology research; data collection methods; populations and samples; proposal and report writing; Statistics in education and research; sampling theory, methods of summarising and interpreting data; frequency distributions; measures of central tendency; measures of dispersion, significance and hypothesis testing.

PST 5212   Computer Applications in Stem Education   10 Credits

The module covers concepts of human communication; planning and using educational technology; learning environments; computers and learning; computer literacy; word processing, spreadsheets, document production, e-learning and online education.

PST 5213   Educational and Instructional Technology   10 Credits

The module looks at using appropriate technology for teaching and training; The chalk board; The white board; The overhead projector; The slide projector; The video recorder; Use of video and television in the classroom; Basic use of computers for producing training materials; Presentation techniques using multimedia packages and e-learning fundamentals (X-Ref PST1213).

PST 5219   Didactics and Pedagogy II   10 Credits

This module explores peer teaching; peer and tutor evaluation of mock lessons; review of recorded lessons; using evaluation instruments; teacher reflection; case studies as well as journal/log book writing.

PST 5300   Work Based Experience   20 Credits

This is supervised and assessed professional practice in schools and a review of professional documentation, resources and learning environments; observation of lessons; discussion and counselling. The module counts as two taught modules.

PST 5312 Online Learning Principles and Practice   20 Credits

The module is on theory and practice of online learning. Students engage in a virtual learning experience to gain skills in online lesson planning, delivery and assessment of students. The module counts as two taught modules.

PST 5310   Research Project   20 Credits

A short experimental, theoretical or design project preferably linking the specialist subject of the candidate to teaching and learning. The project counts as two taught modules.

Think in other terms

DEPARTMENT OF TECHNICAL AND ENGINEERING EDUCATION AND TRAINING

Lecturer and Chairperson
Mrs D. Chasokela: NC; Automobile Electrics (HIT), Dip Ed (Gweru Poly), BTech Hons Ed; Electrical & Electronics (NUST), MEng; Electr. Syst Control & IT (Southwest Jiaotong)

Secretary
Ms P. Dube: NC Secretarial Studies, ND Secretarial Studies, HND Office Management (Bulawayo Poly)

ACADEMIC STAFF

Lecturers
Dr G. N. Shava: BEd (UZ), MEd (University of Fort Hare), PhD (ZOU)

UNDERGRADUATE DEGREE PROGRAMME

SPECIAL REGULATIONS

1.0   PREAMBLE

1.1   The Department of Technical and Engineering Education and Training seeks to offer world-class programmes in identified area of engineering education. The Department aims to prepare quality practitioners, educators and professionals for the secondary and post-secondary school education sector, suitable for serving in a wide variety of environments for teaching, training and skills development. The master's and doctoral programmes offered in the Faculty shall prepare technologically-inclined senior professionals for leadership in raising the level of scientific and technological appreciation among the general populace.

1.2   These regulations should be read in conjunction with the General Academic Regulations for Undergraduate Degrees of the University (hereinafter referred to as the General Regulations).

2.0   PROGRAMMES OFFERED IN THE DEPARTMENT

The Department of Technical and Engineering Education and Training at NUST offers the programmes listed below:

2.1   **Undergraduate**

2.1.1   **Bachelor of Technology Education Honours (BTechEd Hons) in:-**

2.1.1.1 Civil and Construction Engineering

2.1.1.2 Electrical and Electronic Engineering

2.1.1.3 Mechanical and Industrial Engineering

2.1.1.4 Technical Graphics

2.1.1.5 Wood Science and Technology

2.2   **Bridging Modules in Engineering and Technology**

2.3   **Postgraduate**

2.3.1   **Postgraduate Diploma in Higher Education (PGDHE)**

2.3.2   **Master of Technology Education (MTechEd) in**

2.3.2.1 Civil and Construction Engineering

2.3.2.2 Electrical and Electronic Engineering

2.3.2.3 Mechanical and Industrial Engineering

2.3.2.4 Technical Graphics

2.3.2.5 Wood Science and Technology

2.4   **Diploma in Engineering Education (Short modules)**

Think in other terms

CIVIL AND CONSTRUCTION ENGINEERING

PROGRAMME SUMMARY

Key to module codes

55   Brick and bond theory
56   Construction material
57   Construction drawing
58   Measurement of construction work
59   Industrial studies and design

YEAR I

Module Code	Module Description	Credits
PTE1131	Engineering Mathematics 1	10
PTE1145	Engineering Drawing (TCW1203)	10
PTE1147	Material Science	10
PTE1231	Engineering Mathematics II	10
PTE1246	Engineering Mechanics (Statics & Dynamics)	10
PTE1256	Workshop Technology and safety	10

YEAR II

Module Code	Module Description	Credits
PTE2146	Fluid Mechanics	10
PTE2147	Strength of materials I	10
PTE2157	Construction Survey (TCW2102)	10
PTE2255	Solid Mechanics/Strength of Materials II	10
PTE2258	Analysis of Structures	10
PTE2259	Environmental Engineering	10

YEAR III

Module Code	Module Description	Credits
PTE3000	Industrial Attachment	120

YEAR IV

Module Code	Module Description	Credits
PST4010	Final Year Project	20
PTE4146	Engineering Mechanics II (Elective) -	

Think in other terms

PTE4156	Electrical Installations and Appliances (Elective)	10
PTE4157	Geo-technological Engineering	10
PTE4158	Design of Structures	10

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	120
YEAR II	120
YEAR III	120
YEAR IV	120
Total minimum credits:	**480**

Think in other terms

ELECTRICAL AND ELECTRONIC ENGINEERING

PROGRAMME SUMMARY

Key to module codes
50   Analogue Electronics and Communication
51   Digital Electronics and Communication
52   Electrical Systems
53   Electronics Systems
54   Computers and Programs

YEAR I

Module Code	Module Description	Credits
PTE1131	Engineering Mathematics I	10
PTE1153	Circuit Theory and Networks	10
PTE1154	Computer Engineering	10
PTE1231	Engineering Mathematics II	10
PTE1252	Electrical and Electronic Measurements	10
PTE1253	Electronic engineering circuits and devices	10

YEAR II

PST2177	Programming & programme design	10
PTE2150	Analogue electronics	10
PTE2152	Electrical Machines	10
PTE2250	Analogue communication	10
PTE2253	Design Project	10
PTE2254	Digital Electronics	10

YEAR III

PTE3000	Industrial Attachment	120

YEAR IV

PST4175	Computer Communication & Networking	10
PTE4151	Digital Communication	10

Think in other terms

PTE4152	Instrumentation and Control I	10
PST4010	Final Year Project	20
PTE4252	Instrumentation and Control II	10
PTE4254	Microprocessors and microcontrollers	10
PDT4276	Graphic design	10

Total Credits for the Programme

Year I	120
Year II	120
Year III	120
Year IV	120
Total Minimum Credits:	**480**

Think in other terms

MECHANICAL AND INDUSTRIAL ENGINEERING

PROGRAMME SUMMARY

Key to module codes

45	*Engineering drawing and design*
46	*Mechanics – statics & dynamics*
47	*Material science and technology*
48	*Maintenance engineering, workshop technology*
49	*Manufacturing engineering*

YEAR I

Module Code	Module Description	Credits
PTE1131	Engineering Mathematics I	10
PTE1145	Engineering Drawing I	10
PTE1147	Material Science	10
PTE1231	Engineering Mathematics II	10
PTE1246	Engineering Mechanics I (Ref PTE1281)	10
PTE1256	Workshop Technology and safety	10

YEAR II

PTE2145	Industrial Design	10
PTE2146	Fluid Mechanics	10
PTE2147	Strength of Materials I	10
PTE2245	Engineering Design	10
PTE2246	Thermodynamics	10
PTE2247	Strength of Materials II	10

YEAR III

PTE3000	Industrial Attachment	120

YEAR IV

PTE4146	Engineering Mechanics II	10
PTE4149	Manufacturing technology & Processes	10
PTE4152	Instrumentation and Control I	10
PST4010	Final Year Project	10
PTE4248	Maintenance Engineering	10
PTE4249	Manufacturing Systems	10

Think in other terms

TOTAL CREDITS FOR THE PROGRAMME

Year I	120
Year II	120
Year III	120
Year IV	120
Total Minimum Credits:	**480**

Think in other terms

TECHNICAL GRAPHICS

PROGRAMME SUMMARY

Key to module codes

80   Mathematical applications to drawing
81   Building, architectural drawing and desig
82   Engineering drawing and design
83   Fine art and Free hand sketching
84   Computer aided design

YEAR I

Module Code	Module Description	Credits
PTE 1145	Engineering Drawing I	10
PTE 1147	Material science	10
PTE 1181	Architectural mathematics	10
PDT1222	Fine art studio I	10
PTE 1281	Applied structural statics and dynamics	10
PTE1282	Technical drawing	10

YEAR II

PTE1280	Applied geometry	10
PTE 2181	Architectural & structural drawing	10
PTE 2183	Environmental design	10
PDT2224	Product Development	10
PTE 2281	Building Construction	10
PDT2222	Fine Art Studio II	10

YEAR III

PTE3000	Industrial Attachment	120

Think in other terms

YEAR IV

PTE 4158	Design of Structures	10
PTE 4181	Building Services	10
PTE 4184	Computer Aided Architectural Design	10
PST4010	Final Year Project	20
PTE 4224	Personal Development	10
PDT4222	Graphic Design	10
PTE 4288	Materials and construction	10

Total Credits for the Programme

Year I	120	
Year II	120	
Year III	120	
Year IV	120	
Total Minimum Credits:	**480**	

WOOD SCIENCE AND TECHNOLOGY

PROGRAMME SUMMARY

Key to module codes

85   Wood characteristics and quality
86   Processing and workshop technology
87   Tools, machines and machining
88   Design, drawing and materials
89   Product development and manufacturing

YEAR I

Module Code	Module Description	Credits
PTE1145	Engineering Drawing I	10
PTE1147	Material science	10
PTE1185	Wood chemistry	10
PTE1246	Eng Mechanics I (Statics & Dynamics)	10
PTE1256	Workshop Technology and safety	10
PTE1282	Technical drawing	10

YEAR II

PTE2185	Wood structure, quality and processing	10
PTE2187	Construction equipment & methods	10
PTE2189	Wood manufacturing systems & processes	10
PDT2224	Product development	10
PTE2258	Analysis of structures	10
PTE2287	Wood machines & Maintenance Engineering	10

YEAR III

PTE3000	Industrial Attachment	120

YEAR IV

Think in other terms

PST4161	Principles of marketing	10
PTE4186	Furniture and cabinet construction	10
PTE4189	Wood finishes	10
PST4010	Final Year Project	20
PDT4224	Personal development	10
PDT4222	Graphic Design	10
PTE4288	Materials and construction	10

TOTAL CREDITS FOR THE PROGRAMME

Year I	120	
Year II	120	
Year III	120	
Year IV	120	
Total Minimum Credits:		**480**

MODULE SYNOPSES

CIVIL AND CONSTRUCTION ENGINEERING

PTE1131   Engineering Mathematics 1/Calculus 1   10 Credits
The module covers indices and logarithms, formulae, mensuration, trigonometry, force and moments, estimating and costs; Series, arithmetic and geometric progressions, convergence, sum to infinity, gradient of a curve, the chain rule, tangents and normals, increasing and decreasing functions, rates of change, stationary points; Polynomials, discriminant, real roots, solving quadratic equations, domain, range, one-one functions, graphical illustrations; Calculus, differentiation, integration, applications of arc length, area, volumes, moments of inertia, centroids; Vector and scalar products; Equations of lines and planes; Matrices basic operations, rank, inverse Gaussian elimination, Cramer's rule; Determinants, Eigen values and Eigen vectors; Ordinary differential equations; Applications of First order differential equations: mechanical and electrical engineering problems; Elementary functions including Hyperbolic functions and their inverses, Differentiation technique; Leibnitz's Rule, Hospital's Rule; Applications of differentiation: maxima and minima, kinematics; Integration techniques, Reduction formula; Integration of complex functions, integration by substitution, trigonometric relationships, trapezium rule, graphical determination, integration by parts; Applications of Integration: arc-length, area, volume, moments of inertia, and centroids.

