FACULTY PROSPECTUS 2007

FACULTY OF SCIENCE

THE UNIVERSITY OF NAMIBIA

NOTE

This Faculty Prospectus is valid for 2007 only. Regulations and curricula for 2006 may be amended. General regulations and information appear in the General Prospectus: information, Regulations and Fees.

Although the information contained in this faculty prospectus has been compiled as accurately as possible, council and senate accept no responsibility for any errors and omissions, which may occur. The University retains the right to amend any regulation or condition without prior notice.

The information is correct up to 30 October 2006.

The fact that particulars of a specific course or field of study have been included in this Faculty Prospectus does not necessarily mean that such course or field of study will be offered in 2007 or any consecutive year.

This Faculty Prospectus must be read in conjunction with the General Prospectus: information, Regulations and Fees.

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FACULTY PREAMBLE

The key mission of the Faculty is to consolidate, teach and disseminate scientific knowledge in order for Namibia to achieve science-led development. Given the past history, which did not encourage and promote effective teaching of science and mathematics, especially in the formerly disadvantaged communities, the Faculty particularly aims at promoting student interest in the learning and teaching of science; and producing good quality science graduates, who will help to build a science culture in society.

The Faculty's principal objective is to promote the development of science, technology, and environmental studies, and to encourage and facilitate research activities, which address the new demands of the national economy.

ACADEMIC YEAR - 2007

FIRST SEMESTER

08 Jan	University opens
29 Jan - 09 February	Registration (Last day for Late Registration: 16 February 2007)
12 February	**Lectures commence for FIRST SEMESTER**
02 April	EASTER BREAK starts
10 April	Lectures resume after Easter Break
01 June	**Lectures end for FIRST SEMESTER**
05 June	First Opportunity Exams commence (Semester I modules)
22 June	First Opportunity Exams end (Semester I modules)
10 July	Second Opportunity Exams commence (Semester I modules)
27 July	Second Opportunity Exams end (Semester I modules)

SECOND SEMESTER

30 July	**Lectures commence for SECOND SEMESTER**
17 September	SPRING BREAK starts
24 September	Lectures resume after Spring Break
09 November	**Lectures end for SECOND SEMESTER**
13 November	First Opportunity Exams commence (Semester II & Year mod)
30 November	First Opportunity Exams end (Semester II & Year modules)
14 December	Academic Year ends & University closes (until 08 Jan 2008)
09 January 2008	Second Opportunity Exams commence (Semester II &Year modules)
26 January 2008	Second Opportunity Exams end (Semester II &Year mod)

(i) GENERAL

Last day for Late Registration (*Late fee payable*) ..... 16 February
Last day for approval of exemption(s) ..... 16 February
Last day for approval of retention of continuous assessment mark ..... 16 February
Last day for approval of module(s) & qualification changes..... 16 February
Last day to submit outstanding documentation..... 31 May
Last day to apply for enrolment cancellation..... 19 October

(ii) CANCELLATIONS

SEMESTER I MODULES

Last day to cancel Semester I modules..... 11 May

SEMESTER II MODULES

Last day to cancel Semester II modules..... 19 October

DOUBLE MODULES

(a double module normally extends over one academic year)
Last day to cancel Double modules..... 19 October

(iii) FINANCE

SEMESTER I MODULES

Last day to cancel with 100 % credit ..... 28 February
Last day to cancel with 50 % credit ..... 30 March

SEMESTER II MODULES

Last day to cancel with 100 % credit ..... 10 August
Last day to cancel with 50 % credit ..... 14 Sept

DOUBLE MODULES

(a double module normally extends over one academic year)
Last day to cancel with 100 % credit ..... 28 February
Last day to cancel with 50 % credit 01 June

PERSONNEL

OFFICE-BEARERS AND ADMINISTRATIVE PERSONNEL

Dean:	Prof E M R Kiremire
Deputy Dean:	Prof G Heimbeck
Faculty Officer:	Ms T Tjipura
Faculty Secretary:	Ms M Matengu-Lizazi
Typist:	Vacant

General enquiries regarding the Faculty of Science and the qualifications offered by the Faculty should be directed to:

Mrs Tekla Tjipura: B.Econ, M. Admin (UNAM)
The Faculty Officer
Faculty of Science
University of Namibia
Private Bag 13301
WINDHOEK
Telephone: ++ -264-61-206-3047
Fax: ++ -264-61-206 3791
E-mail: ttjipura@unam.na

Matters regarding specific subjects and departments should be addressed to the relevant Head of Department.

ACADEMIC PERSONNEL

DEPARTMENT OF BIOLOGY

Head of Department:	Prof GP Kaaya: B.V.M, MSc (Nairobi) PhD (Guelph, Canada)
Professor:	Prof GP Kaaya: B.V.M, MSc (Nairobi) PhD (Guelph, Canada)
Senior Lecturer:	Dr E Maass B.Sc,B.Sc Hons, MSc,PhD (US)
Senior Lecturer:	Dr.J.K.E .Mfune: BSc. BSc. Hons (Malawi) M.Sc, Ph.D (Aberdn,U.K)
Senior Lecturer:	**Dr. I. Mapaure: BSc. BSc. Hons, Msc, Ph.D (Zimbabwe)**
Lecturer:	Dr PM Chimwamurombe BSc. Biochemistry MSc. Biotechnology (UZ) PhD Plant Biotechnology (Univ of Pretoria S.A)
Lecturer:	Mr. B Kaonjua: B.Sc. (State Univ of New York) M.Sc. (University of Brussels)
Lecturer:	Mr A Faul: B.Sc. Hons, MSc (Stellenbosch)
Lecturer:	Mr. V.M Haakuria: BSc. (UNAM), BSc Hons. (Rhodes Univ), MSc. (Wits Univ)
Lecturer:	Dr R Böck: M.Sc. (Saarbrücken / Germany) ,Ph.D (Oklahoma State/USA)
Lecturer:	Ms E.M. Julies: B.Sc. B.Sc. Hons (Rhodes Univ), M.Sc. (Univ of Ghent, Belgium) on study Leave
Lecturer:	Mr. K.C.Chinsembu: BSc.(Zambia), MSc.(Brussels)
Tutor:	Ms C Mukaru BSc. (UNAM)
Laboratory Technician:	Mr. A. Hijarunguru: BSc (US)
Laboratory Technician:	Mr. JD Uzabakiriho: B.Sc , M.Sc. (NUR)
Laboratory Technician:	Ms M. A Thomas: B.Sc. (Humboldt, USA)
Laboratory Technician:	Mr J. S. Namundjanga B.Sc. (UNAM)
Technical Assistant:	Ms. R. Shimwooshili: Med and Lab.Science Cert (Limbe Cameroon)
Mushroom Technologist (Biology/ZERI):	Ms. P. Kandhila-Muandingi BSc. (China)
Cleaner:	Ms. A. Amutenya: Grade. 6
Project Technician:	Mr. A .Hijarunguru:BSc (USA)
Project Technician:	Mr. P. Petrus: Grade 12

DEPARTMENT OF CHEMISTRY

Head of Department:	Dr. M.A.Kandawa–Schulz: M.Sc. Dr.rer.nat. (Rostock)
Associate Professor:	Prof E M R Kiremire: B.Sc. (Hons), University of East Africa, Makerere University College) Ph.D. (University of New Brunswick,Canada)
Senior Lecturer:	Prof S Lu M.Eng (China)
Senior Lecturer:	Vacant
Senior Lecturer:	Dr E F Archibong: PhD.(University of New Brunswick,Canada)
Senior Lecturer:	Dr H R Lotfy: B.Sc, MSc, PhD. (Mansaoura- RPI,USA)
Senior Lecturer:	Dr E Mvula: B.Sc. (UNAM) B.Sc. Hons, M.Sc.(Cape Town),PhD (Max Planck Institute-UNAM)
Lecturer:	Dr M A Kandawa-Schulz: M.Sc. Dr.rer.nat. (Rostock)
Tutor:	Ms T Thomas B.Sc. (UNAM)
Chief Technician:	Mr W Song: B. Eng. (China) South East Univ.
Laboratory Technician:	Ms S Potgieter B.Sc.(Stellenbosch), PGDE(UNAM)
Laboratory Technician:	Ms M Kalili B.Sc. (UNAM)
Laboratory Technician:	Mr T Ndunge: B.Sc. (UNAM)
Laboratory Technician:	Mr R Angula: B.Sc. (UNAM)
Laboratory Technician:	Ms M Nepembe B.Sc (UNAM)
Laboratory Technician:	Mr N Gariseb B.Sc (UNAM)
Laboratory Assistant:	Ms L Katjimune
Staff Development Fellow:	Mr G Uiseb: B.Sc. (UNAM)
Staff Development Fellow:	Ms T Nghaamwa B.Sc (UNAM)
Staff Development Fellow:	Ms R Hans: B.Sc. (UNAM), MSc (UB)
Staff Development Fellow:	Mr ERT Elago: B.Sc. (Durban) PGDE (UNAM) B.Sc.Hons
Staff Development Fellow:	Ms A Shiimi: BSc,(UNAM)
Staff Development Fellow:	Mr E Naomab: B.Sc. MSc. (UNAM)
Staff Development Fellow:	Mr V Uahengo: B.Sc. (UNAM)
Staff Development Fellow:	Ms N Pogori B.Sc (UNAM)
Staff Development Fellow:	Ms G Kahaka: B.Sc. (UNAM)
Assistant Technician:	Vacant

DEPARTMENT OF COMPUTING

Head of Department:	Mr. G.M. Muriithi: BSc (Eng), MSc, PGDipCs (Nairobi, Kenya)
Professor:	Vacant
Senior Lecturer:	Mr. E L Mkusa B.Sc. (Mech Eng) MBA (UDSM) M.Sc. (OR, Lancaster) M.Sc.(IT. Strathclyde)
Lecturer:	Mr. G.M. Muriithi: BSc (Eng), MSc, PGDipCs (Nairobi, Kenya)
Lecturer:	Ms. Kauna Mufeti BSc (UNAM), MSc (Rhodes Univ)
Lecturer:	Mrs. N Suresh: BE (Eng), MTech(Electronics)(Mysore, India)
Lecturer:	
Lecturer:	Mr J J Magenya HND (ENG), (ESSEX, UK), MSc Computer Science (UNAM)
Lecturer:	**Mr Frans David (MSc (China)**
Tutor:	**Mrs F A du Preez NAT Dip Edu , FDE (Com)**
Tutor:	Mr W Kiburu B.Sc. Hons (JKUAT, Kenya)
Tutor:	Mr F Da Silva B.Sc. Eng (HIMEE – Varna, Bulgaria)
Tutor:	Mr E Mwangonde BSc (Computer Science & Demography) Malawi
Laboratory Technician:	Mr. J M Mutonga
Laboratory Technician:	Vacant

DEPARTMENT OF ENGINEERING & TECHNOLOGY

Head of Department:	Prof F. P. L Kavishe BSc. (Eng) (DSM), MSc, DIC, PhD, (London), R. Eng, C.Eng.
Professor:	Prof F. P. L Kavishe BSc. (Eng) (DSM), MSc, DIC, PhD, (London), R. Eng, C.Eng.
Lecturer:	Mr E. Ruhunga: Bsc. Eng, MSc. (Burundi)
Staff Development Fellow:	Mr E. Gelderbloem: BSc. (Eng) WITS

DEPARTMENT OF GEOLOGY

Head of Department:	Dr B.S. Mapani B.Sc. (UNZA), MSc. (Nancy), PhD (Melbourne)
Professor:	Vacant
Senior Lecturer:	Dr F Kamona: BMinSc, MMinSc (UNZA) Dr. rer. nat. Aachen).
Lecturer:	Vacant
Lecturer:	Dr B.S. Mapani: B.Sc. (UNZA), MSc. (Nancy), PhD (Melbourne)
Lecturer:	Vacant
Lecturer: (Part-time):	Dr B Corner: B.Sc. Hons, M.Sc, Ph.D. (Wits)
Lecturer: (Part-time):	Prof. J Kirchner: Vordiplom (Hamburg) PhD. (Innsbruck, Austria)
Laboratory Technician:	J. Kaluwapa: Nat. Dipl (Mech. Eng), Polytechnic of Namibia

DEPARTMENT OF MATHEMATICS

Head of Department:	Mr O Shuungula B.Sc. (UNAM) BSc-Hons (UCT) M.Sc. (UCT)
Professor:	Prof G Heimbeck: Dipl.-Math, Dr.rer.nat, Dr.rer.nat.habil (Würzburg)
Associate Professor:	Dr R K Dubey: BSc (A.U), M.Sc (A.U) B.Ed (P.V) Ph.D ((A.P.S.U)
Senior Lecturer:	Vacant
Senior Lecturer:	Vacant
Lecturer:	Mr O Shuungula B.Sc. (UNAM) BSc-Hons, M.Sc. (UCT)
Lecturer:	Mr M M Mugochi BSc. Hons Mphil (UZ)
Lecturer:	Mr Z Mushaandja: B.Sc. (UNAM) B.Sc.-Hons (UCT) M.Sc. (UCT) (on study leave)
Lecturer:	Mr F Gideon: B.Sc.UNAM), BSc-Hons, MSc (Rhodes Univ)
Assist Lecturer:	Mr D Iiyambo: B.Sc., PGDE (UNAM), BSc-Hons,(UCT)
Tutor:	Mr D Elago: B.Sc. (UNAM) PGDE (UNAM)
Tutor:	Ms C Amakutsi: B.Sc. (UNAM) PGDE (UNAM)
Tutor:	Mr L Komomungondo B.Sc. (UNAM)
Staff Development Fellow:	Mr A Shikongo: B.Sc. (UNAM)