PTE1145   Engineering Drawing   10 Credits
The module gives an introduction to engineering drawing; geometrical constructions; tangency constructions; construction of ellipses; orthographic projections of simple geometrical solids and general engineering components in first and third angle; plane geometry; space geometry; dimensioning; pictorial views; freehand sketching; sectioning; intersections; developments; conventions and assembly drawings.

PTE1147   Material Science   10 Credits
The module looks at materials classification and structure, atomic bonding in materials, crystallisation, dislocations, plastic deformation, temperature measurement, phase diagrams, solidification, liquidification, vaporization, alloy formation, types of material, composite, selection and their applications i.e.; wood, plastics, ceramics and other alloys; Structure and properties of metals and alloys; Review of principles, Diffusional processes; Constitutional phase diagrams; Lattice defects; Deformation of metals, fracture and fatigue, polymers and corrosion; Materials for Modelling; Theories of models and model making; Imagination, creativity, innovation and invention; Image formation, model making and realization; Problem solving, visual patterns, models, prototypes and artefacts; Material selection for designs, experimentation

with a range materials; Costs of models for designs; properties and analysis of materials for design models and product development; Testing and evaluating materials; Directory of design materials and an analysis of design case studies.

PTE1231   Engineering Maths II   10 Credits

This module explores series, arithmetic and geometric progressions, convergence, sum to infinity, gradient of a curve, the chain rule, tangents and normals, increasing and decreasing functions, rates of change, stationary points; Integration of complex functions, integration by substitution, trigonometric relationships, trapezium rule, graphical determination and integration by parts;

PTE1246 Engineering Mechanics I (Statics and Dynamics)   10 Credits

This module covers scalars, vectors, triangle of forces, parallelogram and polygon of forces, principle of transmissibility, Newton's laws, resolution of forces into two and three dimensional components, position vectors, resultant forces, moments, couples, equilibrium equations, structures: types of supports, truss analysis, joint method, section method, friction in inclined plane, wedges and screws; (X-ref TIE2106/2206).

PTE1256   Workshop Technology and Safety   10 Credits

This module examines workshop tools, occupational safety and health, processes and routines, construction materials, construction measuring instruments, personnel in the construction process, construction laws; The workshop environment, safety and care of equipment, space management; Safety and hygiene: workshop safety, ergonomic safety, Government regulations; Environmental stresses and hygiene, chemical stresses, harmful agents through inhalation, skin absorption & ingestion; Control of environmental factors; Measurement and measuring instruments, reliability, precision, scale, steel rules, calipers, micrometers, gauges, etc; Machine shop practice, marking, hand sawing, filing, drilling, and use of lathe; Equipment operation and maintenance, fabrication, welding, turning, cutting, soldering and brazing; Equipment acquisition, storage and disposal; (X-ref TIE 1103 and TIE1203).

PTE2146   Fluid Mechanics   10 Credits

This module focuses on elements of fluid mechanics, Pressure and head, Static Forces on surfaces, Motion of fluid particles and streams, Bernoulli's equation, The momentum equation, Uniform flow in open channels, Design of hydraulic systems and control, applications of hydraulics in industry, pneumatics and cut-out systems.

PTE2147   Strength of Materials I   `   10 Credits

This module is on direct stress and strain; Compound bars; Poisson's ratio and lateral strain; Hoop stress and axial stress in a cylinder; Stress in thin shells; Mechanical properties of materials, ductile and brittle materials, resilience, fatigue, creep, hardness; Sheer and torsion; Bending moment diagrams; Second moment of are and modulus of section.

Think in other terms

PTE2157   Construction Survey   10 Credits
The module gives a definition of survey, SI units in survey, Application of Plane and geodetic survey; Topographical, cadastral, hydrographic, mine photogrammetry and engineering survey; Theory of errors; Systematic and random errors; Methods of eliminating or minimizing these errors; Methods of set up; Ranging a line using a prism square; Taping; Corrections to the measured lengths; Temperature, slope, standardization, tension, reduction to mean sea level; Leveling:- dumpy, tilting, and automatic levels, Leveling of construction, longitudinal and cross-sections, grading of constructions, cut and fill work; (X-Ref TCW2102).

PTE2247   Strength of Materials II   10 Credits
This module covers structures: forces in members, sheer force and bending moments diagrams; Simple bending equation and applications, slope and deflections of beams, Macaulay's method, Torsion equation and applications to hollow and solid shafts, thin cylinders, thick cylinders: Lame's theory and line, stresses in three dimensions, shear and tensible combined, Mohr's stress circle, strain in three dimensions and Mohr's strain circle.

PTE2255   Solid Mechanics   10 Credits
This module explores normal stress and strain, stress and strain relationships, elastic and plastic deformation, Hooke's law, shear stress and strain, allowable stress and allowable load; Analysis of axially loaded bars, temperature effects, stresses on inclined surfaces; Analysis of beams for shear and bending:- shear force and bending moment; Bending stresses in beams; Torsional behaviour of hollow bars, indeterminate circular shafts, elastic torsion of thin walled closed tubes; Analysis of stress and strain:- plane stresses, principal stresses, and maximum shear stresses, Mohr's circle of plane stress, Hooke's law for plane stress, spherical and cylindrical pressure vessels, triaxial stress, 3D stress as well as plain stress.

PTE2258   Analysis of Structures   10 Credits
The module is on basic structural theory; structures and their behaviour; loads, determinacy and indeterminacy; plane and space trusses; bridge and roof trusses; long span structures – cables and arches; influence lines for statically determinate beams and trusses; strain and complementary energy; basic structural theorems, principle of virtual work; Deflection of statically determinant structures; area moment method, application of Castiglione's theorems, unit load method, analysis of statically indeterminate structures; method of superposition, slope deflection and moment distribution and application to beams and rigid frames.

PTE2259   Environmental Engineering   10 Credits
This module looks at human activities and environmental pollution; Plumbing, drainage, Objectives of wastewater treatment; Waste water characteristics BOD kinetics; Wastewater flow rates and design flows; Flow equalization, wastewater treatment processes and selection; Design, operation and management plant.

Think in other terms

PTE4146   Engineering Mechanics II (Elective)   10 Credits
This module explores dynamics of a particle, force, mass, acceleration, work and energy, Impulse of energy and momentum, special applications, dynamics of system of particles, conservation of energy and momentum, introduction to three dimensional dynamics of a rigid body, angular momentum, KE, momentum and energy equations, parallel plane motion, gyroscope motion, are moments of inertia, mass moment of inertia, mass moment of inertia about an axis and products of inertia; (X-ref TIE2106/2206).

PTE4156 Electrical Installations and Appliances (Elective)   10 Credits
The module looks at domestic installation, domestic appliances and conduit work.

PTE4157   Geotechnical Engineering   10 Credits
This module focuses on important subjects include principles of effective stress and shear strength of soil; Strain-stress behaviour; Soil stiffness; Lateral earth pressure; Moor-Coulomb and Rankin approaches; Consolidation theory and permeability; Gravity and sheet piling; Behaviour of piles; Seepage; Bearing capacity and slope stability; Critical soil model and the ultimate capacity of shallow foundations.

PTE4158   Design Of Structures   10 Credits
This module gives an introduction to structural design, design methods, load on structures; Design in reinforced concrete; Basis of design, material properties, loading, design of beams, slabs, columns and foundations; Design in structural steel work; Design of vertically loaded masonry walls, design of laterally loaded wall panels; Enhancement of Auto CAD application in Civil Engineering drawings e.g. detailing, labelling and dimensioning.

PTE4256   Transport Engineering and Plan   10 Credits
The module explores the role of traffic and transport engineering- its scope and function; Highway surveys; Geometric design of highway, design of intersections, design of signals, markings and signs; Sight distances Horizontal and vertical curves; Construction and maintenance of low cost roads, stabilize roads and bituminous roads.

PTE4258   Hydraulic Design   10 Credits
The module gives an overview of hydraulic structures: conveyance structures, flow measuring devices, control structures etc; Design of municipal drainage system; Methods of analysis and hydraulic design: conveyance structures, water distribution systems etc. Storage systems: ground and overhead reservoirs and impoundments.

PTE4259   Geotechnical Engineering II   10 Credits

This module looks at the Geo-structural mechanisms and the critical state soil model; Bearing capacity and design of foundations; Settlement of foundations and analysis; Geotechnical process for ground improvement; Construction methods, dams and embankments; Soil improvement grouting vertical drains, geosynthesis, soil reinforcement; Filtration, separation and erosion control; Drainage in plane; Flow prevention; Gravity retaining walls and design; Pile construction, flexible and rigid pipes and deep in situ walls.

ELECTRICAL AND ELECTRONICS

PTE1131　　Engineering Mathematics 1/Calculus 1　　　10 Credits
The module looks at indices and logarithms, formulae, mensuration, trigonometry, force and moments, estimating and costs; Series, arithmetic and geometric progressions, convergence, sum to infinity, gradient of a curve, the chain rule, tangents and normals, increasing and decreasing functions, rates of change, stationary points; Polynomials, discriminant, real roots, solving quadratic equations, domain, range, one-one functions, graphical illustrations; Calculus, differentiation, integration, applications of arc length, area, volumes, moments of inertia, centroids; Vector and scalar products; Equations of lines and planes; Matrices basic operations, rank, inverse Gaussian elimination, Cramer's rule; Determinants, Eigen values and Eigen vectors; Ordinary differential equations; Applications of First order differential equations: mechanical and electrical engineering problems; Elementary functions including Hyperbolic functions and their inverses, Differentiation technique; Leibnitz's Rule, Hospital's Rule; Applications of differentiation: maxima and minima, kinematics; Integration techniques, Reduction formula; Integration of complex functions, integration by substitution, trigonometric relationships, trapezium rule, graphical determination, integration by parts; Applications of Integration: arc-length, area, volume, moments of inertia and centroids.

PTE1153　　Circuit Theory and Networks　　　　　　10 Credits
The module gives an analysis of continuous and discrete signals and systems. Topics include convolution, impulse response, system classifications, state variable formulation, differential and difference equations.