DEPARTMENT OF PHYSICS

Head of Department:	Prof J A Oyedele: B.Sc. (Ife), M.Sc., PhD (Mc Master, Canada)
Professor:	**Prof J A Oyedele: B.Sc. (Ife), M.Sc., PhD (Mc Master, Canada)**
Senior Lecturer:	Dr R Steenkamp: Ph.D. (Potchefstroom)
Senior Lecturer:	Dr S Singh M.Sc. PhD. (India)
Lecturer:	Ms P Dobreva: M.Sc. (Sofia, Bulgaria)
Lecturer:	**Mr X Chen: M.Sc. (Southern China)**
Staff Development Fellow:	Mr. I Davids: B.Sc. (UNAM), BSc. Hons (North West)
Tutor:	Vacant
Laboratory Technician:	Mr S. Sitoka: B.Sc. (UNAM)
Laboratory Technician:	**Mr H C Hoffmann**
Technical Assistant:	Ms F Evaristus
Staff Development Fellow:	Mr. A. Chatu B.Sc. (UNAM)

DEPARTMENT OF STATISTICS

Head of Department:	**Ms N. Nickanor:** B.Sc. (UNAM), PGD (Population Studies – UB), M.A (Population Studies – UB)
Professor:	**Vacant**
Senior Lecturer:	Vacant
Lecturer:	Dr M A E Muller: B.Sc. Hons, (Unisa) , M.Sc. (UOFS), H.E.D. **(Unisa)** PhD. (Univ of Pretoria)
Lecturer:	Mr D.H Hikwumwah: M.Sc. (KENT) MBA (MSM)
Lecturer:	Vacant
Lecturer:	Mr C J Mahindi: BA. (Dar-er Salaam) PGD, M.Phil. (Cairo)
Lecturer:	Ms A Kaduma: B.Sc. Hons (EU), PGDE (UNAM) M.Sc. (IUP)
Lecturer:	Ms N Indongo: B.Sc. (UNAM), MSc. (Soton, UK)
Lecturer:	Ms N. Nickanor: B.Sc. (UNAM), PGD (Population Studies – UB), M.A (Population Studies – UB)
Staff Development Fellow:	Mr I Neema: B.Sc. (UNAM), M.Sc. (WPI, USA)
Staff Development Fellow:	Mr P Iyambo: B.Sc. (UNAM)

A. REGULATIONS

The regulations outlined here should be read in conjunction with the General Prospectus: Information, Regulations and Fees.

The following sections A to D explain the detailed structure of the degree programmes offered by the Faculty.

A. 1. COURSES OF STUDY

A. 1. 1. DEGREES OFFERED

The Faculty awards the following degrees:

Bachelor of Science	(11BSCI)
Bachelor of Science (Special in Population and Development)	(11BSCP)
Bachelor of Science (Engineering)	(11BSCE)
MSc. Biodiversity Management & Research	(11MSCB)
MSC. Information Technology (IT)	(11MSCI)
MSc Chemistry	(11MSCC)
Ph.D.	

B. BACHELOR OF SCIENCE DEGREE (=11BSCI)

B. 1. ADMISSION REQUIREMENTS

To register in a B.Sc. course of study, a candidate must hold a valid IGCSE or HIGCSE Certificate (with passes in at least five subjects), which add up to 25 points, calculated using the specified UNAM scale. Equivalent qualifications are acceptable.

In addition to the above, admission to the B.Sc. course of study requires at least a symbol C on IGCSE or equivalent qualification in Mathematics and English.

Students can also gain admission to degree programmes in the Faculty through Mature Age entry as per UNAM's Mature Age Entry regulations contained in the "General Prospectus: Information, Regulations and Fees".

Meeting the minimum admission requirements does not necessarily ensure admission, this depends on places available.

B. 2. DURATION OF STUDY

The Bachelor of Science degree programmes cannot be completed in less than four (4) years. The B.Sc. degree must be completed within six (6) years of full-time study.

B.3. EXEMPTIONS

UNAM will give exemptions for equivalent courses taken at other tertiary institutions but the exemptions shall not exceed 50% of the program in the Bachelor of Science. For Detailed Exemption rules See The General Prospectus, Information, Regulations & Fees book.

B. 4. CURRICULUM COMPILATION

The curriculum for the B.Sc. degree is compiled as follows:

Year 1: UNAM CORE
UCE 3119 English Communication & Study Skills
UCA 3119 English Academic Purposes
UCC 3109 Computer Literacy

UCI 3109 Contemporary Social Issues

FACULTY CORE
MTS3101 Mathematics 1A
MTS3112 Mathematics 1B or MTS3132 Foundation Mathematics
STS3101 Statistics 1A

[1]Any three (3) half modules offered on 1st year level in the first semester (or equivalence)
[1]Any three (3) full first year level modules offered on 1st year level in the second semester (or equivalence)

Year 2: Any eight (8) second year level modules (or equivalents) [2]

Year 3: Any eight (8) third year level modules (or equivalents) [2]

Year 4: Any six (6) to eight (8) fourth year level modules (or equivalents) [2]
Depending on Departmental regulations. Pertaining to the chosen majors.

When compiling a curriculum, students must take their majors and all pre-requisites and co-requisites into account.

B. 4. 1. MAJORS

The B.Sc. degree comprises of two majors, chosen from the list below:
Environmental Biology
Chemistry
Computer Science
* Economics
* Geography
Geology
Mathematics
Molecular and Physiological Biology
Physics
*Psychology
Statistics

* These majors are not offered by the Faculty of Science – students must take at least one major offered in the Faculty of Science.

B. 4. 2. UNIVERSITY CORE CURRICULUM

UCE3119 ENGLISH COMMUNICATION & STUDY SKILLS	4L/week

[1] At least two (2) of the three (3) half modules in each semester must be offered by the Faculty of Science

[2] Module = 14 weeks at 4 lecture periods / week

[3] Half module + 14 Weeks at 2 lecture per /week

[4]At least 50% of these must be offered by the Faculty of Science.

Contact time: 56 hours theory (4L / week)
Assessment: Continuous 60% Examination 40% (1 x 2 hour exam)
Pre-requisite: C in IGCSE English
Content: Reading: the role of the reader; the purpose / aim of the reading; different reading strategies: skimming and scanning; reading for pleasure; reading for content; text mapping; finding unknown words using contextual clues; identifying main and supporting sentences in a text; the role of audience; differentiating different register in reading; introducing high order reading skills; reading and writing as combined skills. Writing: the role and purpose of writing; identifying different kinds of writing; writing different sentence types: simple, complex, interrogatives; using cohesion devices: conjunctions and linking words; referencing: anaphoric and cataphoric; writing clear and coherent sentences and paragraphs; word-building strategies; the role of register; paragraph structure; writing of topic and supporting sentences; main aspects of grammar in context: tenses, articles, pronouns, active and passive voice, adjectives and adverbs. Speaking: conversation, presentation and general speaking skills; small group discussions. Listening: the role and purpose of listening; listening to general information; listening and note-taking during a lecture; identifying main points; deducing meaning from context. Study Skills: dictionary skills; library science information skills (OPAC).

UCA3119 ENGLISH FOR ACADEMIC PURPOSES 4L/week

Contact time: 56 hours theory (4L / week)
Assessment: Continuous 60% Examination 40% (1 x 2 hour exam)
Pre-requisite: UCE3119
Content: Reading: structure of paragraphs; using cohesive devises to write coherent paragraphs; expressing opinion in paragraphs; writing different types of paragraphs: argumentative, discursive, explanatory; analysing and explaining graphic; paraphrasing; summarising; the process approach; academic writing (essay); analysing of essay titles and instruction words; note-taking for essays; planning essays; referencing and plagiarism; academic register; writing introduction and conclusions; selecting information, organising ideas, drafting, revising and editing essays. Writing: differentiating between facts and opinions in text; understanding and reacting to the writer's view in text; reading methods: overview, close reading, critical reading; critical reading skills; reading strategies for different genres; identifying main and supporting arguments in text; synthesizing information; reading for comprehension; inferring meaning from text. Listening: note-taking techniques during lectures. Speaking: academic speaking; effective presentation skills; preparing for speaking.

UCC3109 COMPUTER LITERACY 2L/week

Contact time: 28 weeks
Assessment: Continuous 100%
Pre-requisite: none
Content: The practical use of computers - Windows, Word processing, Spreadsheets, Databases and other common software.

UCI3109 CONTEMPORARY SOCIAL ISSUES 2L/week

Contact time: 28 hours (2L / week)
Assessment: Continuous 100%
Pre-requisite: none
Aims and Objectives: To equip students with essential social skills in the areas of ethics, gender and HIV/AIDS.
Content: The course will cover three topics of equal length, namely Orientation in Ethics, Introduction to Gender Issues and HIV/AIDS. Orientation in Ethics: Values, standards and attributes; roots of values, standards and attitudes; importance to agree on core values; "golden rule"(every human must be treated humanely); towards a culture of non-violence and respect for life; towards a culture of solidarity and just economic order; towards a culture of tolerance and life in truthfulness; towards a culture of equal rights and partnership; Plagiarism and academic honesty Introduction to gender issues: social perspectives and concepts relating to gender studies; basic theories of gender relations; historical/colonial aspects of gender relations; gender relations in contemporary Namibian society; negative aspects of gender relations; examining approaches to gender equality HIV/AIDS: Background status of HIV/AIDS - national and international, physiological approach of HIV/AIDS, stages, modes of transmission, cause and symptoms of HIV/AIDS, including psycho-social causes for the spread of HIV/AIDS; HIV testing and pre-and post-counselling - diagnosing HIV infection, HIV antibody test, HIV infection, counselling; Primary prevention of HIV/AIDS and opportunistic infections - promoting safe sex protocols, reduce risk behaviors, promoting a healthy life style; primary care for symptomatic and a symptomatic HIV disease and AIDS - principle of

management, anti-retroviral therapy, treatment of opportunistic infections, including nutritional care; Namibian HIV/AIDS Charter of rights; HIV/AIDS support systems on campus and within the community.

B. 4. 3. FACULTY CORE CURRICULUM

MTS 3101: MATHEMATICS 1 A (2 L/Week)

Contact time: 28 hours
1 hr practical per week: 14 hours
1 two-hour paper
Prerequisite: IGCSE Mathematics or special remedial course
This course is to be taken by all first year science students
Content: Sets: Notations and diagrams to describe sets, subsets, supersets, equality of sets, empty sets, singletons, intersection, union, disjoint sets, difference of two sets, complement. Simplification and expansion of algebraic expressions. The absolute value, triangle inequality, linear equations, linear inequalities, quadratic equations, quadratic inequalities. Points and lines in a plane: the distance formula, parallel and perpendicular lines, circles and tangent lines.

MTS 3112: MATHEMATICS 1B (4L/Week)

Contact time: 56 hours
1 hour practical per week: 14 hours
1 three-hour paper
Prerequisite: IGCSE Mathematics or special remedial course
Co-requisite: MTS3101
Course for students who do not major in mathematics.
Content: Functions and their graphs, Euler's number and natural logarithm, the exponential and logarithmic function. Sequences and series with application to life sciences. The binomial formula, binomial expansion and application, small systems of linear equations. 2×2 and 3×3 matrices. Trigonometry, differentiation, applications of the derivative: maxima, minima, increasing and decreasing functions.
Integration.

MTS3132: FOUNDATION MATHEMATICS (4L/week)

Contact time: 56 hours
1 hour practical per week: 14 hours
1 three-hour paper
Prerequisite: IGCSE Mathematics
Co-requisite: MTS3101
Content: Functions: domain, codomain, range, image, preimage, one-to-one functions, onto functions, composite function, inverse of a function, even and odd functions, increasing and decreasing functions.
Euler's number and natural logarithm, polynomials, remainder and factor theorem, partial fractions,
Trigonometry; limit of a function, Newton quotient, derivative of a function, rules of differentiation, antiderivatives, area under a graph, the definite integral. Introduction to Matrices and Systems of Linear Equations: Matrix algebra, determinants, Inverses, Solutions of systems of linear equations by Cramer's and Gauss Elimination.

STS3101 STATISTICS 1A 2L Per Week

14 weeks
1 x 2 hours exam paper
Pre-requisite: At least a credit in IGCSE Mathematics or at least a symbol 3 in HIGCSE Mathematics
Assessment: Continuous: 40%, Examination: 60%
Content: What is Statistics and who is the Statistician? Definition of the word 'data' and 'information': quantitative versus categorical, discrete versus continuous data. Variables: qualitative/ quantitative. Sources of data: primary versus secondary sources, population versus sample. Sampling techniques: why sample? Probability versus non-probability sampling methods; Simple Random Sampling, Stratified Sampling, Systematic Sampling, Cluster Sampling; use of random numbers tables. Types of measurement: nominal, ordinal, interval and ratio scales. Presentation of data: tabular forms- frequency tables, graphical methods- histograms, pie charts, compound bar chart, stem and leaf plot, box-and-whisker plot, frequency polygon, etc. Measures of Central tendencies: Mean, median and mode; Measures of dispersion- standard deviation and variance, inter-quartile range; skew ness and kurtosis, identifying outliers; sigma notation.