PTE1154　　Computer Engineering　　　　　　　　　10 Credits
The module explores computer components: types of computer systems features, function of central processing unit, the motherboard, the expansion bus, system memory map, and volatile/non- volatile memory storage methods; Introduction to operating systems: MSDOS, UNIX and Windows; Software development; Software life cycles, structured programming, introduction to modular design: C-constricts, introduction to programming in C; Packages: computer maintenance and diagnostic spreadsheets.

PTE1231　　Engineering Maths II　　　　　　　　　　10 Credits
This module examines series, arithmetic and geometric progressions, convergence, sum to infinity, gradient of a curve, the chain rule, tangents and normals, increasing and decreasing functions, rates of change, stationary points; Integration of complex functions, integration by substitution, trigonometric relationships, trapezium rule, graphical determination and integration by parts.

Think in other terms

PTE1252   Electrical and Electronic Measurements   10 Credits
The module looks at physical quantities, SI units, Avogadro constant, scalar and vectors; Measurements, errors and uncertainty; Measurement Systems: Static characteristics of measurement instruments; Transducers: Principles of Capacitive, resistive, inductive, electromagnetic, thermoelectric, elastic, piezoelectric, piezo-resistive, electrochemical, gas, ion selective electrodes; Signal conditioners and data acquisition; Introduction to flow measurement; Radiation Measurements, Basic measuring devices, ammeters, voltmeters, transducers, accuracy, precision and components; Electronic measuring instruments, digital voltmeters, multimetres; Oscilloscopes; Measurement of AC power and the measurement of non-electrical parameters.

PTE1253   Electrical Circuits and Devices   10 Credits
The module gives an introduction to volt-ampere characteristics of diodes, transistors with power and photo electronic devices; Maxwell's equation for static and harmonic varying current, displacement current, application of circuit theory, semi-conductors, diodes and transistors, logic gates, NAND, NOT, NOR, OR exclusively OR, Boolean algebra, combination logic, minimization, programmable logic devices, sequential logic, arithmetic operations and circuit memory elements.

PTE2150   Analogue Electronics   10 Credits
The module is an introduction to stabilized power supplies, small-signal models of differential, single stage; Multistage and integrates circuit amplifiers, oscillators, wave shaping and switching circuits; High frequency effects; stability and performance measurement.

PTE2152   Electrical Machines   10 Credits
The module covers fields and magnetic circuits; Energy conversion phenomena; Three-phase theory; Transformers: principles, operation and construction; Special transformers; Principles, classification, characteristics and construction of synchronous, induction and dc machines; Single-phase induction motors; Steady-state and transient behaviour of machines.

PTE2250   Analogue Communication   10 Credits
The module is an introduction to analogue communications; amplitude modulation; single side band modulation and angle modulation, frequency division multiplexing, propagation effects; demodulation; Determination of the signal-to-noise ratio in AM and FM systems; Design of small signal HF amplifiers, mixers, oscillators and detectors, mixer theory and spectral analysis, noise generation in electronic circuits and devices.

PTE2253   Design Project   10 Credits
The module constitutes of various designs that can be constructed and tested in the laboratory or computer room.

Think in other terms

PTE2254   Digital Electronics   10 Credits
The module focuses on Boolean algebra, Combinational logic; Minimization; Karnaugh mapping; Programmable logic devices; Sequential logic; Arithmetic Operations and circuit memory elements; Operational amplifiers, classification, parameters and basic building blocks.

PTE2259   Environmental Engineering   10 Credits
The module outlines the human activities and environmental pollution; Plumbing, drainage, Objectives of wastewater treatment; Waste water characteristics BOD kinetics; Wastewater flow rates and design flows; Flow equalization, wastewater treatment processes and selection; Design, operation and management plant.

PTE4151 Digital Communication   10 Credits
The module gives an introduction to digital communication systems: digital signal processing, modulation, transmission, and demodulation; Propagation; Random noise, channel capacity and error control coding and optimum receiver design principles.

PTE4152   Instrumentation And Control I   10 Credits
The module highlights the frequency measuring instruments, frequency analysers, Counters, Transducers; Open and closed loop controllers; Transfer functions, Simple servomechanisms, Derivation of transfer functions; Time domain, Frequency domain, Stability, Routh criterion, Root locus; Characteristics of measuring means , static characteristics, gain, sensitivity, resolution sensitivity of an instrument or a transducer; dynamic characteristics of measuring means; errors in engineering measurements; Analogue measuring instruments: flow meters, pressure gauges, thermometers, scales etc; Electronic instrumentation: sensors and transducers; AD/DA Converters; Accuracy and error of measurement.

PTE4252   Instrumentation and Control II   10 Credits
The module looks at frequency measuring instruments, Frequency analysers; Counters; Transducers and sensors; Open and closed loop controllers; Transfer functions; Simple servomechanisms, Derivation of transfer functions; Time domain, Frequency domain, Stability, Routh Criterion, Root Locus; Programmable logic controllers (PLCs), Distributed Control Systems (DCCs); Supervisory Control and Data Acquisition (SCADA) packages; Time domain and frequency domain system modelling; representation and reduction of multiple systems (block diagram techniques); stability; steady state errors (accuracy); frequency response methods, PID controllers compensation; programmable logic controllers (PLCs) and introduction to state space methods.

Think in other terms

PTE4254   Microprocessors and Microcontrollers   10 Credits
The module looks at the basic concepts of microprocessors; Architecture and operation; Instruction sets and assembly language programming; Subroutine, interrupts, programmed controlled I/O: I/O operations; I/O memory mapped; I/O ports; Programmable LSI ports and applications of microprocessors.

Think in other terms

MECHANICAL AND INDUSTRIAL ENGINEERING

PTE1131   Engineering Mathematics 1/Calculus 1   10 Credits

The module explores indices and logarithms, formulae, mensuration, trigonometry, force and moments, estimating and costs; Series, arithmetic and geometric progressions, convergence, sum to infinity, gradient of a curve, the chain rule, tangents and normals, increasing and decreasing functions, rates of change, stationary points; Polynomials, discriminant, real roots, solving quadratic equations, domain, range, one-one functions, graphical illustrations; Calculus, differentiation, integration, applications of arc length, area, volumes, moments of inertia, centroids; Vector and scalar products; Equations of lines and planes; Matrices basic operations, rank, inverse Gaussian elimination, Cramer's rule; Determinants, Eigen values and Eigen vectors; Ordinary differential equations; Applications of First order differential equations: mechanical and electrical engineering problems; Elementary functions including Hyperbolic functions and their inverses, Differentiation technique; Leibnitz's Rule, Hospital's Rule; Applications of differentiation: maxima and minima, kinematics; Integration techniques, Reduction formula; Integration of complex functions, integration by substitution, trigonometric relationships, trapezium rule, graphical determination, integration by parts; Applications of Integration: arc-length, area, volume, moments of inertia and centroids.

PTE1145   Engineering Drawing   10 Credits
The module is an introduction to engineering drawing; geometrical constructions; tangency constructions; construction of ellipses; orthographic projections of simple geometrical solids and general engineering components in first and third angle; plane geometry; space geometry; dimensioning; pictorial views; freehand sketching; sectioning; intersections; developments; conventions and assembly drawings.

PTE1147   Modelling and Materials   10 Credits
The module looks at materials classification and structure, atomic bonding in materials, crystallisation, dislocations, plastic deformation, temperature measurement, phase diagrams, solidification, liquidification, vaporization, alloy formation, types of material, composite, selection and their applications i.e.; wood, plastics, ceramics and other alloys; Structure and properties of metals and alloys; Review of principles, diffusional processes; Constitutional phase diagrams; Lattice defects; Deformation of metals, fracture and fatigue, polymers and corrosion; Materials for Modelling; Theories of models and model making; Imagination, creativity, innovation and invention; Image formation, model making and realization; Problem solving, visual patterns, models, prototypes and artifacts; Material selection for designs, experimentation with a range materials; Costs of models for designs; properties and analysis of materials for design models and product development; Testing and evaluating materials; Directory of design materials and analysis of design case studies.

Think in other terms

PTE1231   Engineering Maths II   10 Credits
The module examines series, arithmetic and geometric progressions, convergence, sum to infinity, gradient of a curve, the chain rule, tangents and normals, increasing and decreasing functions, rates of change, stationary points; Integration of complex functions, integration by substitution, trigonometric relationships, trapezium rule, graphical determination, integration by parts.

PTE1246 Engineering Mechanics I (Statics and Dynamics)   10 Credits
This module is on scalars, vectors, triangle of forces, parallelogram and polygon of forces, principle of transmissibility, Newton's laws, resolution of forces into two and three dimensional components, position vectors, resultant forces, moments, couples, equilibrium equations, structures: types of supports, truss analysis, joint method, section method, friction in inclined plane, wedges and screws; (X-ref TIE2106/2206).

PTE1256   Workshop Technology and Safety   10 Credits
The module explores workshop tools, occupational safety and health, processes and routines, construction materials, construction measuring instruments, personnel in the construction process, construction laws; The workshop environment, safety and care of equipment, space management; Safety and hygiene: workshop safety, ergonomic safety, Government regulations; Environmental stresses and hygiene, chemical stresses, harmful agents through inhalation, skin absorption & ingestion; Control of environmental factors; Measurement and measuring instruments, reliability, precision, scale, steel rules, calipers, micrometers, gauges, etc; Machine shop practice, marking, hand sawing, filing, drilling, and use of lathe; Equipment operation and maintenance, fabrication, welding, turning, cutting, soldering and brazing as well as equipment acquisition, storage and disposal; (X-ref TIE 1103 and TIE1203).

PTE2145   Industrial Design   10 Credits
The module explores the stages in the life cycle of a product, characteristics of global competition, characteristics of a competitive product, research and development, its role in the design of a product, factors influencing forward move of a product; Identifying customer needs and establishing product, generic product development process, concept generation and development.

PTE2146   Fluid Mechanics   10 Credits
The module looks at the elements of fluid mechanics, Pressure and head, Static Forces on surfaces, Motion of fluid particles and streams, Bernoulli's equation, the momentum equation, Uniform flow in open channels, Design of hydraulic systems and control, applications of hydraulics in industry, pneumatics and cut-out systems.

PTE2147   Strength of Materials I   10 Credits
The module explores direct stress and strain; Compound bars; Poisson's ratio and lateral strain; Hoop stress and axial stress in a cylinder; Stress in thin shells; Mechanical properties of

Think in other terms

materials, ductile and brittle materials, resilience, fatigue, creep, hardness; Sheer and torsion; Bending moment diagrams; Second moment of are and modulus of section.

PTE2245   Engineering Design   10 Credits
The module looks at coupling design: rigid and flexible couplings, Bolt Loading, Clutches: conical and multiple disc, Brake design: band, disc, automatic braking systems, Gear design: spur, helical, bevel and worm, Rolling bearings design, Ball bearings, taper bearings, belt design, V-belt and flat belt.

PTE2246   Thermodynamics/Thermal Physics   10 Credits
The module explores temperature scales, practical thermometers; Ideal gas: equation of state, kinetic theory of gases, pressure of a gas, kinetic energy of a molecule, work done by an ideal gas, thermal equilibrium, thermal conduction, convection, radiation; Laws of thermodynamics, the working fluid and phase equilibrium, reversible and irreversible processes, The second law of thermodynamics and Entropy, The heat engine cycles, vapour power cycles, refrigeration cycles, Turbines and compressors, Cooling systems: air, water, additives; Communication and production; Design registration and protection.

PTE2247   Strength of Materials II   10 Credits
This module examines structures: forces in members, sheer force and bending moments diagrams; Simple bending equation and applications, slope and deflections of beams, Macaulay's method, Torsion equation and applications to hollow and solid shafts, thin cylinders, thick cylinders: Lame's theory and line, stresses in three dimensions, shear and tensible combined, Mohr's stress circle, strain in three dimensions, Mohr's strain circle; deflection and moment distribution; application to beams and rigid frames.

PTE2259   Environmental Engineering   10 Credits
Human activities and environmental pollution. Plumbing, drainage, Objectives of wastewater treatment. Waste water characteristics BOD kinetics. Wastewater flow rates and design flows. Flow equalization, wastewater treatment processes and selection. Design, operation and management plant.

PTE4146   Engineering Mechanics II (Elective)   10 Credits
This module looks at dynamics of a particle, force, mass, acceleration, work and energy, impulse of energy and momentum, special applications, dynamics of system of particles, conservation of energy and momentum, introduction to three dimensional dynamics of a rigid body, angular momentum, ke, momentum and energy equations, parallel plane motion, gyroscope motion, are

Think in other terms

moments of inertia, mass moment of inertia, mass moment of inertia about an axis and products of inertia; (X-ref tie2106/2206).

PTE4149 Manufacturing Technology and Processes 10 Credits

This module covers casting processes, solidification of castings, gating and feeding systems, mould materials and their testing, continuous casting, special processes, design of castings, casting defects, inspection and quality control; Bench work, marking and setting out; Powder metallurgy: production of metal powders, their characteristics, purity, grain size etc; control and testing, pretreatments, pressing, lubricants, sintering, injection moulding, film blowing, cindering, mixing, extrusion; Machining processes: metal cutting tools, mechanics of chip removal, economics of cutting, cutting processes, turning, milling, sawing, thread cutting, metal removal rate calculations, grinding; Non-traditional machining processes and rapid prototyping techniques.

PTE4152 Instrumentation And Control I 10 Credits

This module looks at frequency measuring instruments, frequency analysers, Counters, Transducers; Open and closed loop controllers; Transfer functions, Simple servomechanisms, Derivation of transfer functions; Time domain, Frequency domain, Stability, Routh criterion, Root locus; Characteristics of measuring means , static characteristics, gain, sensitivity, resolution sensitivity of an instrument or a transducer; dynamic characteristics of measuring means; errors in engineering measurements; Analogue measuring instruments: flow meters, pressure gauges, thermometers, scales etc; Electronic instrumentation: sensors and transducers; AD/DA Converters; Accuracy and error of measurement.

PTE4248 Maintenance Engineering 10 Credits

The module focuses on maintenance and reliability, Preventative maintenance, Total productive maintenance (TPM) corrective maintenance breakdown maintenance, reliability centred maintenance, condition based maintenance, systems reliability – Weibull parameters; Estimating reliability and the Weibull diagram.

PTE4249 Manufacturing Systems 10 Credits

This module covers the classification of manufacturing systems, project, batch, line, continuous, facility layout and design: problems that stimulate facility layout design, locating new facilities, Assembly lines, Flow line design, Approaches to line balancing: Ranked positional weight, Largest candidate Rule, Kibridge and Western method, Practical issues in line balancing, sequencing of a mixed model, improvements to solutions on line balance, GT Cellular manufacturing and scheduling.

PTE4252 Instrumentation and Control II 10 Credits

This module examines the frequency measuring instruments, Frequency analysers; Counters; Transducers and sensors; Open and closed loop controllers; Transfer functions; Simple

servomechanisms, Derivation of transfer functions; Time domain, Frequency domain, Stability, Routh Criterion, Root Locus; Programmable logic controllers (PLCs), Distributed Control Systems (DCCs); Supervisory Control and Data Acquisition (SCADA) packages; Time domain and frequency domain system modelling; representation and reduction of multiple systems (block diagram techniques); stability; steady state errors (accuracy); frequency response methods, PID controllers compensation; programmable logic controllers (PLCs) and introduction to state space methods.

TECHNICAL GRAPHICS

PTE1145   Engineering Drawing   10 Credits
The module is an introduction to engineering drawing; geometrical constructions; tangency constructions; construction of ellipses; orthographic projections of simple geometrical solids and general engineering components in first and third angle; plane geometry; space geometry; dimensioning; pictorial views; freehand sketching; sectioning; intersections; developments; conventions and assembly drawings.

PTE1147   Modelling and Materials   10 Credits
The module looks at materials classification and structure, atomic bonding in materials, crystallisation, dislocations, plastic deformation, temperature measurement, phase diagrams, solidification, liquidification, vaporization, alloy formation, types of material, composite, selection and their applications i;e; wood, plastics, ceramics and other alloys; Structure and properties of metals and alloys; review of principles, diffusional processes; Constitutional phase diagrams; Lattice defects; Deformation of metals, fracture and fatigue, polymers and corrosion; Materials for modelling; theories of models and model making; Imagination, creativity, innovation and invention; Image formation, model making and realization; Problem solving, visual patterns, models, prototypes and artifacts; Material selection for designs, experimentation with a range materials; Costs of models for designs; properties and analysis of materials for design models and product development; Testing and evaluating materials; Directory of design materials and an analysis of design case studies.

PTE1181   Architectural Mathematics   10 Credits
The module looks at calculation of linear, curved and circular objects; measurement of surface area, volume, density of 2-D and 3-D formations; angular measures of shapes and designs found in building and product structures; sawing, filing, drilling, and use of lathe; Equipment operation and maintenance, fabrication, welding, turning, cutting, soldering and brazing; Equipment acquisition, storage and disposal; (X-ref TIE 1103 and TIE1203).

Think in other terms

PTE 1281   Applied Structural Statics and Dynamics   10 Credits
This module is an introduction to static and dynamic behaviour of the major structural systems applied in architecture; An examination of the monolithic wall, post-and- lintel and multistory framed construction, tunnels, vaults and domes, suspended, catenary and tensile structures, etc to enable students to develop their understanding of the structural principles that underlay their physical structural form. The aim of the module is to develop analytical capabilities in relating the sizes of components to their physical characteristics of structural elements and the analysis of forces acting on them.

PTE1282   Technical Drawing   10 Credits
This module looks at plane geometry, space geometry, first and third angle projection, dimensioning, pictorial views, freehand sketching, drawing of common objects, sectioning, intersections, developments, conventions, assembly drawing and exploded views; The use of AutoCAD covering the menu options of the operating screen settings, limits and control g auto CAD program; Use of basic operating commands SNAP, GRID, ORTHO, ENTER, etc; Practical lab exercises and assignments in 2D and 3D such as drawing and dimensioning of various machine parts, architectural plans, process flow charts and block diagrams.

PTE2180   Applied Geometry   10 Credits
The module examines surface development principles, parallel radial and triangulation; Development of right and oblique based prisms and the development of special types of roofs.

PTE2181   Architectural & Structural Drawing   10 Credits
The module is on drawing and utilizing models, block and site plans, floor existing work, new work, elevations and sections, constructional details of key components, fixtures and jointing methods; Steel and timber structures, roof trusses, columns and steel base fixture.

PTE 2281   Building Construction I   10 Credits
The module examines the construction process and the materials used in construction through lectures, case studies and project assignments. Students shall be required to study a building under construction and create a portfolio for documenting the project.

PTE4158   Design Of Structures   10 Credits
The module is an introduction to structural design, design methods, load on structures; Design in reinforced concrete; Basis of design, material properties, loading, design of beams, slabs, columns and foundations; Design in structural steel work; Design of vertically loaded masonry walls, design of laterally loaded wall panels; Enhancement of Auto CAD application in Civil Engineering drawings e.g. detailing, labelling and dimensioning.

Think in other terms

PTE4181   Building Services   10 Credits
The module looks at infrastructural services required in buildings including water supply and distribution, hot water supply and distribution of solid waste and rain water drainage, sewage treatment and its disposal, refuse removal and disposal, electrical and telephone services for buildings, ventilation, air conditioning and acoustics.

PTE4184   Computer Aided Architectural Design   10 Credits
This module explores thinking skills, creativity and the expression and provides a practical introduction to the use of computers in design, various electronic graphic representation used in design, and functionality and the structure of modern CAD systems. Students are then given theoretical and practical introduction to computer based and drawing tools and techniques through lectures and hands on instruction and demonstration.

PTE4288   Materials and Construction   10 Credits
This module is about on-site and off-site analysis of construction projects and products; selection and evaluation of materials for construction and design projects; quantitative and qualitative analysis; materials for repair jobs; (X-ref AAR1204).

WOOD SCIENCE AND TECHNOLOGY

PTE1145   Engineering Drawing   10 Credits
The module is an introduction to engineering drawing; geometrical constructions; tangency constructions; construction of ellipses; orthographic projections of simple geometrical solids and general engineering components in first and third angle; plane geometry; space geometry; dimensioning; pictorial views; freehand sketching; sectioning; intersections; developments; convention and assembly drawings.

PTE1147   Modelling and Materials   10 Credits
The module looks at materials classification and structure, atomic bonding in materials, crystallisation, dislocations, plastic deformation, temperature measurement, phase diagrams, solidification, liquidification, vaporization, alloy formation, types of material, composite, selection and their applications i.e. wood, plastics, ceramics and other alloys; Structure and properties of metals and alloys; Review of principles, diffusional processes; Constitutional phase diagrams; Lattice defects; Deformation of metals, fracture and fatigue, polymers and corrosion; Materials for Modelling; Theories of models and model making; Imagination, creativity, innovation and invention; Image formation, model making and realization; Problem solving, visual patterns, models, prototypes and artefacts; Material selection for designs, experimentation with a range materials; Costs of models for designs; properties and analysis of materials for

design models and product development; Testing and evaluating materials; Directory of design materials and analysis of design case studies.

PTE1185   Wood Chemistry   10 Credits
The module looks at the chemical structure of wood and bark, cellulose, lignin, tannin, extractives, resins and gums, rubber, pyrolysis, dyes, mass spectroscopy, eco-friendly production and products.

PTE1246 Engineering Mechanics I (Statics and Dynamics)   10 Credits
The module explores scalars, vectors, triangle of forces, parallelogram and polygon of forces, principle of transmissibility, Newton's laws, resolution of forces into two and three dimensional components, position vectors, resultant forces, moments, couples, equilibrium equations, structures: types of supports, truss analysis, joint method, section method, friction in inclined plane, wedges and screws (X-ref TIE2106/2206).

PTE1256   Workshop Technology and Safety   10 Credits
The module looks at workshop tools, occupational safety and health, processes and routines, construction materials, construction measuring instruments, personnel in the construction process, construction laws; The workshop environment, safety and care of equipment, space management; Safety and hygiene: workshop safety, ergonomic safety, Government regulations; Environmental stresses and hygiene, chemical stresses, harmful agents through inhalation, skin absorption & ingestion; Control of environmental factors; Measurement and measuring instruments, reliability, precision, scale, steel rules, calipers, micrometers, gauges, etc; Machine shop practice, marking, hand sawing, filing, drilling, and use of lathe; Equipment operation and maintenance, fabrication, welding, turning, cutting, soldering and brazing and equipment acquisition, storage and disposal; (X-ref TIE 1103 and TIE1203).