B. 5. EXAMINATION REGULATIONS

For detailed examination and promotion rules see the General Prospectus: Information, Regulations and Fees. A candidate will be eligible to write the examination if he/she has obtained the required continuous assessment mark of 40%. Examination will be administered at the end of each semester

B. 6. RE-REGISTRATION RULES

B.6.1. MINIMUM NUMBER OF MODULES1 TO BE PASSED FOR RE-REGISTRATION IN THE FACULTY

Take Note:

4 (of 10) modules after 1st year of registration. 40% of the curriculum. At least 1 of these modules should be non-core

9 (of 18) modules after 2nd year of registration. 50% of the curriculum including all UNAM core modules (3)

16 (of 26) modules after 3rd year of registration. 62% of the curriculum including all 1st year modules

24 (of 32 - 34) modules after 4th year of registration. 71-75% of the curriculum including all 2nd year modules

PLEASE NOTE: IF YOU DO NOT MEET THE ABOVE MENTIONED CRITERIA, YOU WILL NOT BE ALLOWED TO CONTINUE YOUR STUDIES IN THE FACULTY OF SCIENCE

[1]Module= 14 weeks at least 4 lecture periods /week

B. 6. 2. PASS REQUIREMENTS

B. 6. 2. 1. ACADEMIC ADVANCEMENT RULES

1st → 2nd year

At least 3 of the modules of the prescribed 1st year curriculum (excluding the UNAM core modules)

- a student who has passed only 3 of 1st year content modules will be allowed to register for not more than ½ of the prescribed 2nd year level modules, but will still be regarded as a 2nd year student
- a student who has passed less than 3 of the 1st year content modules will not be allowed to register for modules on 2nd year level, and will remain a 1st year student

2nd → 3rd year

All ten 1st year modules (including the UNAM core modules) + at least 4 (i.e. ½) of the prescribed 2nd year curriculum

- a student who has passed only 4 of the 2nd year modules will be allowed to register for not more than ½ of the prescribed 3rd year level modules, but will still be regarded as a 3rd year student
- a student who has passed less than 4 of the 2nd year modules will not be allowed to register for modules on 3rd year level, and will remain a 2nd year student

3rd → final year

All eight 2nd year modules + 6 (i.e. ¾) of the prescribed 3rd year curriculum, provided that the outstanding 3rd year modules are not pre-requisites for any of the 4th year modules, i.e. a student can only be regarded as a final year student if such a student is able to complete all outstanding modules in one year

- a student who has passed only 5 of the 3rd year modules will be allowed to register for not more than ½ of the prescribed 4th year level modules, and will thus be regarded as a non-final year student
- a student who has passed less than 5 of the 3rd year modules will not be allowed to register for modules on 4th year level, and will remain a 3rd year student

B. 6. 2.2. MAXIMUM NUMBER OF MODULES PER YEAR

No student will be allowed to register for more than 10 modules per year

B. 6.2.3. PRACTICALS

Attendance of practical classes is compulsory.

B. 7. MODULE RESTRICTIONS

A student will be admitted to a specific module only if he/she meets the requirements for the particular module. The UNAM CORE, as well as STS3101 Statistics 1A, MTS3101 Mathematics 1A and either MTS3112 Mathematics 1B or MTS3132 Foundation Mathematics are compulsory for all first year B.Sc. Degree students, including all students from other Faculties who wish to major in a subject offered by the Faculty of Science.

B. 8. COURSES: CODES, RESTRICTIONS, EQUIVALENTS AND CONTENTS

B. 8.1. BIOLOGY DEPARTMENT

DEPARTMENT OF BIOLOGY (OFFERS TWO MAJORS)

DEPARTMENTAL REGULATIONS

Compilation of the CA mark

Full modules without a practical exam and without an attached field trip:
Theory (not less than 2 tests & 1 assignment) 50%
Practicals (not less than 10 marked assignments) 50%

Half modules without a practical exam and without an attached field trip:
Theory (not less than 1 test & 1 assignment) 50%

Practicals (not less than 5 marked assignments) 50%

Full modules with a practical exam and without an attached field trip:
Theory (not less than 2 tests & 1 assignment) 60%
Practicals (not less than 10 marked assignments) 40%

Full modules without a practical exam and with an attached field trip:
Theory (not less than 2 tests & 1 assignment) 35% field trip 35%
Practicals (not less than 5 marked assignments) 30%

Unless otherwise indicated, the relationship between the CA mark and the Examination mark is 40:60.

B. 8.1.1. ENVIRONMENTAL BIOLOGY MAJOR

Students opting for a major in Environmental Biology should take all of the following modules:

FIRST YEAR MODULES

BLG3101 BIOLOGY 1A — 2L+1PS/ week

Contact time: 28 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 1 test and 1 assignment): 50%
Practicals (not less than 10 marked assignments): 50%
Exam 1 x 2hr theory paper
Pre-requisite: IGCSE Biology
Equivalent: (BLG3101 + BLG3121) = BIO3100 General Biology
Content: The first part of the course will look at basic laboratory equipment used in Biology and safety procedures. Basic techniques in Biology such as microscopy, drawing, the scientific process, writing of scientific reports etc. will be covered. The second part of the course will consist of cell biology: prokaryotic and eukaryotic cells, ultrastructure of plant and animal cells; cell organelles and their functions; cellular transport; cellular reproduction and the cell cycle. The course will be concluded with an introduction to genetics: basic principles; reproduction as the basis of heredity; principles of inheritance; Mendelian theory; chromosomes and chromosomes variations; structure and mapping; linkage and cross-over.

BLG3112 BIOLOGY 1B — 2L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 60%
Practicals (not less than 10 marked assignments) 40%
Exam 1 x 3 hr theory paper 70% 1 x 1 hr practical exam 30%
Pre-requisite: IGSCE Biology
Equivalent: (BLG3101 + BLG3112) = BIO3100 General Biology
Content: This course is organized around five themes, namely diversity and classification of organisms, organisation and maintenance of the organism, physiology, development of the organism and continuity of life, relationships of organisms with one another and their Environment. While special emphasis is placed on the Plant and Animal Kingdoms, including the human, aspects of bacteriology and virology are also discussed. Students will be introduced to broad ecological, microbiological, molecular and physiological principles which will be expanded in later years. Concepts such as phylogeny of living organisms and identification of species relevant to Namibia will be carried through the course. Each theme will be supplemented with appropriate weekly practical sessions in the laboratory and the field, with both microscope and investigative experimental work being covered.

SECOND YEAR MODULES

BLG3211 PLANT BIOLOGY 4L+1PS/ week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 60%
Practicals (not less than 10 marked assignments) 40%
Exam 1 x 3 hr theory paper 70% 1 x1 hr practical exam 30%
Pre-requisite: BLG3101 Biology 1A and BLG3112 Biology 1B; OR HIGSCE Biology 1,2,3
Equivalent: BIO 3211 Functional Plant Biology
Content: This course starts with an introduction to systems of classification, including the five kingdom and the three domein systems. It then considers the characteristics and life cycles of the following important algae and plant groups: Chlorophyta, Phaeophyta, Rhodophyta, Chrysophyta, Euglenophyta, Pyrophyta, Cryptophyta, Bryophytes, Mosses (liverworts & hornworts), Lycopodophyta, Equisetophyta, Pteridophyta, Gingkophyta, Cycadophyta, Pinophyta, Gnetophyta, and the angiosperms. The basic anatomy of the angiosperm stem, root and leaves as well as morphological adaptations of these organs are also discussed.

BLG3202 CELL AND MOLECULAR BIOLOGY 2L+ ½ PS/week

Contact time: 28 hours
Attached time: 21 hours
Assessment: CA Theory (not less than 2 tests &1 assignment) 60%
Practicals (not less than 10 marked assignments) 40%
Exam 1 x 3 hr theory paper 70% 1 x1 hr practical exam 30%
Pre-requisite: BLG3101 Biology 1A and BLG3112 Biology 1B; OR HIGSCE Biology 1,2,3
Equivalent: BIO 3213 Cell and Molecular Biology
Content: An introduction to the chemical basis of cellular processes: important elements, compounds and molecules as well as chemical bonds and their importance and roles in biochemical reactions are being looked at. This leads to the study of macromolecules such as proteins, enzymes and nucleic acids and their roles in cellular organization. This unit also examines the organization and control of genetic information in the production of proteins. The organization of the chloroplast and mitochondrion and their principal metabolic pathways are also reviewed.

EBL3231 INTRODUCTION TO ECOLOGY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 1 tests & 1 assignment) 50%
Practicals (not less than 5 marked assignments) 50%
Exam: 1 x 3 hr theory paper
Pre-requisite: BLG3101 Biology 1A and BLG3112 Biology 1B; OR HIGSCE Biology 1,2,3
Equivalent: BIO 3231 Introduction to Ecology
Content: Introducing Ecology: definition, scope, levels, and development of Ecology and Ecological studies Adaptation: meaning, tolerance of biotic organisms to varying abiotic Environments, homeostasis. Climate: solar radiation, effects of rotation on climate, regional climates, microclimates, climate and vegetation. Water balance: plant and animal responses to moisture. Thermal balance: temperature and metabolism, plant and animal responses to temperature, temperature and distribution of biotic organisms. Light and biological cycles: plant adaptations to light intensity, photoperiodism seasonality. Soils: soil genesis, soil development, classification and mapping.

EBL3222 FIELD BIOLOGY 2L + ½PS /week

Contact time: 28 hours
Attached time: 21 hours
Assessment: CA: Exam = 50:50
CA Practical tests (not less than 5 marked assignments)
Exam 1 x 2 hr practical exam
Pre-requisite: none
Equivalent: none
Content: A largely field based course including basic principles in field observations, the identification of common plant and insect species, simple dichotomous keys and their uses.

THIRD YEAR MODULES

EBL3311 POPULATION ECOLOGY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 50%
Practicals (not less than10 marked assignments) 50%
Exam 1 x 3 hrs theory paper
Pre-requisite: EBL3231 Introduction to Ecology
Equivalent: none
Content: Properties of populations: defining populations, population density, population dispersion, age structure, sex ratios, mortality and natality. Population growth and regulation: rate of increase, population growth, density-dependent population regulation, density-independent influences, population fluctuations and cycles, key factor analysis, extinction. Intraspecific competition: density and stress, dispersal, social interactions Life history patterns: patterns of reproduction, mating systems, sexual reproduction, reproductive effort, gender allocation, r – and k – selection, habitat selection. Population genetics: genetic variation, natural selection, interbreeding, genetic drift. Interspecific competition: classic competition theory, resource partitioning, differential resource utilization, The niche. Predation: models of predation, predator-prey systems, functional response to/of predation, numerical response, foraging theory. Herbivore-carnivore systems: prey defence, predator offence, cannibalism, predator-prey cycles, regulation. Mutualism: coevolution, types of mutualism, pollination, seed dispersal, origins of mutualism, population effects. Pest control: definition of pests, theory of biological control, genetic control, integrated pest management. Parasitism: characteristics of parasites, hosts as habitats, life cycles, host responses Parasitism: population dynamics, evolutionary responses, social parasitism.

EBL3331 FRESHWATER AND MARINE ECOLOGY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 50%
Practicals (not less than 10 marked assignments) 50%
Exam 1 x 3 hrs theory paper
Pre-requisite: EBL3231 Introduction to Ecology
Equivalent: ENB3322 Aquatic Ecology & ENB3421 Freshwater and Marine Biology
Content: A review of the principle features of freshwater and marine Environments from a global and Namibian perspective. Examination of organic production in the sea and the energetics of a marine Environment. The ecology of lentic systems (lakes, dams and ponds) and the ecology of lotic systems (rivers and streams). It then reviews the major groups of aquatic plants and animals from freshwater and marine Environments. Practical aspects of artisanal and commercial fishing as well as the principles of freshwater aquaculture and mariculture are also discussed. This course includes short visits to major freshwater bodies and a field trip to the coast of Namibia.

EBL3312 ECOSYSTEM ECOLOGY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 35%
Field trip 35% Practicals (not less than 5 marked assignments) 30%
Exam 1 x 3 hrs theory paper
Pre-requisite: EBL3231 Introduction to Ecology
Equivalent: ENB3312 Community Ecology & ENB3313 Arid Zone Ecology
Content: Essential processes of ecological systems; Nature of ecosystem energetics: primary production-environmental factors facilitating and/or limiting primary production; secondary production-environmental factors facilitating and/or limiting secondary production; food chains and food webs-definitions, hypotheses and trophic levels; models of energy flow in ecosystem energetics; biogeochemical cycles: Oxygen cycle, carbon cycle, nitrogen cycle, phosphorous cycle, sulphur cycle; ecosystems and biomes: grassland, tropical savannah, desert, tropical forests; Namibian ecosystems and diversity of life within – desert, nama karoo, karoo, savannah. Arid environments: characteristics- soil, water, wind storms, sand storms, rainfall, temperature, dew; adaptation of living organisms to arid environments- plants, vertebrate and invertebrate animals. Desertification: definition, proximate and ultimate causes, effects, prevention. Deforestation: definition, causes, effects. Communities: definition, classification, physical structure, biological structure; edge communities, Island communities, community population interaction, community patterns in space and time. Disturbance: characteristics, sources, effects on nutrient cycling, animal response to disturbance,

disturbance and community stability. Succession: definition, descriptive approach, models, climax, fluctuations, changes in ecosystem attributes, time and direction, succession and animal life, degradative succession.