PTE1282   Technical Drawing   10 Credits
This module looks at plane geometry, space geometry, first and third angle projection, dimensioning, pictorial views, freehand sketching, drawing of common objects, sectioning, intersections, developments, conventions, assembly drawing and exploded views; The use of AutoCAD covering the menu options of the operating screen settings, limits and control g auto CAD program; Use of basic operating commands SNAP, GRID, ORTHO, ENTER, etc; Practical lab exercises and assignments in 2D and 3D such as drawing and dimensioning of various machine parts, architectural plans, process flow charts and block diagrams.

PTE1285   Timber Mechanics (Stat & Dynamics)   10 Credits
The module looks at strength properties of wood; Static and dynamic behaviour of building structural systems, framed structures, walls, tunnels, lintels, vaults and domes, catenary and tensile structures and effects of loading (X-ref AAR1206).

Think in other terms

PTE2187   Construction Equipment & Methods   10 Credits
The module explores planning and scheduling projects; heavy and large-scale construction, building estimations; quantity surveying and pricing of labour, materials and equipment; resource management and computer-based solutions (X-ref AQS4108).

PTE2189   Wood Manufacturing Systems and Processes   10 Credits
The module explores the classification of systems; layout; assembly lines; scheduling; group technology; machine scheduling; production flow analysis and wood manufacturing processes (X-ref TIE3112, TIE3113, TIE3213).

PTE2258   Analysis of Structures   10 Credits
The module looks at basic structural theory; structures and their behaviour; loads, determinacy and indeterminacy; plane and space trusses; bridge and roof trusses; long span structures – cables and arches; influence lines for statically determinate beams and trusses; strain and complementary energy; basic structural theorems, principle of virtual work; Deflection of statically determinant structures; area moment method, application of Castiglione's theorems, unit load method, analysis of statically indeterminate structures; method of superposition, slope deflection and moment distribution; application to beams and rigid frames.

PTE2287   Wood Machines & Maintenance Engineering   10 Credits
The module explores the rationale for maintenance; types of maintenance; machine maintenance operations and organization; investigative maintenance; repair, replacement and monitoring; systems reliability; engineering tools and solutions (X-ref TIE2110; TIE3110).

PTE4186   Furniture & Cabinet Construction   10 Credits
The module focuses on the interpretation of plans and drawings, measurement, shop and office geometry, hand, portable power and stationary power tools, joinery and assembly, small, medium and large-scale projects, shelves, drawers and doors, materials and processes.

PTE4189   Wood Finishes   10 Credits
The module examines the planning and applying wood finishes; Surface Coatings, 'Natural' Finishes, pigmented Finishes, penetrating finish, and waxing; Finishing Techniques; Staining, Glazing and Toning, Pickling and Liming, Bleaching and distressing.

PTE4288   Materials and Construction   10 Credits
The module covers on-site and off-site analysis of construction projects and products; selection and evaluation of materials for construction and design projects; quantitative and qualitative analysis and materials for repair jobs (X-ref AAR1204).

Think in other terms

POSTGRADUATE DIPLOMA PROGRAMME

SPECIAL REGULATIONS

1.0   ENTRY REGULATIONS

1.1   Admission requirements
1.1.1   Applicants must be in possession of at least an appropriate Bachelor's degree.
1.1.2   Applicants must also be employed in a teaching capacity in higher and tertiary education institutions.

1.2   Programme of study
1.2.1   The minimum duration of the diploma programme is one-year on block-release or two years on part-time study.
1.2.2   The programme consists of taught modules and live assessment of practical teaching.
1.2.3   Each semester shall consist of 6 modules (3 core and 3 electives).
1.2.4   Candidates who prefer to study only the 6 core modules shall be awarded the Postgraduate Certificate in Higher Education.
1.2.5   Electives offered in any academic year shall be determined by the availability of lecturers and demand.
1.2.6   The mode of instruction shall include lectures, seminars, workshops, peer presentations and online delivery.
1.2.7   Candidates shall be required to obtain a minimum total of 144 credits to be awarded the diploma.

2.0   ASSESSMENT OF CANDIDATES

2.1   Assessment
2.1.1 All taught modules shall be assessed by module work and examination, unless specified otherwise.
2.1.2 The continuous assessment must normally consist of at least three distinct tasks by the students including assignments, tests, mock examinations, presentations, reports, projects, portfolios, etc.
2.1.3 A component of observed and assessed practical teaching is embedded in each module in which candidates demonstrate their teaching and knowledge delivery skills.

Think in other terms

PROGRAMME SUMMARY

YEAR I

CORE

Module Code	Module Description	Credits
PTE 5103	Learning & Teaching Strategies in HE	12
PTE 5104	Higher Education Curriculum Development	12
PTE 5105	Student Assessment in HE	12

ELECTIVES

PTE 5102	Scholarship in Further & Higher Education (HE)	12
PTE 5106	Large and Small Group Teaching	12
PTE 5107	Problem-based Learning	12
PTE 5108	Quality & Innovation in HE	12
PTE 5111	Student Research and design projects	12
PTE 5116	Academic Involvement in the Community	12

CORE

PTE5206	Adolescent & Mature Students	12
PTE5213	Educational & Information Technology	12
PTE5203	Lesson delivery	12

ELECTIVES

PTE 5202	Policy, professionalism & Management in HE	12
PTE 5204	Programme Planning & Development	12
PTE 5208	Leadership, Governance and Strategic Planning in HE	12
PTE 5209	Statistics for Educators	12
PTE 5211	Research, Consultancy and Publishing	12

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
Total minimum credits:	**144**

Think in other terms

MODULE SYNOPSES

PTE5102 Scholarship in Further and Higher Education (Elective)   **12 Credits**
The module explores the nature of academic work in modern universities and colleges, expectations, challenges, comparisons with other professions, adaptations to change; Lecturer performance, effectiveness, job detailing and appraisal; Teaching, research and community service.

PTE5103 Learning & Teaching Strategies in Higher Education (Core)   **12 Credits**
The module looks at specifying educational purpose: aims, goals and objectives; curriculum Specification, operational content Bloom's Taxonomy: domains and levels of learning process/expressive objectives; Competence and performance criteria (P;C;); Learning outcomes; Planning for cognitive, psychomotor and affective learning outcomes; Teaching strategies: face-to-face, print-based, e-learning, etc; Learning styles: tutor-led, self-directed, mediated, etc; and documentation for teaching.

PTE5104 Higher Education Curriculum Development (Core)   **12 Credits**
The module covers conceptions, principles, models and factors influencing curriculum development; Needs assessment, curriculum changes, curricular reforms and innovation in developing countries; Evaluation of the overall effectiveness of curricula in Higher Education; Quality and quality assurance through inspection; Curriculum research and the educator.

PTE5105 Student Assessment in Higher Education (Core)   **12 Credits**
The module examines testing, assessment and evaluation of student performance; Formative, diagnostic and summative); Validity and reliability criteria; Assessment; Tutor, self and peer assessments; criterion/norm referenced assessment; Preparation for and processing of examinations, assessment specification grid, marking, grading and profiling of examination results; Moderation of question papers for quality and standards control.

PTE5106 Large and Small Group Teaching   (Elective)   **12 Credits**
The module explores mass lectures, medium and small classes, conducting theory and practical lessons, group projects and assignments; Media of presentation; Tutorials and mentoring sessions; Group compositions and dynamics.

PTE5107 Problem-Based Learning (Elective)   **12 Credits**
The module looks at the definitions, models, and examples of problem-based learning (PBL); Practice and application, comparative benefits, essentials and resources.

Think in other terms

PTE5108 Quality and Innovation in Higher Education (Elective)   12 Credits
The module looks at the attitudes and the environment for quality assurance, staff, students, facilities, resources; innovation and creativity in programme delivery.

PTE5111 Student Research & Project Writing (Elective)   12 Credits
This module explores types and paradigms of research, sharpening skills of data collection, analysis and interpretation; Formats and contents of reports; Writing style and language, etc.

PTE5116 Academic Involvement in the Community (Elective)   12 Credits
This module looks at community development processes, identification, needs analysis, feasibility study, negotiation and intervention and factors influencing success in community development projects.

PTE5203 Lesson Delivery (Core)   12 Credits
This module is a supervised and assessed professional practice in the candidates' own classes; Review of professional documentation, resources and learning environments; observation of lessons; discussion and counselling. Each candidate shall be assessed at least twice.

PTE5202 Policy, Professionalism and Management in Higher Education (Elective)
12 Credits
The module explores policy formulation and implementation, decision-making strategies in organizations and communities; policy and educational reform; dominant policies in Zimbabwe education, Resources management: human, financial, material, time; Principles of project planning and management, factors affecting project management: Political, Economic, Social, Technical, Legal and Environmental (PESTLE); Budgeting; Risk and Contingency Management and research in Management.

PTE5204 programme Planning and Development (Elective)   12 Credits
This module focuses on academic and administrative programmes in higher education; module development: objectives, processes and evaluation, module writing, designing short and long modules, designing individualised and group programs, professional staff development, purposes and procedures for accreditation for prior learning (APL) and accreditation for prior experiential learning (APEL).

PTE5206 Adolescent and Mature Students (Core)   12 Credits
The module covers college and university student characteristics, behaviour and academic performance; Psycho-social and physiological influences to student performance.

PTE5208 Leadership, Governance and Strategic Planning In H E (Elective)   12 Credits

Think in other terms

The module explores the institutional organization; academic and administrative leadership, principles and tools for good governance, the role of the state; Local, regional and international cooperation between institutions; Strategic Planning principles and processes.

PTE5209 Statistics for Educators   (Elective)   **12 Credits**

The module looks at the descriptive and inferential statistics in use in education and educational research; sampling theory, methods of summarising and interpreting data; frequency distributions; measures of central tendency; measures of dispersion; fractiles; measures of strength and association; probability distributions: the normal distribution; significance and hypothesis testing.

PTE5211 Research, Consultancy and Publishing (Elective)   **12 Credits**

The module looks at the foundations and practices in academic research; Identifying research opportunities in industry and society; Drawing up research proposals; Seeking funding; Conference presentations; Gaining consultancy assignments, specialist training; Publishing in journals, books; Current issues in the research literature relating to funding, organisation, student support, human resources development, reform and innovation, etc; in higher and tertiary education; Consultancy and project proposals.

PTE5213 Educational and Information Technology (Core)   **12 Credits**

The module examines the trends, theories and history of media in education, technical developments in subject content delivery, implications for classroom and distance education modes, appropriate technology, computers, information and communication technologies (ICT), multimedia, virtual learning, hardware and software developments, strengths and limitations for developing countries, developing programs using ICT, educational resources planning and management and learning resource centres.

Think in other terms

MASTERS DEGREE PROGRAMME

SPECIAL REGULATIONS

These are the postgraduate programmes offered by the department of Technical and Engineering Education and Training.

1.0   ENTRY REGULATIONS
1.1   Admission requirements
1.1.1   Applicants must be in possession of an approved Honours degree in the area of Technical Education with relevant subject specialisation.
1.1.2   Alternatively, applicants with a relevant Bachelor's degree plus the Postgraduate Diploma in Technical or Technology Education or its approved equivalent shall be considered.

1.2   Programme of study
1.2.1   The two-year block release or part time programme is composed of prescribed core modules as well as a research project.
1.2.2   The supervised research project should culminate in a dissertation of a minimum of 10 000 words.

2.0   ASSESSMENT OF CANDIDATES
All taught modules shall be assessed through module work and examination, unless specified otherwise in the appropriate module synopsis.

Think in other terms

CIVIL AND CONSTRUCTION ENGINEERING

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PTE6156	Environmental Engineering & water resources	18
PTE6159	Structural design in concrete & steel	18
PTE6253	Electronic, Power Sources & Circuits	18
PTE6256	Surface Water Modelling	18
	Education modules	36

YEAR II

PTE6357	Ground Water Modelling (Elective)	18
PTE6352	Electronics Design (Elective)	18
PTE6456	Water, Resources Planning & Management (Elective)	18
PTE6459	Environmental Engineering & Management (Elective)	18
PST6010	Dissertation	72

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
YEAR II	144
Total minimum credits:	**288**

Think in other terms

ELECTRICAL AND ELECTRONICS ENGINEERING

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PTE6153	Linear Systems	18
PST6175	Computational Discrete Mathematics	18
Education Modules	36	
PTE6245	Human Factor Engineering	18
PTE6254	Intelligent Condition and Monitoring	18
Education Modules	36	
YEAR II		
PTE6346	Management and Technology	18
PST6375	Simulation and Modelling	18
PST6311	Advanced Research Methods	18
PST6010	Dissertation	-
PTE6448	Automation and Robotics	18
PTE6446	Engineering Project management	18
PST6411	Tools for basic and applied research	18
PST6010	Dissertation	72

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
YEAR II	144
Total minimum credits:	**288**

MECHANICAL AND INDUSTRIAL ENGINEERING

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PTE6146	Environmentally conscious engineering	18
PST6175	Computational Discrete Mathematics	18
Education Modules	36	
PTE6245	Human Factor Engineering	18
PTE6248	Computer Control & Manufacturing Systems	18
Education Modules	36	

YEAR II

PTE6346	Management and Technology (Elective)	18
PST6375	Simulation and Modelling (Elective)	18
PST6311	Advanced Research Methods	18
PST6010	Dissertation	72
PTE6448	Automation and Robotics (Elective)	18
PTE6449	Quality Systems (Elective)	18
PST6411	Tools for basic and applied research	18
PST6010	Dissertation	72

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144	
YEAR II	144	
Total minimum credits:	**288**	

Think in other terms

TECHNICAL GRAPHICS

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PTE6180	Architectural design and drawing	18
PTE6182	Advanced design and manufacturing	18
Education modules	36	
PTE6256	Production Management	18
PTE6280	Advanced Engineering Science	18
Education modules	36	

YEAR II

PST6381	Integrated Building Services	18
PTE6356	Sustainable Environment (Elective)	18
PST6311	Advanced Research Methods	18
PTE6458	Advanced Construction	18
PTE6461	Entrepreneurship	18
PST6411	Tools for basic and applied research	18
PST6010	Dissertation	72

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
YEAR II	144
Total minimum credits:	**288**

Think in other terms

WOOD SCIENCE AND TECHNOLOGY

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PTE6182	Advanced design and manufacturing	18
PTE6188	Advanced Material Science	18
Education modules	36	
PTE6247	Material Technology	18
PTE6256	Production Management	18
Education modules	36	

YEAR II

PTE6387	Advanced Wood Processing	18
PTE6388	Timber Engineering	18
PST6311	Advanced Research Methods	18
PTE6458	Advanced Construction (Elective)	18
PTE6461	Entrepreneurship (Elective)	18
PST6411	Tools for basic and applied research	18
PST6010	Dissertation	72

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	**144**
YEAR II	**144**
Total minimum credits:	**288**

Think in other terms

ENGINEERING AND TECHNOLOGY

PROGRAMME SUMMARY

YEAR I

Module Code	Module Description	Credits
PTE6146	Environmentally conscious engineering	18
PTE6182	Advanced Design and Manufacturing	18
Education modules	36	
PTE6245	Human Factor Engineering	18
PTE6256	Production Management	18
Education modules	36	

YEAR II

PTE6356	Management and Technology (Elective)	18
PTE6375	Simulation and Modelling (Elective)	18
PST6311	Advanced Research Methods	18
PTE6449	Quality Systems (Elective)	18
PTE6461	Entrepreneurship (Elective)	18
PST6411	Tools for basic and applied research	18
PST6010	Dissertation	72

TOTAL CREDITS FOR THE PROGRAMME

YEAR I	144
YEAR II	144
Total minimum credits:	**288**

MODULE SYNOPSES

CIVIL AND CONSTRUCTION ENGINEERING

PTE6156 Environmental Engineering & Water Resources   18 Credits
The module looks at human activities and environmental pollution and an understanding of the role transport processes play in natural and engineered systems which control the quality and quantity of water for human use. The scope includes concerns in toxic and hazardous waste management with a focus on aspects of chemical transport between air, water and soil systems, and microbial degradation processes in the natural and engineering environment. A particular emphasis is placed on recognizing and modeling processes that are potentially transport limited and to what degree such limitations may be overcome; Wastewater characteristics; BOD kinetics; Wastewater flow rates and design flows; Introduction to microbial metabolism and role of micro-organisms in biological treatment; Kinetics of biological growth; Landfill Engineering, Urban Hydrology and Urban Drainage.

PTE6159   Structural Design in Concrete & Steel   18 Credits
The module explores concrete design: limit state, ultimate state, characteristic material strength, stress, yield, shear and calculations; Concrete structures: calculations; Concrete design tool; Reinforced concrete: magnitudes, stresses and calculations.

PTE6253   Electronic, Power Sources and Circuits   18 Credits
The module examines power sources: characteristics of AC and DC current, principles of step down/up, rectification, voltage and current regulation, Ohm's Law, power, use meters to measure voltage, current and resistance; Electronics and control: reed switch, micro switch and relay, transistors (NPN and PNP types) as amplifier and switch and define current gain, a Darlington Pair, capacitors, diodes for rectification and protection against back emf, zeners for voltage reference, LEDs and photodiodes, resistors , transducers, calculate resistance of series and parallel resistors; Circuits: draw circuit diagrams including – switching using the output to operate transistors and relays; Operational amplifiers , explain the functions of AND, OR, NAND, NOR and XOR as well as construct truth tables for the above functions.

PTE6256   Surface Water Modelling   18 Credits
The module focuses on hydrologic cycle; Water balance: Evaporation, infiltration, overland flow, base flow; Rainfall-runoff models, overland flow models; Stream flow discharge and rating curve; advanced flood routing; stochastic hydrology and a statistical analysis of hydrologic events.

Think in other terms

PTE6352   Electronics Design (Elective)   18 Credits
The module explores study circuit and component technologies in contemporary very large scale and very large scale integrated circuits; Use of the Computer-Aided Design workstation to produce complete circuits related to area of specialization and design circuits in special construction of choice.

PTE6357   Ground Water Modelling (Elective)   18 Credits
The module outlines the classification of groundwater systems; Aquifer parameters and properties; Flow and contaminant transport equations; Well hydraulics and parameter estimation; Well development; Artificial Recharge; Numerical modelling of aquifer systems; Use of groundwater models; Seepage and drainage problems; Quality loss function; Total quality tools and techniques.

PTE6456 Water, Resources Planning and Management (Elective)   18 Credits
The module highlights planning economics; Quantitative optimization methods applied to water resources planning; Waste recycling practices; Planning under uncertainty; Conjunctive use of surface and groundwater resources; Water legislation and administration as well as experiences from professionals in industry on water resource planning and management.

PTE6459   Environmental Engineering and Management (Elective)   18 Credits
The module examines environmental issues: solid and liquid wastes management; Water and air quality monitoring and modelling:- monitoring methods, analytical and numerical modelling methods; Environmental Impact Assessment; legal and institutional issues on environmental management; Public Health issues; Water and Sewerage Network Operation and Management; Environment and Sustainable development.

ELECTRICAL AND ELECTRONICS ENGINEERING

PTE6153   Linear Systems   18 Credits
The module looks at linear Vector Spaces, Functions and Linear Transformations, Normed Linear Spaces, Differential Equations and Dynamical Systems, Reachability and Controllability, Decomposition Theory for LTI systems, Observability and State Reconstruction.

PDT6245   Human Factor Engineering   18 Credits
The module explores work Study: method study, time study, motion economy; Ergonomics: man-machine interaction, work conditions; Industrial psychology and biomechanical models of human at work.

Think in other terms

PTE6254   Intelligent Conditioning and Monitoring   18 Credits
The module has an introduction to the role of sensors in manufacturing automation; operation principles of different sensors; electrical, optical, acoustic, pneumatic, magnetic, electro-optical and vision sensors; Condition monitoring of manufacturing systems; principle; sensors for monitoring force, vibration and noise, selection of sensors and monitoring techniques; Acoustic emission; principles and applications; concepts of pattern recognition; Sensors for CNC machine tools; linear and angular position and velocity sensors; Automatic identification techniques for shop floor control; optical character and machine vision sensors; smart / intelligent sensors; integrated sensors, Robot sensors, Micro sensors, Nano sensors; Manufacturing of semi conductor sensors and fibre optic sensors; principles, applications.

PTE6346   Management of Technology (Elective)   18 Credits
The module covers technology; Technology transfer; Research and development infrastructure, interaction, and cooperation; Technology and its environment - social, human, political factors; Managing innovation and technology dynamics and change dynamics.
;
PDT6446   Engineering Project Management (Elective)   18 Credits
The module focuses on the entrepreneur, project planning, implementation and review, decision making factors, problem formulation and solution using optimisation theory, finite mathematics, and statistical techniques.

PDT6448   Automation and Robotics (Elective)   18 Credits
This module examines industrial Robots: An introduction to industrial robots; Classification of robots and their geometries; Robot end-effectors (tooling and grippers); Safety considerations; Programming Industrial Robots: Robot motion control; resolution, repeatability, accuracy and control; Future trends; Robot Animation Teaching Simulation; Robotics Sensing: Robot sensor technologies; Image acquisition; Computer vision systems: Image processing; Robot programming using sensors; Automated Assembly: Image processing; transfer and parts presentation; Requirements for general purpose assembly; Some problems with assembly; Design considerations in automated assembly; principles of high volume manufacturing systems; Choosing, specifying and justifying a robot system: Evaluation methods for robot capital investment and evaluation of manufacturing costs.

MECHANICAL AND INDUSTRIAL ENGINEERING

PTE6146 Environmentally Conscious Engineering   18 Credits
The module explores cleaner production concepts; Eco-design; Explosive and toxic gases, liquid and metallic poisons; Airborne dust - causes and prevention; Physiological effects of vitiated and

contaminated air; Compiling of a monitoring strategy, management systems for environmental control and environmental auditing.