EBL3322 CONSERVATION BIOLOGY & BIODIVERSITY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 35%
Field trip 35%
Practicals (not less than 5 marked assignments) 30%
Exam 1 x 3 hrs theory paper 100%
Co-requisite: EBL3312 Ecosystem Ecology and EBL3311 Population Ecology
Equivalent: ENB3321 Conservation Biology
Content: Concept of biodiversity conservation: definitions of biodiversity and conservation; Global patterns of biodiversity; distribution of biodiversity- emphasis on Namibia. Value of Biodiversity: direct value- medicinal value, agricultural value, consumptive value; indirect value- biogeochemical cycles, waste disposal, provision of fresh water, prevention of soil erosion, regulation of climate, ecotourism. Causes of extinction: habitat loss; alien species; pollution-acid deposition, eutrophication, oil pollution, ozone depletion, organic chemicals, radioactive wastes; overexploitation. Conservation of biodiversity: species by species conservation-keystone species, metapopulations; habitat conservation- biodiversity hotspots, wilderness areas, protected ecosystems- national parks/reserves, wetlands, reserve design; landscape dynamics; computer analysis – gap analysis, population viability analysis. Habitat restoration: Restoration Ecology, restoration plan. Captive Breeding: definition, genetic problems with small populations, fostering, reintroduction of captive-bred animals. Biodiversity conservation agreements: national, international, United Nations conventions and agreements on conservation of biodiversity and protected areas

FOURTH YEAR MODULES

BLG3410 PROJECT & ADVANCED SKILLS IN BIOLOGY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA 100%
Pre-requisite: STS3211 Statistics for Life Sciences I and STS3212 Statistics for Life Sciences II
Equivalent: BIO3410 Final year independent study project
Content: The final year project will start at the beginning of the first term and finish by the tenth week of the second term. Each student will have their own project title. Students will submit a written report and will also present their work as an oral presentation. The completed report must have the approval of the supervisor before it can be submitted for examination. Each written report will be marked and moderated externally. Project titles will be supplied by all staff at the beginning of each year. Special skills: These are techniques and skills that the students will find useful in their projects as well as in their future careers in biology. Skills included will be: Scientific communication, Powerpoint presentations, photography, advanced microscopy.

EBL3411 BIOGEOGRAPHY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 50%
Practicals (not less than 10 marked assignments) 50%
Exam 1 x 3 hrs theory paper
Pre-requisite: EBL3231 Introduction to Ecology
Equivalent: ENB3411 Biogeography
Content: Biogeography: definition, relationship with other sciences, philosophy and basic principals, brief history. Limits of species distributions: ecological niche, relationship between abundance and distribution, physicallimiting factors, limitation by biotic interactions, adaptation and gene flow. Past changes in the physical geography of the earth: geologic time scale, continental drift model, continents of the Paleozoic and early past changes in the physical geography of the earth: breakup of Gondwanaland, paleoclimates and paleocirculations. Mesozoic. Speciation and extinctions: speciation, adaptive radiation, extinction, species selection, carbon dating fossil records. Mechanisms of biotic movement, nature of barriers to biotic movement, establishing a colony, dispersal routes. Dispersal: dispersal Endemism, Provincialism, Disjunction: endemism – cosmopolitanism, types of endemics; provincialism – terrestrial biogeographic regions, biogeographic lines, classifying islands, aquatic regions and provinces, quantifying similarity among

biotas; Disjunction- disjunctions defined, causes. Distribution patterns of terrestrial animals: abilities of land creatures to cross water barriers amphibians, reptiles, mammals. Distribution patterns of flying animals: bird distribution, bats, insects. Distribution patterns of plants: factors limiting growth and reproductive success of plants, regional endemism and patterns of speciation in plants, distribution patterns of non-vascular plants.

EBL3412 MANAGEMENT OF NATURAL RESOURCES 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 35%
Field trip 35%
Practicals (not less than 5 marked assignments) 30%
Exam 1 x 3 hrs theory paper
Pre-requisite: EBL3311 Population Ecology and EBL3312 Ecosystem Ecology and EBL3332 Conservation & Biology & Biodiversity
Equivalent: ENB3419 Management of Natural Resources
Content: Definitions of management, sustainable management, and natural resources; types of natural resources: - stock (non-renewable) resources, flow (renewable resources); objectives of natural resource management. Measures of stock availability: resource base, proven reserves, conditional reserves, hypothetical resources, speculative resources, ultimately recoverable resources. Measures of flow resources: maximum resource potential, sustainable capacity, absorptive capacity, carrying capacity. History of natural resource management in Namibia. Different approaches to natural resource management: conservancy model, campfire, community based natural resource management, adaptive natural resource management. Traditional ecological knowledge in natural resource management: plants, game, fish, insects, water, soil. Environmental Impact Assessment (EIA): Origins, procedures, problem, impact identification, impact evaluation, impact comparison. Natural resource accounting and economic valuation: cost-benefit analysis, multi-objective cost benefit analysis, identifying cost-benefit flows- problem of selection bias, calculating material costs and benefits, placing money values on non-market goods. Stakeholders in natural resource management: grassroots (community level), citizen action (public sector), NGO sector, Government sector. Aquatic resources: management of commercial and sporting fish, seals, shellfish, rock lobsters, seaweed stocks; stock selection, breeding, handling, and processing; population modeling; marine pollution, protection of coastal waters. Terrestrial resources: Management of game for tourism and harvest; manipulation of animal numbers; domesticated indigenous animals and their management. Communities and protected areas: the biosphere reserve concept- rationale, set-up, application, innovations. Integrated Environmental Management: objectives, procedures, application.

EBL3401 TAXONOMY AND IDENTIFICATION 2L + ½PS /week

Contact time: 28 hours
Attached time: 21 hours
Assessment: CA Theory (not less than 1 test and 1 assignment) 50%
Practicals (not less than 5 marked assignments) 50%
Exam 1 x 2 hrs theory paper
Pre-requisite: EBL3222 Field Biology
Equivalent: ENB3311 Biological Systematics
Content: Principles of taxonomy; History of taxonomy; Nomenclature; Cladistics; Taxonomic keys and their uses; Identification of important plant, insect, fish etc. species; Herbarium and museum collections and their maintenance.

EBL3402 WASTE MANAGEMENT 2L + ½PS /week

Contact time: 28 hours
Attached time: 21 hours
Assessment: CA Theory (not less than 1 test and 1 assignment) 50%
Practicals (not less than 5 marked assignments) 50%
Exam 1 x 2 hrs theory paper
Pre-requisite: none
Equivalent: none
Content: Early concepts of waste management; modern trends / integrated waste management – reduce (returnable vs. non-returnable bottles, other measures), reuse, recycle (municipal recycling, paper recycling, plastics recycling); Solid waste management: on site disposal, composting, incineration, open dumps, sanitary landfills (leachate, site selection, monitoring pollution, how pollutants enter the Environment, legislation); Hazardous chemical waste management: uncontrolled sites, responsible management, secure

landfill, land application, surface impoundment, deep well disposal; Alternatives to land disposal of hazardous waste – source reduction, recycling and resource recovery, treatment, incineration; Ocean dumping – ocean dumping; the conflict; alternatives to ocean dumping.

B. 8.1.2. MOLECULAR AND PHYSIOLOGICAL BIOLOGY MAJOR

Students opting for a major in Molecular and Physiological Biology should take all of the following modules:

FIRST YEAR MODULES

BLG3101 BIOLOGY 1A — 2L+1PS/ week

Contact time: 28 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 1 test and 1 assignment) 50%
Practicals (not less than 10 marked assignments) 50%
Exam 1 x 2 hrs theory paper
Pre-requisite: IGCSE Biology
Equivalent: (BLG3101 + BLG3121) = BIO3100 General Biology
Content: The first part of the course will look at basic laboratory equipment used in Biology and safety procedures. Basic techniques in Biology such as microscopy, drawing, the scientific process, writing of scientific reports etc. will be covered. The second part of the course will consist of cell biology: prokaryotic and eukaryotic cells, ultrastructure of plant and animal cells; cell organelles and their functions; cellular transport; cellular reproduction and the cell cycle. The course will be concluded with an introduction to genetics: basic principles; reproduction as the basis of heredity; principles of inheritance; Mendelian theory; chromosomes and chromosomes variations; structure and mapping; linkage and cross-over.

BLG3112 BIOLOGY 1B — 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 60%
Practicals (not less than 10 marked assignments) 40%
Exam 1 x 3 hrs theory paper 70%
1 x 1 hr practical exam 30%
Pre-requisite: IGSCE Biology
Equivalent: (BLG3101 + BLG3121) = BIO3100 General Biology
Content: This course is organized around five themes, namely diversity and classification of organisms, organisation and maintenance of the organism, physiology, development of the organism and continuity of life, relationships of organisms with one another and their Environment. While special emphasis is placed on the Plant and Animal Kingdoms, including the human, aspects of bacteriology and virology are also discussed. Students will be introduced to broad ecological, microbiological, molecular and physiological principles which will be expanded in later years. Concepts such as phylogeny of living organisms and identification of species relevant to Namibia will be carried through the course. Each theme will be supplemented with appropriate weekly practical sessions in the laboratory and the field, with both microscope and investigative experimental work being covered.

SECOND YEAR MODULES

BLG3211 PLANT BIOLOGY — 4L+PS/ week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 60%
Practicals (not less than 10 marked assignments) 40%
Exam 1 x 3 hrs theory paper 70%
1 x 1 hr practical exam 30%
Pre-requisite: BLG3101 Biology 1A and BLG3112 Biology 1B; OR HIGSCE Biology 1,2,3
Equivalent: BIO 3211 Functional Plant Biology
Content: This course starts with an introduction to systems of classification, including the five kingdom and the three domein systems. It then considers the characteristics and life cycles of the following important algae and plant groups: Chlorophyta, Phaeophyta, Rhodophyta, Chrysophyta, Euglenophyta, Pyrophyta,

Cryptophyta, Bryophytes, Mosses (liverworts & hornworts), Lycopodophyta, Equisetophyta, Pteridophyta, Gingkophyta, Cycadophyta, Pinophyta, Gnetophyta, and the angiosperms. The basic anatomy of the angiosperm stem, root and leaves as well as morphological adaptations of these organs are also discussed.

BLG3212 ANIMAL BIOLOGY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 60%
Practicals (not less than10 marked assignments) 40%
Exam 1 x 3 hr theory paper 70% 1 x 1 hrs practical exam 30%
Pre-requisite: BLG3101 Biology 1A and BLG3112 Biology 1B; OR HIGSCE Biology 1,2,3
Equivalent: BIO3212 Functional Animal Biology
Content: Introduction to Animal Biology will deal with the classification of animals. The course will then concentrate on the trend of the Phylogeny of animal evolution and its structure, diversification and functions. This will reinforce the understanding of Phylogeny. The evolutionary trends of each phylum will be discussed from the primitive to the most advanced animals. In addition to Animal Biology, students will have a brief introduction into the classification and the structures of Bacteria.

BLG3202 CELL AND MOLECULAR BIOLOGY 2L+ ½ PS/week

Contact time: 28 hours
Attached time: 21 hours
Assessment: CA Theory (not less than 2 tests &1 assignment) 60%
Practicals (not less than 10 marked assignments) 40%
Exam 1 x 3 hrs theory paper 70% 1 x 1 hr practical exam 30%
Pre-requisite: BLG3101 Biology 1A and BLG3112 Biology 1B; OR HIGSCE Biology 1,2,3
Equivalent: BIO 3213 Cell and Molecular Biology
Content: An introduction to the chemical basis of cellular processes: important elements, compounds and molecules as well as chemical bonds and their importance and roles in biochemical reactions are being looked at. This leads to the study of macromolecules such as proteins, enzymes and nucleic acids and their roles in cellular organization. This unit also examines the organization and control of genetic information in the production of proteins. The organization of the chloroplast and mitochondrion and their principal metabolic pathways are also reviewed.

MBL3231 INTRODUCTION TO MICROBIOLOGY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 1 tests & 1 assignment) 50%
Practicals (not less than 5 marked assignments) 50%
Exam 1 x 3 hrs theory paper
Pre-requisite: BLG3101 Biology 1A and BLG3112 Biology 1B; OR HIGSCE Biology 1,2,3
Equivalent: BIO 3263 General Microbiology
Content: Introduction to and history of Microbiology: the scope of the science; important experiments that led to the development of the science. Microbial nutrition: nutritional groups; microbial requirements for various elements and nutrients. Culture media: history of development, complex and defined media, selective and differential media; solid and both media. Preparation of micro-organisms for microscopy: different types of light microscopes; preparation of smears; fixation - staining
(simple, differential, staining specific structures, acid fast staining). Bacterial growth: growth characteristics on solid media; colony development; growth in liquid media; population growth in a closed broth culture.

MBL3222 CURRENT ISSUES IN BIOLOGY 2L + ½PS / week

Contact time: 28 hours
Assessment: CA 100% (seminar participation, not less than 1 test and 1 assignment)
Pre-requisite: BLG3101 Biology 1A and BLG3112 Biology 1B; OR HIGSCE Biology 1,2,3
Equivalent: BIO3253 Current Issues in Biology
Content: The course provides a forum to discuss current issues in the area of Microbiology, Physiology and Molecular Biology. Important topics such as enzymology, local technologies, scientific principles of fermented meat and vegetable products, quality assurance and control, new developments in AIDS research etc., will be discussed.

THIRD YEAR MODULES

MBL3331 PLANT PHYSIOLOGY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 50%
Practicals (not less than 10 marked assignments) 50%
Exam 1 x 3 hrs theory paper
Pre-requisite: CHM3101Chemistry 1A; AND CHM3112 Chemistry1B or CHM3192 Chemistry for Life Sciences
Equivalent: MPB3312 Plant Physiology
Content: This course deals with energy and its use by plants, including basic thermodynamics, chemical equilibrium, redox reactions, ATP & other compounds important in metabolism, and enzymes. The processes of photosynthesis and respiration are discussed in detail and emphasis is placed on C4 and CAM photosynthesis and the reasons for their evolution. The absorption and movement of water and mineral salts are described with special reference to the concept of water potential, physical processes involved water movement and the principles of solute absorption, including the nature of membranes and movement across membranes (symport, antiport and uniport). The structure and composition of soil as a source of mineral salts are dealt with, while other sources of nutrients, including N-fixation in root nodules, mycorhizzae, carniverous and parasitic plants are also discussed. The assimilation of nitrogen and sulphur is dealt with, as well as the transport of water and mineral salts from the root to the leaves. Special attention is given to the photosynthesis-transpiration compromise and the cohesion theory. The transport of photosynthetic products from the leaves to the rest of the plant, with emphasis on the pressure flow model, concludes the course.

MBL3332 PLANT GROWTH & DEVELOPMENT 4L + 1PS / week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests and 1 assignment) 50%
Practicals (not less than 10 marked assignments) 50%
Exam 1 x 3 hr theory paper
Pre-requisite: CHM3101 Chemistry 1A; AND CHM3112 Chemistry 1B or CHM3192 Chemistry for Life Sciences
Equivalent: MPB3413 Plant Growth & Development
Content: This course starts with an overview of growth, growth parameters and the physics and kinetics of plant growth, followed by an in depth study of plant movements. The structure, functioning and role of the five known classes of plant hormones are discussed, while phenomema such as photomorphogenesis, photoperiodism and the biological clock are dealt with in detail.

MBL3311 MICROBIOLOGY & MOLECULAR GENETICS 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 50%
Practicals (not less than 10 marked assignments) 50%
Exam 1 x 3 hr theory paper
Pre-requisite: BLG3202 Cell and Molecular Biology and MBL3231 Introduction to Microbiology
Equivalent: MPB3311 Microbiology and Molecular Genetics
Content: Identification of bacteria: Microscopy, culture characteristics, biochemical tests, rapid methods. Microbial metabolism: Generation of energy: Breakdown of glucose to pyruvate, three pathways. Aerobic and anaerobic respiration. Fermentations. Oxidation of inorganic molecules. Bacterial photosynthesis. Microbial genetics and genetic engineering: Organization and replication of procaryotic DNA. Mutations: types, isolation, repair. Conjugation, transformation and transduction. Isolation, specific cleavage and synthesis of DNA. Vectors. Transformation. Identifying recombinants. Characterizing genes. Industrial microbiology: Industrial fermentation: media, scale-up, fermentation vessels. Strain selection. Preservation of strains. Products. Bioconversions, biodegradation, bioremediation, bioleaching. Factors that may influence sterility in manufacturing. Design, operation and monitoring of a facility for manufacture of sterile products. Mushroom cultivation: History of cultivation. Mushroom fungus genetics. Obtaining pure cultures. Spawn, Production substrates. Cultivation of Agaricus, Pleurotus, Lentinula, Volvariella. Pests. Potential for mushroom cultivation in Namibia. Virology: Structure of Plant, animal and bacterial viruses. Reproduction.

MBL3312 COMPARATIVE ANIMAL PHYSIOLOGY 4L+1PS/week

Contact time: 56hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 60%
Practicals (not less than 10 marked assignments) 40%
Exam 1 x 3 hrs theory paper 70% 1 x 2 hr practical paper 30%
Pre-requisite: CHM3101 Chemistry 1A; AND CHM3112 Chemistry 1B or CHM3192 Chemistry for Life Sciences
Equivalent: MPB3321 Comparative Animal Physiology
Content: This third year course covers the following areas: Comparison of respiration process in terrestrial and aquatic invertebrates (arthropods, sponges, mollusks, nematodes, helminthes & echinoderms), vertebrates (mammals, birds, reptiles, amphibians & fish) and in diving animals. Circulation in invertebrates and vertebrates including composition of blood, coagulation mechanisms and hemeostasis. It will also compare feeding mechanisms, digestion and food absorption in terrestrial and aquatic invertebrates and vertebrates. It will cover various aspects of energy metabolism, energy storage, tolerance to low and high temperatures, freezing, adaptation to temperature change and hibernation. Compare excretion, osmoregulation, movement, reproduction, nervous and endocrine systems in terrestrial and aquatic invertebrates and vertebrates. The course will also cover aspects of parasitism and how parasites interact with their hosts, and their adaptations.

FOURTH YEAR MODULES

MBL3411 IMMUNOLOGY 4L + 1PS / week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests and 1 assignment) 50%
Practicals (not less than 10 marked assignments) 50%
Exam 1 x 3 hr theory paper
Pre-requisite: CHM3101 Chemistry 1A; AND CHM3112 Chemistry 1B or CHM3192 Chemistry for Life Sciences; AND MBL3311 Microbiology & Molecular Genetics
Equivalent: MPB3412 Immunology
Content: This course will introduce the immune system and its components: immunoglobulin classes, cells involved in the immune system, the major histocompatibility-complex, immunoglobulin genes, etc. It will continue to look at the structure of the antibody molecules and will examine cellular and humoral immunity. This will be put into perspective by examining various human diseases caused by viruses, bacteria, parasites etc., as well as looking at contemporary issues.

MBL3412 ADVANCED MICROBIOLOGY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests & 1 assignment) 50%
Practicals (not less than 10 marked assignments) 50%
Exam 1 x 3 hr theory paper
Pre-requisite: MBL3311 Microbiology& Molecular Genetics
Equivalent: MPB3411 Advanced Microbiology
Content: Environmental biology: The role of microorganisms in the Environment. Terrestrial Environment: soils. Soil microorganism associations with plants. Marine Environment and Freshwater Environment including lakes and rivers. Sewage treatment: Conventional sewage treatment , anaerobic digesters, constructed wetlands, septic tanks. Analysis of water purity. Indicator organisms. Food microbiology: Use of microbes to change/alter foods. Spoilage of food by microorganisms. Preservation of foods. Control of microbes in situations and on objects other than food. Physical methods Chemical methods. Adverse relationships with organisms – disease: Epidemiology of infectious disease. Human diseases caused by viruses, bacteria and fungi. In each case a number of diseases will be described to give examples of the various methods of spread (air, food/water, direct contact and arthropod . Antimicrobial chemotherapy: Development of chemotherapy. General characteristics of antimicrobial drugs. Determining the level of antimicrobial activity. Mechanisms of action and factors influencing action. Examples of: anti-bacterial drugs, anti-fungal drugs, anti-viral drugs. Bacterial resistance to drugs. Other relationships with microorganisms: commensalism and mutualism. Normal microflora of the human body. Ruminants.

BLG3410 PROJECT & ADVANCED SKILLS IN BIOLOGY 4L+1PS/week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA 100%
Pre-requisite: STS3211 Statistics for Life Sciences I and STS3212 Statistics for Life Sciences II
Equivalent: BIO3410 Final year independent study project
Content: The final year project will start at the beginning of the first term and finish by the tenth week of the second term. Each student will have their own project title. Students will submit a written report and will also present their work as an oral presentation. The completed report must have the approval of the supervisor before it can be submitted for examination. Each written report will be marked and moderated externally. Project titles will be supplied by all staff at the beginning of each year. Special skills: These are techniques and skills that the students will find useful in their projects as well as in their future careers in biology. Skills included will be: Scientific communication, Powerpoint presentations, photography, advanced microscopy.

MBL3401 ANIMAL GROWTH & DEVELOPMENT 2L + ½PS / week

Contact time: 28 hours
Attached time: 21 hours
Assessment: CA Theory (not less than 1 test and 1 assignment) 50%
Practicals (not less than 5 marked assignments) 50% Exam 1 x 2 hr theory paper
Pre-requisite: CHM3101 Chemistry 1A; AND CHM3112 Chemistry 1B or CMH3192 Chemistry for Life Sciences, AND MBL3311 Microbiology & Molecular Genetics
Equivalent: MPB3413 Developmental Biology
Content: This course will cover animal growth, including the development of the gametes, fertilization, all stages of pre-embryonic and post-embryonic development, aging, and effects of various physiological and Environmental factors affecting these processes. It will address both terrestrial and aquatic vertebrates and invertebrates.

MBL3402 APPLIED MOLECULAR BIOLOGY 2L + ½PS / week

Contact time: 28 hours
Attached time: 21 hours
Assessment: CA Theory (not less than 1 test and 1 assignment) 50%
Practicals (not less than 5 marked assignments) 50% Exam 1 x 2 hr theory paper
Pre-requisite: CHM3101 Chemistry 1A; AND CHM3112 Chemistry 1B or CMH3192 Chemistry for Life Sciences, AND MBL3311 Microbiology & Molecular Genetics
Equivalent: MPB3322 Molecular Genetics
Content: This course will concentrate on the concept of the gene, genes and genomes, molecular mechanisms of gene regulation (gene expression), as well as genetic recombination. Students should be equipped with sufficient theory and an investigative methodology that can be applied to a wide variety of biological problems of molecular nature.

NB: STUDENTS OPTING FOR A DOUBLE MAJOR IN BIOLOGY (I.E TAKING BOTH ENVIRONMENTAL BIOLOGY AND MOLECULAR & PHYSIOLOGICAL BIOLOGY) SHOULD DO ALL OF THE ABOVE COURSES, AS WELL AS THE FOLLOWING:

BLG3231 HUMAN BIOLOGY 4L + 1PS / week

Contact time: 56 hours
Attached time: 42 hours
Assessment: CA Theory (not less than 2 tests and 1 assignment)
Practicals (not less than 10 marked assignments) Exam 1x 3 hr theory paper
Pre-requisite: BLG3101 Biology 1A and BLG3112 Biology 1B; OR HIGSCE Biology 1,2,3
Equivalent: BIO3232 Human Biology
Content: This course will cover the following areas: Human evolution, including evidence based on fossils, biochemistry, anatomical and biogeography. Physiology and anatomy of human body systems. Disorders of cardiovascular system (hypertension, atherosclerosis, stroke and aneurysm), Immunological e.g. allergies and autoimmune diseases; respiratory diseases e.g. bronchitis, pneumonia and emphysema; endocrine disorders e.g. diabetes and goiter; vision e.g. myopia, hyperopia and astigmatism. It will also cover integration and coordination as well as some infectious diseases like HIV/AIDS, hepatitis, malaria, schistosomiasis and trypanosomiasis including their vectors and transmission mechanisms. The human genome, the process of aging and cancers will also be taught.

BIOLOGY DEPARTMENT: PREREQUISITES

YEAR	COURSE CODE / NAME	SEMESTER	PRE/ CO-REQUISITE
1	BLG3101 Biology 1 A	1	IGCSE Biology
	BLG3112 Biology 1B	2	IGCSE Biology
2	BLG3211 Plant Biology	1	BLG3101 and BLG 3112, OR HIGCSE Biology 1,2,3
	BLG3212 Animal Biology	2	BLG3101 and BLG 3112, OR HIGCSE Biology 1,2,3
	BLG3202 Cell & Molecular Biology	2	BLG3101 and BLG 3112, OR HIGCSE Biology 1,2,3
	BLG3231 Human Biology	1	BLG3101 and BLG 3112, OR HIGCSE Biology 1,2,3
	MBL3231 Introduction to Microbiology	1	BLG3101 and BLG 3112, OR HIGCSE Biology 1,2,3
	MBL3222 Current Issues in Biology	2	BLG3101 and BLG 3112, OR HIGCSE Biology 1,2,3
	EBL3231 Introduction to Ecology	1	BLG3101 and BLG 3112, OR HIGCSE Biology 1,2,3
	EBL3222 Field Biology	2	BLG3101 and BLG 3112, OR HIGCSE Biology 1,2,3
3	MBL3311 Microbiology and Molecular Genetics	1	BLG3202 and MBL 3231
	MBL3331 Plant Physiology	1	CHM3101, AND CHM 3112 or CHM 3192
	MBL3312 Comparative Animal Physiology	2	CHM3101, AND CHM 3112 or CHM 3192
	MBL3332 Plant Growth and Development	2	CHM3101, AND CHM 3112 or CHM 3192
	EBL3311 Population Ecology	1	EBL3231
	EBL3331 Fresh Water and Marine Ecology	2	EBL3231
	EBL3312 Ecosystem Ecology	2	EBL3231
	EBL3332 Conservation Biology and Biodiversity	1	*EBL3312 and * EBL3311
4	BLG3410 Projects and Advanced Skills in Biology	Full year	STS 3221 and STS 3222
	MBL3401 Animal Growth and Development	1	MBL3311, AND CHM3101, AND CHM 3112 or CHM 3192
	MBL3411 Immunology	1	MBL3311, AND CHM3101, AND CHM 3112 or CHM 3192
	MBL3402 Applied Molecular Biology	2	MBL3311, AND CHM3101, AND CHM 3112 or CHM 3192
	MBL3412 Advanced Microbiology	2	MBL3311
	EBL3401 Taxonomy and Identification	1	EBL3222
	EBL 3411 Biogeography	1	EBL3231
	EBL3402 Waste Management	2	
	EBL 3412 Management of Natural Resources	2	EBL3311 and EBL3312 and EBL3332

* Co-requisites

BIOLOGY DEPARTMENT: COURSE EQUIVALENTS

TRIMESTER MODULE (S) FAILED	SEMESTER MODULE (S) TO BE TAKEN
BIO3100 General Biology	BLG3101 and BLG3112
BIO3211 Functional Plant Biology	BLG3211 Plant Biology
BIO3212 Functional Animal Biology	BLG3212 Animal Biology
BIO3231 Introduction to Ecology	EBL3231 Introduction to Ecology
BIO3232 Human Biology	BLG3231 Human Biology
BIO3213 Cell and Molecular Biology	BLG3202 Cell and Molecular Biology
BIO3263 General Microbiology	MBL3231 Introduction to Microbiology
BIO3253 Current Issues	MBL3222 Current Issues in Biology
ENB3311 Biological Systematics	EBL3401 Taxonomy & Identification
ENB3321 Conservation Biology	EBL3332 Conservation Biology & Biodiversity
ENB3312 Community Ecology	EBL3312 Ecosystem Ecology
ENB3322 Aquatic Ecology	EBL3331 Freshwater & Marine Ecology
ENB3313 Arid Zone Ecology	EBL3312 Ecosystem Ecology
BIO3313 Scientific Communication	BLG3410 By assignment
MPB3311 Microbiology	MBL3311 Microbiology & Molecular Genetics
MPB3321 Comparative Animal Physiology	MBL3312 Comparative Animal Physiology
MPB3312 Plant Physiology	MBL3331 Plant Physiology
MPB3322 Molecular Genetics	MBL3402 Applied Molecular Biology
MPB3313 Parasitology	By Assignment
ENB3411 Biogeography	EBL3411 Biogeography
ENB3421 Freshwater & Marine Biology	EBL3331 Freshwater & Marine Ecology
ENB3419 Management of Natural Resources	EBL3412 Management of Natural Resources
MPB3411 Advanced Microbiology	MBL3412 Advanced Microbiology
MPB3421 Developmental Biology	MBL3401 Animal Growth & Development
MPB3412 Immunology	MBL3411 Immunology
MPB3413 Plant Growth & Development	MBL3332 Plant Growth & Development
MPB3423 Topics in Vertebrate Physiology	By Assignment
BIO3410 Final Year Independent Project	BLG3410 Project and Advanced Skills in Biology

B 8.2. CHEMISTRY DEPARTMENT

DEPARTMENTAL REGULATIONS

Except where specifically stated, all Chemistry courses with final examinations will have the following distribution of marks: Continuous Assessment (60%) and Final Examination (40%)
The Continuous Assessment mark will include the following:

(a) Laboratory work
(b) A minimum of TWO TESTS
(c) Assignments, quizzes, essays, oral presentations, etc.
The laboratory work will make up a minimum of 15% of the Continuous
Assessment Mark. The remainder of the Continuous Assessment Marks will be distributed among the tests, assignments, quizzes, essays, oral presentations, etc. The exact distribution of marks for each course will be announced or given to the students by the lecturer at the beginning of each course.