PST6175   Computational Discrete Mathematics   18 Credits
The module explores discrete models; Foundations; Basic concepts of sets and functions; Finite series; Logic; Propositional logic; Predicate logic; Combination circuits; Induction; Finite probability space, events; Conditional probability; Bayes' theorem; Integer random variables; Expectations; Varia Analysis and verification; Searching algorithms; Recursive algorithms; Relations; Discrete models; Foundations; Basic concepts of sets and functions; Finite series; Logic; Propositional logic; Predicate logic; Combination circuits; Induction; Finite probability space, events; Conditional probability; Bayes' theorem; Integer random variables; Expectations; Varia Analysis and verification; Searching algorithms; Recursive algorithms; Relations; Basic concepts; Properties of relations; Operations relations; Undirected graph, Directed graph, weighted graph, Euler circuits and Hamiltonian cycles; Graph isomorphism and representation planar graphs; Trees; Different state machines; Input, Output, Initial state and a transition table;

PDT6245   Human Factor Engineering   18 Credits
The module examines work Study: method study, time study, motion economy; Ergonomics: man-machine interaction, work conditions; Industrial psychology and biomechanical models of human at work.

PDT6248 Computer Control and Manufacturing Systems   18 Credits
The module gives an analysis of microprocessor controlled servo loops, adaptative control, state space methods in controlling analysis of NC machines, robots and their controllers; programmable controllers; Prerequisites as well as industrial Instrumentation and Control.

PTE6346   Management of Technology (Elective)   18 Credits
The module outlines technology; Technology transfer; Research and development infrastructure, interaction, and cooperation; Technology and its environment - social, human, political factors; Managing innovation and technology dynamics; Change dynamics; Contemporary social and environmental policy issues and research themes, such as: development and displacement, the transnational dimensions of environmental issues, access to wood in urban areas, urban planning and sustainability, the social production of risk, and resource extraction and conservation conflicts.

PDT6448   Automation and Robotics (Elective)   18 Credits
The module highlights industrial Robots: An introduction to industrial robots; Classification of robots and their geometries; Robot end-effectors (tooling and grippers); Safety considerations; Programming Industrial Robots: Robot motion control; resolution, repeatability, accuracy and control; Future trends; Robot Animation Teaching Simulation; Robotics Sensing: Robot sensor technologies; Image acquisition; Computer vision systems: Image processing; Robot

Think in other terms

programming using sensors; Automated Assembly: Image processing; transfer and parts presentation; Requirements for general purpose assembly; Some problems with assembly; Design considerations in automated assembly; principles of high volume manufacturing systems; Choosing, specifying and justifying a robot system: Evaluation methods for robot capital investment and the evaluation of manufacturing costs.

PTE6449   Quality Systems (Elective)   **18 Credits**
The module looks at total quality management: overview, principles, levels of adoption; Pioneering works of Deming, Juran, Crosby, Ishikawa, Imai, Shingo and Fiegenbaum; International Standards: Malcom Baldridge, ISO 9000, ISO 14 000; Cost of quality; Quality function deployment; Quality loss function as well as total quality tools and techniques.

TECHNICAL GRAPHICS

PTE 6182 Advanced Design and Manufacturing   **18 Credits**
The module explores product design, technology for sustainability, advance manufacturing technology, web and internet technologies and multidiscinary engineering technologies.

PTE6180 Architectural Design and Drawings   **18 Credits**
The module examines plans, sketches, presentation, art, landscape, perspective and axonometric.

PDT6256 Production Management   **18 Credits**
The module looks at construction and design, budget management, event management and health and safety.

PTE6280 Advanced Engineering Science   **18 Credits**
The module enables the students to extend and apply knowledge and understanding of key engineering concepts, principles and practice through independent learning , understand and apply the relationships between engineering, mathematics and science, develop skills in investigation and research in an engineering context, analyse, design, construct and evaluate creative solutions to complex engineering problems, communicate advanced engineering concepts clearly and concisely, using appropriate terminology, develop an informed understanding of the role and impact of engineering in changing and influencing our environment and society, including ethical implications.

PTE6381 Integrated Building Services   **18 Credits**
The module looks at how various types of building services equipment work and how they are integrated into a building; Heating cooling, lighting, energy supply, on-site power generation, building management systems, water supply and waste systems, fire safety, vertical

Think in other terms

transportation and building services for high-performance buildings; Short and long-term maintenance contracts to the commercial, retail and construction sectors throughout.

PTE6356 Sustainable Environment (Elective)   **18 Credits**
The module explores contemporary social and environmental policy issues and research themes, such as: development and displacement, the transnational dimensions of environmental issues, access to wood in urban areas, urban planning and sustainability, the social production of risk, and resource extraction and conservation conflicts.

PTE6458 Advanced Construction   **18 Credits**
The module examines the management of technology, processes and projects, its technological interdependencies and socio-economical boundary constraints, results in the worldwide uniqueness of our program, New technologies, processes and strategies for designing and producing of buildings: Faster return on investment through implementation of rapid project delivery and zero defect construction by robot oriented design and automated construction systems, Integration of intelligent systems in daily life and environments: Microsystems and microelectronics increasingly form a part of our everyday's life; Its miniaturization allows its incorporation in domestic systems and appliances; Simultaneously we want to deal with a standardized and compatible network of synergetic subsystems rather than detached island solutions, Life cycle management, value engineering and innovation.

PST 6461 Entrepreneurship (Elective)   **18 Credits**
The objective of this module is to examine the characteristics and goals f the social entrepreneur as well as an in-depth view into the practises of creating social value for individuals and communities. The student's ability to develop and implement social change will increase significantly as the student becomes acquainted with the theories of social entrepreneurship and learn how to identify the characteristics of the social entrepreneur. Upon completion of this recommended module, the student will also be able to evaluate the organisational structure, human resources, funding, marketing and stakeholder participation; all vital success factors in a social change project. The study of the theories and practice of creating partnerships for social change, the aptitude to resource initiatives to link community needs and the talent to develop a plan to implement social change will all be covered in this study of social entrepreneurship

WOOD SCIENCE AND TECHNOLOGY

PTE6182 Advanced Design and Manufacturing   **18 Credits**
The module highlights product design, technology for sustainability, advance manufacturing technology, web and internet technologies and multidiscinary engineering technologies;

Think in other terms

PTE6188 Advanced Material Science   **18 Credits**

The module looks at materials processing, structural materials, functional materials and materials for sustainable technology material characterisation.

PTE6256 Production Management   **18 Credits**

The module covers construction and design, budget management, event management and health and safety.

PTE6247 Material Technology   **18 Credits**

The module outlines wood-based hybrid materials, bionics, material emissions, material characterisation and innovative material technology.

PTE6387 Advanced Wood Processing   **18 Credits**

The module explores chemical pulping of eucalypts (collaboration of Western Australian Forestry and a number of pulp and paper companies (APM, APPM, and ANM); Chemical pulping of eucalyptus is now the dominant process used world-wide for the manufacture of fine writing paper, High temperature drying of pine (CSIRO in collaboration with NSW and Queensland Forestry Commission Laboratories) Machine stress grading of pine, Wood-fibre-reinforced cement composites (CSIRO and James Hardie), Advanced breeding and selection technology for pine (CSIRO/State Forestry Services) ;Introduction to Wood Finishing, Colour Theory and Wood Colour, Surface Preparation, Surface Finishes, Spraying Technology, Automated Finishing, Drying and Curing of Finishes, Post-Treatments and Cost Considerations, Coating Parameters, Recycling, Safety, Environmental, Quality Control and Finish Testing, Measuring the colour of Canadian wood species, Farnsworth-Munsell colour test, Finish sanding and surface preparation, Conditioning of surfaces for staining, Spraying basics – gun setup, correct use, and cleaning, Staining effects & simple finishes, chemical staining, Advanced staining systems, Preparing bleaches and removing stains from wood, Tests on liquid finishes, Tests on wet coatings, Water-based finishes, Roller coating, UV curing, Curtain coating, Powder coating of MDF, Achieving special finishing effects, Exterior finishes and testing, Testing the properties of finishes as well as tours of various industrial finishing facilities.

PTE6388 Timber Engineering (Elective)   **18 Credits**

The module examines timber and hybrid structures, multi - story timbers buildings, assessment and retrofitting, methods of assessment, maintenance and strengthening, remodelling, densification, structural dynamics, lateral force method, modal response and spectrum analysis.

PTE6458 Advanced Construction   **18 Credits**

The module focuses on management of technology, processes and projects, its technological interdependencies and socio-economical boundary constraints, results in the worldwide uniqueness of our program, New technologies, processes and strategies for designing and producing of buildings: Faster return on investment through implementation of rapid project

Think in other terms

delivery and zero defect construction by robot oriented design and automated construction systems, Integration of intelligent systems in daily life and environments: Microsystems and microelectronics increasingly form a part of our everyday's life; Its miniaturization allows its incorporation in domestic systems and appliances; Simultaneously we want to deal with a standardized and compatible network of synergetic subsystems rather than detached island solutions, Life cycle management, value engineering and innovation.

PST 6461 Entrepreneurship (Elective)   18 Credits
The objective of this module is to examine the characteristics and goals of the social entrepreneur as well as an in-depth view into the practises of creating social value for individuals and communities. The student's ability to develop and implement social change will increase significantly as the student becomes acquainted with the theories of social entrepreneurship and learn how to identify the characteristics of the social entrepreneur. Upon completion of this recommended module, the student will also be able to evaluate the organisational structure, human resources, funding, marketing and stakeholder participation; all vital success factors in a social change project. The study of the theories and practice of creating partnerships for social change, the aptitude to resource initiatives to link community needs and the talent to develop a plan to implement social change will all be covered in this study of social entrepreneurship.

CENTRE FOR CONTINUING EDUCATION

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1.0 PREAMBLE

1.1 The Centre for Continuing Education seeks to extend access to university education to those people who, for a variety of reasons, are unable to participate in the University's conventional programmes of study. In this regard, the Centre is open to partnerships with faculties, other University units, public and private sector organisations to create, facilitate and provide flexible and customised learning programmes to a wider public, for the access of knowledge, skills and information required for individuals to effectively function in the workforce and society

1.2 In line with the NUST vision, the Centre's courses have been crafted and adopted to widen and deepen access to adult education and training. In response to market demand for hands-on skills, the focus is on enhancing capacity to use digital applications as well as strengthening entrepreneurial skills in business, management and other life-work situations. There are no special entry requirements for the Centre's courses. Additional information will be afforded on enquiry.

2.0 The Centre fulfils its mandate in several ways:

2.1 COMPUTER COURSES

These are short IT courses aimed at equipping participants with the requisite skills to operate in the digital world. They target post-secondary individuals who want to gain knowledge of computers or want to pursue careers in Information Technology. Another target in this category is adults that want to simply learn how to use a computer and the internet. IT professionals are also catered for if they wish to attain certification in specific areas of IT.

DIGITAL SKILLS LICENCE

The course covers:
- IT Concepts.
- Desktop Essentials and File Management.
- Word Processing.
- Spreadsheets.
- Databases.
- Presentations
- Internet and Cloud Services.
- IT Security and Privacy.
- Digital Lifestyles.

COMPUTER SYSTEMS SUPPORT

The course covers:
Desktop Hardware.