B.8.2.1 CHEMISTRY MAJOR

FIRST YEAR MODULES

CHM3101 CHEMISTRY 1A (= ½ semester/module)

Course equivalent: NONE

Pre-requisite: NONE

Contact time: 2L/T + 1PS per week; 28 lectures/tutorials; 14 practical sessions; 1 x 2 hours exam paper

Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA.
Final exam: 40%

Content: An Introduction to Chemistry. Measurements and SI units. Matter: physical state and chemical constitution. Atoms and molecules, naming compounds, chemical equations and reactions, moles, atomic masses, stoichiometry, the periodic table, electronic structure of atoms, chemical bonding. Selected chemical reactions and modelling of structures.

CHM3112 CHEMISTRY 1B (=1 semester/module)

Course equivalent: CHE3100

Pre-requisite: CHM3101 or permission of the department

Contact time: 4L/T + 1PS per week; 56 lectures/tutorials; 14 practical sessions; 1 x 3 hours exam paper

Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA.
Final exam: 40%

Content: The gaseous state and the gas laws; the ideal gas equation; kinetic-molecular theory of gases. Thermochemistry; energy; enthalpy; heat capacity, standard enthalpy of formation and reaction. Quantum theory and electronic structure of atoms; atomic orbitals; electron configuration; building-up principle. Periodic relationships among elements; ionization energy, electron affinity; variations in chemical properties. Chemical bonding: ionic and covalent bonding; electronegativity; Lewis structures; molecular geometry; dipole moments; liquids and solids; intermolecular forces in liquids and solids. Rate of reaction. Chemical equilibrium; equilibrium constants; Le Chatelier's principle; Entropy, free energy and spontaneity. Solubility and solubility product constant. Acids and bases; Brønsted and Lewis acidity; acid strength, pH; weak acids and bases;acid- base reactions; buffer solutions. Oxidationand reduction: redox reactions; galvanic cells; standard potentials; Nernst equation; electrolysis; batteries. Introduction of Organic Chemistry.

THE FOLLOWING MODULE OFFERED FOR AGRICULTURE AND BIOLOGY STUDENTS IS ALSO RECOGNIZED AS AN ELECTIVE FOR THE B.SC. CURRICULUM.

CHM3192 CHEMISTRY FOR LIFE SCIENCES (=1 semester/module)

Course equivalent: CHE3122/3123

Pre-requisite: NONE

Contact time: 4L/T + 1PS per week; 56 lectures/tutorials; 14 practical sessions; 1 x 3 hours exam paper

Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA.
Final exam 40%.

Content: States of matter: physical and chemical properties; mixture and pure substances; elements and compounds. Measurements; significant figures; using units in problem solving; metric system; extensive and intensive properties. Atomic structure and the periodic table; Mendeleev's classification of elements; electron configuration; physical and chemical properties as predicted from groups. Ionic compounds: structure and properties; types of bonds; formation of cations (oxidation) and anions (reduction); ionic bonds; names of ions and ionic compounds. Molecular elements and compounds: Lewis structure; bonds; resonance structures; molecular geometry; polarity of molecules. Chemical equations and reactions. Composition and stoichiometry: molecular and formula weights of compounds; percent composition. Avogadro's number of the mole concept; empirical formula and molecular formula; stoichiometry; percent yield; limiting reagent. Solutions: The nature of solutions; concentration; percent concentration; molarity; dilution of solutions; electrolytes and non-electrolytes; structure and solubility; osmosis and the cell. Acid-base equilibrium: acids and bases; properties of acids and bases; relations of acids and bases self ionisation of water; strengths of acids and bases; the pH scale; hydrolysis of salts; buffers; titration. Introduction to organic chemistry: organic compounds; structural formulae and conformations; functional groups; isomerism; organic reactions and mechanisms; acid-base reactions; oxidation-reduction reactions; Alkanes and cycloalkanes: classes of hydrocarbons; alkanes; nomenclature; physical properties; oxidation; halogenation. Unsaturated hydrocarbons: Types of unsaturated hydrocarbons; nomenclature of alkenes and

alkynes; oxidation and reduction; addition reactions; stereo-isomerism. Aromatic compounds: aromatic substitution reactions; polycyclic and heterocyclic compounds. Alcohol, phenols, thiols, ethers: organic compounds of oxygen; common alcohols and phenols; nomenclature and classification of alcohols; hydrogen bonding in alcohols; acid-base reactions; substitution reactions; dehydration reactions; oxidation and reduction of carbonyl compounds addition reactions. Carboxylic acids and esters: the carboxyl group; common carboxylic acids and their classification; IUPAC and common names; acidity; salts; hydrolysis and saponification of esters; addition and substitution reactions. Amines and amides: The amino and amide groups; nomenclature; basicity of amines; amino acids; peptides; proteins. Introduction to carbohydrates, lipids and porphyrins.

SECOND YEAR MODULES

CHM3211 INORGANIC CHEMISTRY I (=1 semester/module)

Course equivalent: CHE3211

Pre-requisite: CHM3112

Contact time: 4L/T + 1PS per week; 56 lectures/tutorials; 14 practical sessions; 1 x 3 hours exam paper

Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA.
Final exam 40%

Content: The atom; atomic parameters: radii, ionization energy, electron affinity and electronegativity. Chemical bonding; valence bond theory: shapes of molecules and hybridization. Molecular orbital theory: diatomic and polyatomic molecules. Delocalized multiple bonding.S and P block elements. Main group organometallic compounds. Nuclear Chemistry; nuclear reactions, stability, radioactivity, transmutation and fission.

CHM3242 ANALYTICAL CHEMISTRY I (= ½ semester/module)

Course equivalent: CHE3341

Pre-requisite: CHM3112

Contact time: 2L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hours exam paper

Assessment: Continuous: 60% minimum 2 tests; laboratory component: minimum 15% of CA.
Final exam 40%

Content: Review of some fundamental concepts; sampling and sample preparation; expressions of concentration and content; evaluation of analytical data; measures of accuracy and precision;random and systematic errors; confidence intervals; significance tests, Q and t-tests;linear regression; aqueous equilibria; mass and charge balance equations and their use in solving multiple ion and complex ion equilibria; principles of titrimetry; acid-base titrations; titration curves and indicators; polyprotic acid-base equilibria, applications of acid-base titrations;gravimetric methods of analysis; solubility and solubility product; common ion and diverse ion effects; precipitation titrations; indicators used in precipitation titrations.

CHM3232 ORGANIC CHEMISTRY I (=1 semester/module)

Equivalent: CHE3222

Pre-requisite: NONE

Contact time: 4L/T + 1PS per week; 56 lectures/tutorials; 14 practical sessions; 1 x 3 hours exam paper

Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA.
Final exam 40%

Content: Carbon compounds and chemical bonds. Functional groups. Alkanes and cycloalkanes: nomenclature, physical properties, bond rotation, conformations, ring strain, bicyclic and polycyclic alkanes. Retrosynthetic analysis,disconnections. Stereochemistry: stereoisomers, enantiomers, chirality, diastereomers, racemates, meso compounds, optical activity, resolution. Nucleophilic substitution and elimination: nucleophiles and electrophiles, SN2 and SN1 reactions; carbocations and carbanions, E1 and E2 reactions. Alkenes and alkynes: hydrogenation, index of hydrogen deficiency, preparation, acidity of terminal alkynes, acetylides, addition reactions, Markovnikov's rule, hydroboration, carbenes. Radical reactions: free radicals, halogenation of alkanes, chain reactions. Alcohols and ethers: synthesis, reactions, mesylates and tosylates, epoxides, crown ethers, phase transfer catalysis. Oxidation-reduction reactions, organometallic compounds.

CHM3261 PHYSICAL CHEMISTRY I (= ½ semester/module)

Course equivalent: CHE3233
Pre-requisites: CHM3112 and MTS3101 and MTS3112 or MTS3121
Co-requisites: MTS3211
Contact time: 2L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hours exam paper
Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA.
Final exam 40%
Content: Kinetic theory of gases: Brief review of gas (Boyle's, Gay-Lussac's (Charles'), Dalton's, Graham's laws) laws. Equations of state for ideal gases and non-ideal gases. Liquefaction of gases and the critical phenomena. The principle of corresponding states. Postulates of kinetic theory and mathematical treatment of kinetic theory. Distribution of molecular velocity. Thermodynamics – Introduction and scope of thermodynamics: System, surrounding and universe. State and state function. Definition of work, heat and internal energy. First law. Enthalpy. Application of first law to an ideal gas, isothermal and adiabatic conditions. Heat capacities – relation between C_v and C_p Thermochemistry: standard enthalpy changes, enthalpies of formation. Hess's law. Temperature dependence of reaction enthalpies (Kirchhoff's equation). Second law. Entropy. The Carnot cycle. Third Law. Zeroth law. Qualitative prediction of equilibrium and direction of reaction. Gibbs-Helmholtz equation. Clapeyron equation, Clausius-Clapeyron equation and van't Hoff isotherm. Free energy and the equilibrium constant. Spontaneous chemical reactions. Phase chemistry: Phase rule. Phase diagrams and transitions of one-component systems. Thermodynamic description of mixtures. Chemical potential. Partial molar quantities and excess molar functions. Liquid mixtures and colligative properties. Multi-component systems. Vapour pressure and boiling point diagrams, distillation. Azeotropes.

THIRD YEAR MODULES

CHM3381 INORGANIC CHEMISTRY II (= ½ semester/module)

Course equivalent: CHE3313
Pre-requisite: CHM3211 and any one of MTS3112, MTS3132.
Contact time: 2L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hours exam paper
Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA
Final exam 40%
Content: Coordination compounds of transition metals; D block elements: occurrence, recovery and oxidation states; constitution, nomenclature and isomerism. Bonding: valence bond theory (VBT), crystal field theory (CFT), ligand field theory (LFT) and molecular orbital theory (MOT).Reaction Mechanisms and rates: ligand substitution, redox and photochemical reactions. Symmetry and spectroscopy; symmetry analysis; Symmetry applications: chemical bonding, infrared and raman spectroscopy, electronic spectra of atoms and transition metal complexes.

CHM3341 ANALYTICAL CHEMISTRY II (= ½ semester/module)

Course equivalent: NONE
Pre-requisite: CHM3242
Contact time: 2L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hour exam paper
Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA
Final exam 40%
Content: Complexometric and EDTA titrations; oxidation reduction, oxidation states and balancing redox equations, the half cell concept; voltaic cells and the Nernst equation; redox titrations and redox titration curves; applications of redox titrimetry. Potentiometric methods; Coulometry and electrogravimetry.

CHM3342 INSTRUMENTAL ANALYSIS I (= ½ semester/module)

Course equivalent: CHE3353
Pre-requisite: CHM3341
Contact time: L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hour exam paper
Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA
Final exam 40%

Content: Instrumental methods of analysis; Flame emission and atomic absorption spectrometry; ICP;X-ray methods; Molecular fluorescence and phosphorescence; NMR spectroscopy; theory and experimental methods of NMR spectroscopy; applications of proton and C-13 NMR spectroscopy. Mass spectrometry; Infrared absorption spectroscopy; Theory and applications of IR and Raman spectroscopy. Thermal methods of analysis; thermogravimetric, differential thermal analysis and differential scanning calorimetry; Enthalpimetric methods.

CHM3321 ORGANIC CHEMISTRY II (= ½ semester/module)

Course equivalent: CHE3321
Pre-requisite: CHM3232 or permission of the Department
Contact time: 2L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hour exam paper
Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA.
Final exam 40%
Content: Conjugated unsaturated systems: allyl radical and allyl cation, alkadienes and polyunsaturated hydrocarbons, 1,2- and 1,4- addition, Diels-Alder reaction. Aromatic compounds: Hückel's rule, aromatic-, antiaromatic-, nonaromatic-classification; annulenes, fullerenes, nanotubes. Heterocyclic compounds. Electrophilic aromatic substitution: halogenation of benzene, nitration, sulfonation, Friedel-Crafts-alkylations and acylations. Protecting and blocking groups. Aldehydes and ketones: synthesis; addition of: organometallic compounds, hydride, hydrogen cyanide, alcohols, derivatives of ammonia; Wittig reaction. Tautomers, enolates, aldol reactions, aldol condensation. Synthesis planning.

CHM3332 PHYSICAL CHEMISTRY II (= 1 semester/module)

Course equivalent: CHE3332
Pre-requisite: CHM3261 and MTS3211
Co-requisites: MTS3232
Contact time: L/T + 1PS per week; 56 lectures/tutorials; 14 practical sessions; 1 x 3 hours exam paper
Assessment: Continuous: 60% minimum 2 tests; laboratory component: minimum 15% of CA
Final exam 40%
Content: Chemical kinetics: Rate and rate law. Order and molecularity. Integrated rate equations and half-life expressions for 0, 1, 2, 3 and n^{th} order reactions. Pseudo-order reactions. Kinetics of radioactive decay and carbon dating. Methods of determining order and rate coefficient. Temperature dependence of rate coefficients (Arrhenius equation). Complex reactions – parallel, opposing, consecutive and chain reactions. Mechanisms. Theories of reaction rates – unimolecular and bimolecular reactions. Activated complex. Effect of catalyst. Experimental methods for studying slow and fast reactions. Electrochemistry: Definitions and units relating to electricity. Ohm's law. Faraday's laws of electrolysis. Definition and measurement of conductivity and molar conductivity. Strong/weak electrolytes. Arrhenius theory. van't Hoff measurements. Ostwald dilution law. Kohlrausch's law of independent migration. Ionic mobilities and transport numbers. Applications of conductivity measurements – dissociation constant, solubilities and solubility products of sparingly soluble salts, conductometric titrations. Thermodynamics of electrolyte solutions – ionic strengths, activities and activity coefficients, Debye-Hückel limiting law and solubility. Electrochemical cells and electrode processes. Electrochemical cells. Electrode potentials. Standard reference electrodes – standard hydrogen electrode, silver/silver chloride, calomel, glass electrodes and ion selective electrodes. Fuel cells. Photovoltaics (as renewable energy technology). Overpotential. Corrosion. Thermodynamics of electrochemical cells. Surface chemistry and colloids: Interfaces. Colloids. Preparation of colloids. Experimental methods of observing and characterising colloids. Colloid stability – DVLO and effect of adsorbed and non-adsorbed polymers. Chemical, biological and medicinal applications of colloids. Surface tension and interfacial tension. Factors affecting surface tension. Self-assembly molecular systems. Surfactants and micelles. Phospholipids and vesicles. Surfactant adsorption (Gibbs adsorption equation). Capillarity. Wetting of solids: contact angles and their determination, influencing factors and importance in ore flotation. Spreading of one liquid on another. Insoluble monolayer films and their application in water evaporation control. Detergency. Formation and stability of emulsions. Adsorption and adsorption isotherms. Langmuir, Freundlich, BET and Tempkin adsorption equations. Chermisorption and heterogeneous catalysis–Langmuir-Hinshelwood and Eley-Ridealmechanisms. Introduction to crystallography: Crystal lattice and unit cells. Identification of lattice planes. X-ray diffraction. Bragg's law. Powder method. Single-crystal X-ray diffraction. Information from X-ray analysis.

CHM3361 BIOCHEMISTRY I (= ½ semester/module)

Course equivalent: CHE3362
Pre-requisite: Chemistry for Life Sciences CHM3192 or Organic Chemistry CHM3232 or CHM3112 chemistry 1B
Contact time: 2L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hour exam paper
Assessment Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA
Final exam 40%
Content: Active and passive transport of ions; bio-mineralisation; oxygen transport, metabolism and activation; essential elements: occurrence and function. Carbohydrates; lipids (fatty acids and triacylglycerols, terpenes and terpenoids, steroids, prostaglandins, waxes); amino acids and proteins; Nucleic acids; nucleotides and nucleosides; Enzymes (protein as catalysts, enzyme nomenclature, measurement of enzyme activity, factors influencing enzyme-catalysed reactions, mechanisms of enzyme activity, membrane transport).

CHM3362 BIOCHEMISTRY II (= ½ semester/module)

Course equivalent: NONE
Pre/Co-requisite: CHM3361
Contact time: 2L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hour exam paper
Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA
Final exam 40%
Content: Carbohydrate and fat catabolism (digestion and absorption of dietary carbohydrates and fats, carbohydrates catabolism, fat catabolism, the tricarboxylic acid cycle, electron transport and oxidative phosphorylation); Nitrogen metabolism (digestion of dietary proteins, transport of amino acids into cells, removal of nitrogen from amino acids, urea cycle, metabolism of ammonia, catabolism of the carbon skeletons of amino acids, role of folic acid in amino acid metabolism, biosynthesis of non essential amino acids, Glycogen metabolism (structure and function of glycogen, synthesis and degradation of glycogen, regulation of glycogen synthesis and degradation, glycogen storage diseases); Lipid synthesis and transport (fatty acids and triglycerol biosynthesis, triglycerol and bile acids, complex lipids, prostglandins and related compounds, phospholipids and glycolipids); DNA and RNA structure and function (genes control protein synthesis, DNA structure and role, DNA replication, Fidelity of DNA replication, DNA in cells, types of RNA, synthesis of RNA, control of transcription, RNA processing); The protein synthesis Glycolysis (Reactions of glycolysis, alternate fates of Pyruvate, oxidation of ethanol in humans, energy yield glycolysis); Citric Acid Cycle (reaction of the citric acid cycle, stoichiometry and regulation of the cycle, hexose monophosphate pathways.)

FOURTH YEAR MODULES

CHM3422 INORGANIC CHEMISTRY III (= ½ semester/module)

Course equivalent: CHE3412
Pre-requisites: CHM3381, CHM3232.
Contact time: 2L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hour exam paper
Continuous assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA
Final exam 40%
Content: Organometallic chemistry; carbonyls, metal clusters, metal-metal bonds, bonding; synthesis and reactivity's. Catalysis: homogeneous and heterogeneous catalysis.

CHM3441 INSTRUMENTAL ANALYSIS II (= ½ semester/module)

Course equivalent: NONE
Pre-requisite: CHM3342
Contact time: 2L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hour exam paper
Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA
Final exam 40%
Content: Separation methods; fractional processes; solvent extraction; introduction to chromatographic methods of separation; general description of chromatography. GC, GLC, LC, TLC, HPLC; the rate theory of chromatography; important relationships from chromatography; qualitative and quantitative analysis by chromatography; gas chromatography; principles of gas-liquid chromatography; high performance liquid chromatography, column efficiency and chromatographic mobile phases; partition chromatography; adsorption chromatography ion-exchange chromatography; size exclusion chromatography; planar chromatography; electrophoresis and electro-chromatography; solid phase extraction (SPE) method;

radiochemical and immunoassay methods; radioactive isotopes; instrumentation; neutron activation and isotope dilution methods; radiometric methods. Advanced NMR: Fourier Transformation in NMR, 1-dimensional NMR, DEPT, INEPT and NOE, 2 dimensional NMR, theory, experimental methods and interpretation of spectra, ^{1}H-^{1}H COSY, HETCOR, TOCSY, INADEQUATE, NOESY, ROESY.

CHM3421 ORGANIC CHEMISTRY III (= ½ semester/module)

Course equivalent: CHE3423
Pre-requisite: CHM3321 or permission of the Department
Contact time: 2L/T per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hour exam paper
Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA.
Final exam 40%
Content: Carboxylic acids and their derivatives: acids, acyl chlorides, acid anhydrides, esters, lactones, amides and imides, lactams. Amines: preparation, reactions, Hofmann and Cope eliminations. Phenols. Organo sulfur compounds. Rearrangements: Baeyer-Villiger, Beckmann, pinacol-pinacolone. Pericyclic reactions: electrocyclic and cycloaddition reactions; sigmatropic rearrangements. Selected examples of multistep synthesis.

CHM3472 INDUSTRIAL CHEMISTRY (= 1 semester/module)

Course equivalent: CHE3482 and CHE3471
Pre-requisite: Pass in all third year modules or permission of the Department
Contact time: 4L + 1PS per week; 56 lectures/tutorials; 14 practical sessions; 1 × 3 hours exam paper
Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA.
Final exam 40%
Content: Sources of chemical industry. The world's major chemical industries. Environmental pollution control. Material and energy balance. Unit operation. Technological economics. Oil and fat industry; coatings industry; soap and domestic industry; leather industry; flavor industry; pharmaceutical industry. Meat industry, fish industry; dairy industry. Biotechnology industry. Sulphuric acid and fertilizer industry; salt industry, uranium industry, cement industry.

CHM3461 PHYSICAL CHEMISTRY III (= ½ semester/module)

Course equivalent: CHE3431
Pre-requisite: CHM 3261 and MTS3232
Contact time: 2L per week; 28 lectures/tutorials; 7 practical sessions; 1 x 2 hour exam paper
Assessment: Continuous: 60%; minimum 2 tests; laboratory component: minimum 15% of CA
Final exam 40%
Content: Quantum theory: Classical mechanics and failure. Quantization of energy. Wave and particle nature of light and electrons. Experimental evidence of diffraction of the light and electrons and photoelectric effect. de Broglie relationship. Electromagnetic radiation and the electromagnetic spectrum. Spectrum of the hydrogen atom. Operators. Schrödinger wave equation and its solution. Interpretation of the wave function. Wave functions for (1) particle-in-a-box: application to conjugated systems and (2) simple harmonic oscillator as model of vibrating molecule. Postulates of quantum mechanics. Operators. Eigenvalues. Zero point energy. Electron density. Looking at atoms directly - the atomic force microscope. Vibrational - Infrared and Raman spectroscopy. Electronic spectroscopy of atoms and molecules. Electron spin resonance spectroscopy. Nuclear magnetic resonance. Photoelectron spectroscopy. Statistical thermodynamics: The distribution of molecular states, configuration and weights, the Boltzmann distribution; the molecular partition function; the internal energy and entropy, the canonical partition function; the thermodynamic function and the molecular partition function; using statistical thermodynamics (mean energies, heat capacities, equations of state, residual entropies and equilibrium constants). Translational, rotational, vibrational and electronic partition functions.

CHM3442 ADVANCED TOPICS IN CHEMISTRY (= ½ semester/module)

Course equivalent: NONE
Pre-requisite: Pass in all third year modules or permission of the Department
Contact time: 2L per week; 28 lectures/tutorials
Assessment: Continuous: 100% Final 100%
Contents: The course will review aspects of advanced developments in the field of inorganic chemistry, organic chemistry, analytical chemistry, physical chemistry, and biochemistry, which relate to the interests of the students. Topics to be covered include:

Natural Product Chemistry: Introduction & History of Natural Product Research; Discovery and development of drugs from natural resources. Chemical characterization of pharmacologically active compounds form plants.
Biotechnology: Introduction & History of Biotechnology; Traditional versus modern biotechnology, Genetic engineering of plants: principles, protocols and applications; Molecular marker techniques; Cloning and tissue engineering.
Waste Water Treatment: Water quality parameters; Water quality legislation and management; Drinking water processing; Primary chemical processes involved in water treatment for example, chlorination and ozonation; Water borne disease and prevention. Information seeking, online chemistry learning and other independent study and problem-based approaches will be important aspects in the course.

CHM3480 PROJECTS (semester/module)

Course equivalent: CHE3493,CHM3482
Pre-requisite: Pass in all third year modules or permission of the Department
Contact time: 2PS per week; 28 practical sessions
Assessment: Continuous: 60%; includes supervisor's evaluation and seminar presentation.
Final Project report: 40%
Content: An independent project carried out in small groups, under the supervision of a member of staff. Topics will be given to students before the end of the first semester. The work will extend over the term and, as a guide, should occupy the equivalent of one whole day per week. The practical work must be completed by the 10^{th} week and a draft report must be submitted by the end of the 12^{th} week. The completed report will be examined by the supervisor and one external examiner and will be defended by oral examination.