Think in other terms

- Operating Procedures.
- Operating Systems and Software.
- Printers and Scanners.
- Laptops.
- Mobile Devices.
- Networking.
- Computer Security.
- Network Security.
- Customer Care.

NETWORK SYSTEMS SUPPORT

The course covers:
- Network Essentials.
- LAN Switching Fundamentals.
- Routing Fundamentals.
- Infrastructure Services.
- Infrastructure Maintenance.

WEB DESIGN

The course covers:
- Web Design Concepts.
- WordPress Installation and Configuration.
- Installing and Managing Themes.
- Content creation using Pages.
- Writing Blog Posts.
- Creating and Editing Widgets.
- Installing and Activating Plug-ins.
- Search Engine Optimisation.

GRAPHIC DESIGN

The course covers:
- Introduction to Graphic Design.
- Graphic Design Software.
- Design Basics.
- Design Principles & Colour Theory.
- Design Layout.
- Typography.
- Visual Effects.
- Design Systems.

Think in other terms

COMPUTERISED ACCOUNTING

The course covers:
- Debtor & Supplier Processing.
- Real Time Processing.
- VAT Refunds and Returns.
- Excel Manipulations.
- Cash Flow Statements.
- End of Period Reporting.

AUTOCAD

The course covers:
- Introduction to AutoCad.
- AutoCad Intermediate.
- 2 D & 3 D Modelling.
- OLE Objects.
- Assigning Layers and Levels.
- Grid Display & Drawings.
- Annotation.
- Plot and Print Options.

PROFESSIONAL ANDROID DEVELOPMENT

The course covers:
- Java Fundamentals for Android Development.
- Android App Development for Beginners.
- Professional Android App Development.
- Monetise Android Apps with Business Models.
- Android Developer Capstone Project: Building a successful Android App.

CYBER SECURITY

The course covers:
- Cyber security fundamentals.
- Computer Forensics.
- Cyber security Risk Management.
- Network Security.
- Cyber security Capstone.

COMPTIA IT CERTIFICATION PROGRAMS

The course covers:
- Security+ (SYO-401 Exam).
- Server+ (SKO-004 Exam).

Think in other terms

- Cloud+ (CVO-001 Exam).

MICROSOFT IT CERTIFICATION PROGRAMS
Students can earn an MTA certification in one of the following fundamentals, depending on one's interests and goals.

MICROSOFT TECHNOLOGY ASSOCIATE (MTA)
The course covers:
- Software Development.
- HTML5 App Development.
- Database.
- Windows Server Administration.
- Networking.
- Security.

MICROSOFT CERTIFIED SOLUTIONS ASSOCIATE & EXPERT (MCSA& MCSE)
The course covers:
- MCSA Windows 10.
- MCSA Windows Server 2012.
- MCSA SQL Server 2012/2014.
- MCSE Enterprise Devices and Apps.
- MCSE Server Infrastructure and Private Cloud.

MICROSOFT OFFICE SPECIALIST (MOS)
The course covers:
- Word 2010/2013.
- Excel 2010/2013.
- PowerPoint 2010/2013.

MICROSOFT CERTIFIED SOLUTIONS DEVELOPER (WEB AND WINDOWS STORE APPS)
The course covers:
- Programming in HTML5 with JavaScript and CSS3.
- Essentials of Developing Windows Store Apps Using HTML5 and JavaScript.
- Advanced Windows Store App Development Using HTML5 and JavaScript.
- Developing ASP.NETMVC Web Applications.
- Developing Microsoft Azure and Web Services.

Think in other terms

2.2 PROFESSIONAL DEVELOPMENT SHORT COURSES

Professional development programmes are short term purposefully designed non-credit courses, workshops and seminars for specific in-service personnel in the public and private sectors. They are essentially designed to enable workers at all levels gain more skills and thus keep abreast of rapidly changing work environments and advancing technologies. Professional development programmes broadly fall into two categories:

2.2.1 Professional development in Business skills and Management:

For supervisory and middle-level management personnel; these are regular short term programmes that are meant to respond to general needs in the business and industrial environment. The programmes are reviewed from time-to-time and they provide management training to organisations on a long term basis. The following are currently on offer:

MODERN MAINTENANCE MANAGEMENT

The course covers:
- Introduction to Production/Operations Management.
- Maintenance Management and Competitiveness.
- Maintenance Strategies.
- Total Productive Maintenance (TPM).
- Spare Parts Management.
- Computerised Maintenance Management Systems (CMMS).
- SE and Maintenance Management.
- Introduction to Project Management.

LABOUR LAW

The course covers:
- Individual Employment Law.
- Collective Labour Law.
- Discipline and Grievance Handling.
- Dispute Resolution.
- Labour Litigation and Labour Court Procedures.

FORENSIC ACCOUNTING AND DEVELOPMENT

The course covers:
- Elements of fraud.
- The Forensic Audit Perspective.
- Fraud Risk Assessment.
- Financial Investigations and the Litigation Process.
- Uncovering "creative" accounting and other "red flags" of fraud.
- Developing Audit Tests.

Think in other terms

- Minimising Electronic Risk and Developing Forensic Reports and Exhibits.

RECORDS AN DATABASE MANAGEMENT
The course covers:
- Introduction to Records Management.
- Management of Files and Document Classification.
- Records Lifecycle.
- Security of Records & Information.
- Management of Electronic Records.
- Computerised Databases.

ORGANISATIONAL MANAGEMENT
The course covers:
- Principles of Management and Leadership.
- Organisational Behaviour.
- Situational appraisal.
- Communication and facilitation.
- Business Ethics and Law.
- Leadership and conflict transformation
- Finance for non-financial managers.

SUPERVISORY MANAGEMENT
The course covers:
- Nature and scope of supervisory management.
- Employee Motivation and Performance Management.
- Facilitation and Creative Problem Solving.
- Building Effective Work Teams.
- Leadership, Delegation and Coaching Skills for supervisors.
- Business Communication Skills for Supervisors.
- Fundamentals of Industrial Relations and the Labour Act.
- Negotiation, Conflict Resolution/Grievance Handling and the Disciplinary Process.
- Basic finance and accounting for non-financial managers/supervisors.
- Work Plans and Work Scheduling.

SAFETY, HEALTH, ENVIRONMENT AND QUALITY (SHEQ) LEADERSHIP
The course covers:
- Leadership and Management Concepts and Applications.
- Felt Leadership and Behaviour Based Safety.
- Safety Economics and Environmental Management.

Think in other terms

- Going Green Concepts, Application and Sustainable Development.
- SHEQ Management System.

SAFETY, HEALTH, ENVIRONMENT & QUALITY (SHEQ) MANAGEMENT SYSTEMS: INTERNAL AUDITORS TRAINING

The course covers:
- SHEQ Auditing and Audit types.
- SHEQ Scope and Applications.
- ISO Standards for SHEQ practice.
- SHEQ Management Systems for Sustainable Development.
- ISO Certification Process.

2.2.2 The following programmes are certificate programmes run over a period of three months to a year, offered in partnership with various organisations. The programmes are designed for practitioners with technical and supervisory skills, who are interested in significantly advancing their careers in the different disciplines of study to meet their needs. Each programme is specially designed to meet the on-going changing demands of the work place in both private and public sector organisations. They offer practical hands on approach to develop human resources, conveying concepts through a combination of theory, cases, examples and skill building exercises.

MANAGEMENT DEVELOPMENT PROGRAMME

The course covers:
- Information Systems and E-Commerce.
- Strategic Human Capital Management.
- Performance Management.
- Strategic Marketing Management.
- Financial Management and Management Accounting.
- Operations and Project Management.
- Corporate Governance and Business Ethics.
- Strategic Management.
- Leadership and Change Management.
- Nature and Scope of Management.

EXECUTIVE CERTIFICATE IN MICROFINANCE AND ENTREPRENEURSHIP

The course covers:
- Fundamentals of Microfinance.
- Principles of Entrepreneurship.
- Microfinance Lending and Risk Management.
- Financial Analysis and Performance of MFI's and Small Business.

Think in other terms

- Small Business Risk Management.
- Governance and Regulation for Microfinance Institutions.
- Market Research and Marketing of Microfinance Services.
- Strategic Business Planning for MFIs and SMEs.

EXECUTIVE CERTIFICATE IN STRATEGIC MINING FINANCE
The course covers:
- Introduction to Mining and Metallurgy.
- Fundamentals of Financial Management.
- Mineral Resource Management.
- Mineral Project Appraisal and Finance.
- Minerals Market Analysis.
- Strategic Planning in Mining.
- Metal Derivatives and Alternative Investments.
- Due Diligence and Mineral Asset Valuation.

CERTIFICATE IN SYSTEMIC COUNSELLING
The course covers:
- The Counselling Process and Techniques.
- Systemic Counselling.
- Bereavement Counselling.
- Systemic HIV/AIDS Counselling.
- Child Counselling.
- Management of Addictions, Stress and Suicide.
- Marital issues and Domestic Violence.

CERTIFICATE IN PROJECT MANAGEMENT
The course covers:
- Project Planning & Management.
- Microsoft Project Professional.
- Monitoring & Evaluation.
- Statistical Data Analysis (SPSS).

CERTIFICATE IN SECURITY MANAGEMENT
The course covers:
- Theory and Practice of Security.
- Crime, Cyber-Crime and Crime Control.
- Organisational Behaviour and the Business Environment.

Think in other terms

- Security and the Legal Environment.
- Communication and Management of Security Records.
- Principles of Investigations.

CERTIFICATE IN LEADERSHIP AND MANAGEMENT
The course covers:
- Introduction to Effective Leadership.
- Introduction to Effective Management.
- Introduction to Decision Making and Problem Solving.
- Communication and Public Relations.
- Professionalism.
- Introduction to Basic Accounting Principles.

CERTIFICATE IV IN INDIVIDUAL SUPPORT (AGEING AND SUPPORT)
The course covers:
- Support Independence.
- Well- Being Aged Care.
- Home and Community Care.
- Disability.
- Compliant Aged Care Practice.

2.3 CONTEXT SPECIFIC PROGRAMMES that are developed at the behest of organisations and thus tailor made to suit specific organisational needs.

2.3.1 OUTREACH PROGRAMMES
Outreach programmes are a part of the University's corporate social responsibility to the community. These programmes are designed to avail higher education to communities and ordinary people in society. They can be viewed as a way of taking the University to the people to enlarge their horizons and assist them realise their dreams. To this end, the Centre develops and runs extension programmes designed to meet the development needs of local communities, civil society and individuals.

2.3.2 ONLINE LEARNING
The CCE facilitates the provision of online education at NUST and beyond. The Centre has selected online courses on offer, such as the Management Development Programme.

2.3.3 RESEARCH AND CONSULTANCY SERVICES

The CCE is one of several University entities tasked to come up with new products and solutions that contribute to productivity and enterprise for the well-being of society. The portfolio covers the different aspect of industrial and commercial arts, environmental issues and professional management clients, stakeholders and partners who would want scientific investigation carried out.

The Centre undertakes research in continuing and lifelong education, and open and distance learning. It also facilities research in all other disciplines of higher education, particularly to determine how these disciplines can be best delivered via open and distance learning modes.

The Centre also provides consultancy services in open and distance learning and serves as a clearing house for specified consultancy services by the National University of Science and Technology.