NB: TO MAJOR IN CHEMISTRY A STUDENT MUST PASS ALL THE ABOVE MODULES AS WELL AS PHC3101 (PHYSICS 1A) , PHC3112 (PHYSICS 1B) AND PHC3192 (LAB1)

CHEMISTRY DEPARTMENT: COURSE EQUIVALENTS

Trimester module(s) failed	Semester module (s) to be taken
CHE3100 General Chemistry	CHM3112 Chemistry IB
CHE3122 Chemistry for Agriculture	CHM3192 Chemistry for Life Science
CHE3123 Chemistry for Agriculture	CHM3192 Chemistry for Life Science
CHE3211Inorganic Chemistry I	CHM3211 Inorganic Chemistry I
CHE3222 Organic Chemistry I	CHM3232 Organic Chemistry I
CHE3233 Physical Chemistry I	CHM3261 Physical Chemistry I
CHE3321 Organic Chemistry II	CHM3321 Organic Chemistry II
CHE3341 Analytical Chemistry	CHM3242 Analytical Chemistry I and CHM3341 Analytical Chemistry II
CHE3332 Physical Chemistry II	CHM3332 Physical Chemistry II
CHE3362 Biochemistry	CHM3361 Biochemistry I and CHM3362 Biochemistry II
CHE3313 Inorganic Chemistry II	CHM3381 Inorganic Chemistry II
CHE 3353Instrumental Analysis	CHM3342 Instrumental Analysis and CHM3441 Advanced Topics in Chemistry
CHE3431Physical Chemistry III	CHM3461 Physical Chemistry III
CHE3471 Chemical Technology	CHM3472 Industrial Chemistry
CHE3412 Inorganic Chemistry III	CHM3422 Inorganic Chemistry III
CHE3482 Applied Chemistry	CHM3472 Industrial Chemistry
CHE3423 Organic Chemistry III	CHM3421 Organic Chemistry III
CHE3493 Advanced Topics in Chemistry	CHM3480 project

CHEMISTRY DEPARTMENT: COURSE PREREQUISITES

YEAR	COURSE CODE/ NAME	SEMESTER	PRE/CO-REQUISITE
1	CHM3101 Chemistry 1A	1	NONE
	CHM 3112 Chemistry 1B	2	CHM3101
	CHM 3192 Chemistry for Life Sciences	2	NONE
2	CHM3211 Inorganic Chemistry I	1	CHM3112
	CHM3261 Physical Chemistry I	1	CHM3112 and MTS3101and or MTS3112 or MTS3121
	CHM3232 Organic Chemistry I	2	NONE
	CHM3242 Analytical Chemistry I	2	CHM3112
3	CHM3381 Inorganic Chemistry II	1	CHM3211
	CHM3321 Organic Chemistry II	1	CHM3232
	CHM3341 Analytical Chemistry II	1	CHM3242
	CHM3361 Biochemistry I	1	CHM3192 or CHM3232
	CHM3332 Physical Chemistry II	2	CHM3261
	CHM3342 Instrumental Analysis I	2	CHM3242
	CHM3362 Biochemistry II	2	CHM3361
4	CHM3421 Organic Chemistry III	1	CHM3321
	CHM3441 Instrumental Analysis II	1	CHM3342
	CHM3461 Physical Chemistry III	1	CHM3261
	CHM3472 Industrial Chemistry	2	All third year modules or permission of Department
	CHM3422 Inorganic Chemistry III	2	CHM3381, CHM3232
	CHM3442 Advanced Topics in Chemistry	2	All third year modules or permission of Department
	CHM3480 Project	2	All third year modules or permission of Department

B. 8.3. COMPUTING DEPARTMENT

B.8.3.1 COMPUTING MAJOR

FIRST YEAR MODULES

CMP3101 COMPUTING 1A 2L+ 1PS/ WEEK

Prerequisites: Departmental entry Test
Assessment: Continuous- 60%, Examination- 40% Exam: 1x 2 hours exam
Content: understanding computer systems and technology: The problem-solving approach. The structure and components of a modern computer (PC) - processor, memory, hard drives, interfaces. Principles of information processing (Windows, word-processing, spreadsheets, presentation and databases)The nature and use of software.

CMP3112 COMPUTING 1B 4L+1PS/WEEK

Assessment: Continuous- 60%, Examination- 40% Exam: 1x 3 hours
Prerequisites: Departmental Entry Test
Co-requisite: CMP3101 Computing 1A
Content: The logical Basis of Computing. The binary system, boolean logic and number representation. Elementary information theory. Logic gates and fundamental circuits. The von Neumann model of the computer. The nature of algorithms. Computer languages.Procedural programming constructs. Concepts of operating systems and networks. Elements of machine architecture.

SECOND YEAR MODULES

CMP3220 ADVANCED AND OBJECT ORIENTED PROGRAMMING 2L +1/2 PS FOR 2 SEMESTERS

Assessment: Continuous- 60%, Examination- 40% Exam: 1x 3 hours
Prerequisites: CMP 3112 Computing 1B
(This is a one full semester module but for the sake of continuity and timetabling, it will usually run throughout the entire year)
Content: Use of C, C++, Visual C++ and/or Java to illustrate classic algorithms. Modular programming, pointers and advanced concepts. Object-oriented constructs - classes and methods. Visual and event-driven programming. Programming project.

CMP3211 DATA MANAGEMENT AND DATABASE PRINCIPLES

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 3 hours
Prerequisites: CMP 3112 Computing 1B
Content: Overview of a Database System & its components. Data Models. Need for persistent data. Concepts of data storage and retrieval, Query processing. Principles and theory of the relational model. Use of a practical DBMS e.g. SQL server. Introduction to object-oriented databases.

CMP 3212 COMPUTER THEORY 4L+1PS/WEEK

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 3 hours
Prerequisites: CMP 3112 Computing 1B
Content: Mathematics for computing - discrete mathematics and logic. Zero and first order logic (predicate).Tree and graph theory. Context-free grammars and Finite Automata. The principles of computability, decidability and tractability.

THIRD YEAR MODULES

CMP3311 SOFTWARE ENGINEERING 1 - CLASSICAL S/E 4L+1PS/WEEK

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 3 hours
Prerequisites: CMP3101 Computing 1A ,CMP 3112 Computing 1 and CMP3211
Content: The need for software engineering. Systems development models. The software life cycle. Requirements, specification and analysis. Design methods. Graphical techniques, DFDs, ERDs etc.. Project management concepts. Costing of development projects. Implementation issues. Testing strategies and techniques. Other development options - re-use and outsourcing.

CMP 3331 NETWORKING, DATA COMMUNICATIONS & DISTRIBUTED SYSTEMS 4L+1PS/WEEK

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 3 hours
Prerequisites: CMP 3220 Advanced and OO Programming
Content: Introduction to underlying principles and technologies needed to provide data
and personal communication in data and telecommunication networks .ISO models and ANSI/IEEE standards for LAN and WAN. Type of Distributed Systems. Coupling schemes of Distributed Systems. Communication Strategies. Client/Server approaches. Design and build a simple LAN (Mini group project).

CMP 3312 SOFTWARE ENGINEERING 2 - MODERN S/E 4L+1PS/WEEK

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 3 hours
Corequisites: CMP 3311 Software Engineering I
Content: Formal methods of system specification. Design of real time and distributed systems.COM and 3-tier architecture. Object oriented analysis and design. Use of UML.CASE tools and IPSE's. Other techniques - clean room etc. Web based systems. Elementary cryptology and PGP. Management and legal issues. The future. Module also to include a practical development project, if possible for an outside client.

CMP 3332 OPERATING SYSTEMS 4L+1PS/WEEK

Prerequisites: CMP 3112 Computing 1 Exam: 1 x 3 hours
Content: Study of history and modern single user, multi user and distributed operating systems. Particular studies of UNIX, LINUX and Windows NT or 2000. Memory and file management, synchronisation and security.

FOURTH YEAR MODULES

3 modules for the year, to be time tabled by arrangement and by staff availability

CMP 3400 RESEARCH PROJECT 1PS per week for 2 Semesters

Exam: No Exam, assessment by course work and submitted Project
Prerequisite: Pass Third Year
Content: Students to be given or choose a project to run throughout both semesters

First Semester - Any four of the following half modules: distributed throughout the year depending on demands and staff availability

CMP 3421 CLIENT SERVER SYSTEMS AND ADVANCED NETWORKS 2L+1/2 PS **WEEK**

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 2 hours
Prerequisite: CMP 3331 Networking and Data Communications
Content: Discussion of design and implementation of distributed systems, large networks and advanced protocols, interfaces, CORBA, COM etc.

CMP 3441 NUMERICAL METHODS AND OPERATIONAL RESEARCH 2L+1/2 PS week

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 2 hours
Prerequisite: MTS3211 Calculus I and MTS3232 Calculus II, and CMP 3220 Advanced OO Programming
Content: Linear programming, optimisation, transportation, queuing theory, simulation. Markov chains and forecasting methods.

CMP3461 ADVANCED HARDWARE STUDIES AND DIGITAL ELECTRONICS 2l+1/2 PS week

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 2 hours
Prerequisite: CMP 3112 Computing 1B
Content: In-depth study of particular processors, future chip development, Merced, advanced computer architecture and peripherals. Practical hardware project.

SECOND SEMESTER - ANY TWO OF THE FOLLOWING HALF MODULES:

CMP3422 WEB DEVELOPMENT AND E-COMMERCE 2l+1/2 PS week

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 2 hours
Prerequisite: CMP 3331 Networking and Data Communications
Content: How the Internet works, Web site planning and engineering. Systems for e-commerce and security. Practical project.

CMP3442 MANAGEMENT OF IT SYSTEMS AND BUSINESS COMPUTING 2L+1/2PS week

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 2 hours
Prerequisite: CMP 3312 Software Engineering II
Content: Problems in managing an IT operation in a rapidly changing Environment. Human resources and man management, technical considerations, project management, budgeting, crisis management and outsourcing.

CMP3462 ADVANCED DATA MANAGEMENT TECHNIQUES 2L+1/2 PS Per week

Assessment: Continuous- 60%, Examination- 40% Exam: 1 x 2 hours
Prerequisite: CMP 3231 Database Principles
Content: Data warehousing, data mining, query optimisation, OO database systems, intelligent active/deductive knowledge bases.

CMP3481 PARALLEL PROCESSING ARCHITECTURE / CONCURRENT SYSTEMS 2L+1/2 PS/week

Assessment: Continuous- 60%, Examination- 40%Exams: 1 x 2 hours
(Prerequisite – CMP 3331 Networking and Data Communications)
Content: parallel computer and network models, memory hierarchy etc.

CMP3482 ARTIFICIAL INTELLIGENCE AND HEURISTICS 2L+1/2PS per Week

(Prerequisite – CMP3212 Computer Theory)

Assessment: Continuous- 60%, Examination- 40%Exams: 1 x 2 hours

Content: Semantics, state space search, knowledge representations, knowledge based systems, pattern recognition, neural networks etc.

COMPUTING DEPARTMENT: COURSE PREREQUISITES

YEAR	COURSE CODE/ NAME	SEMESTER	PRE/COREQUISITE
1	CMP3101Computing 1A	1	Departmental Computing Test
	CMP3112 Computing 1B	2	
2	CMP3211 Data Management and Database Principles	1	CMP3112 Computing 1B
	CMP3212 Computer Theory	2	CMP3112 Computing 1B
	CMP3220 Advanced and Object Oriented Programming	Full year	CMP3112 Computing 1B
3	CMP3331Networking and Data Communications & Distributed systems	1	CMP3311 Advanced and OO programming
	CMP3311 Software Engineering I	1	CMP3112 Computing 1B
	CMP3312 Software Engineering II	2	(Corequisite) CMP3311 Software Engineering I
	CMP3332 Operating Systems	2	CMP3112 Computing 1B
4	CMP3400 Research Project	Full year	Pass third year
	CMP3421 Clients Server Systems and Advanced networks (options)	1	CMP3331 Networking and data comms
	CMP3422 Web Development and E-commerce	2	CMP3331 Networking and data comms
	CMP3442 Management of IT systems and Business Computing	2	CMP 3312 Software engineering II
	CMP3441 Numerical methods & Operational Research	1	MTS3211 Calculus I MTS3232 Calculus II, CMP 3220 Advanced programming
	CMP3461 Advanced hardware studies and digital Electronics	1	CMP3112 Logical basis of computing
	CMP3481 Parallel processing Architecture/Concurrent Systems	1	CMP3331 Networking and data comms
	CMP3462 Advanced data management Techniques	2	CMP 3231 Database principles
	CMP3482 Artificial intelligence and Heuristics	2	CMP3212 Computer theory

COMPUTING DEPARTMENT: COURSE EQUIVALENCIES

Trimester module (s) Failed	Semester module (s) To be taken
CFS 3111 Introduction to Computing	UCC3109 Core + CMP3112 Computing 1B
CFS 3112 Concepts of Algorithms and Programming	UCC3109 Core + CMP3112 Computing 1B
CFS 3113 Simple Machine Architecture and Operating Systems	UCC3109 Core + CMP3112 Computing 1B
CFS 3221 Advanced Programming	CMP3220 Advanced and OO programming
CFS3223 Object Oriented Programming	CMP3220 Advanced and OO programming
CFS 3341 Data base Systems	CMP3211 Data management and databases
CFS 3222 Algorithms and Computability	CMP3212 Computer theory
CFS 3331 Software Engineering 1	CMP3311 Software engineering I and CMP3312 Software engineering II
CFS3332 Software Engineering 2	CMP3311 Software engineering I and CMP3312 Software engineering II
CFS3333 Software Engineering 3	CMP3311 Software engineering I and CMP3312 Software engineering II
CFS 3451Data Communication & Networks	CMP3331 Networking and data comms
CFS 3452 Real –Time & Distributed Systems	CMP3331 Networking and data comms
CFS 3343 Operating Systems	CMP3332 Operating systems
CFS 3442 Networks Administration	CMP3332 Operating systems
CFS3453 Special Topics and Projects	CMP3400 Research Projects
No exact equivalencies - new subjects offered	4th year options

B. 8.4. ECONOMICS DEPARTMENT (IN THE FACULTY OF ECONOMICS AND MANAGEMENT SCIENCE)

B.8.4.1 ECONOMICS MAJOR

FIRST YEAR MODULE

EIE3112 INTRODUCTION TO ECONOMICS

Equivalent: EPE0101/2/3

4 Lectures per week 14 weeks

Assessment: 1 x 2 hour exam paper

Content: Concept of scarcity and wants, market organization of economies, production Possibility curve. Demand, supply and elasticities. Theories of costs, production and price determination under various industry structures, concept of efficiency. Market failure, private and social cost, public goods. Linkage of various sectors at an aggregate level, national income accounting. Determination and fluctuations of aggregate economic activity under different supply conditions. Inflation and Unemployment Money supply and monetary policy.

EIM3231 MICRO ECONOMICS

Equivalent: EMI3201

4 Lectures 14 weeks

Assessment: 1 x 2 hour exam paper

Content: Demand and consumer behaviour- utility analysis, law of diminishing marginal utility, indifference curve analysis Production and cost analysis in the long run- isoquants, isocosts, choice of input combination, short-run and long-run average costs Market structures and firm behaviour, perfect competition, monopoly behaviour, monopolistic competition, oligopoly Factor markets-wage determination, economic rent, interest rate

EIM3232 MICRO ECONOMICS

Equivalent: EMI3202/3

4 Lectures 14 weeks

Assessment: 1 x 2 hour exam paper

Content: Application of supply and demand analysis-Commodity tax and market equilibrium, Quantity rationing, Cartels as monopoly. Allocative efficiency and market structure-Pareto efficiency, failure to achieve Pareto efficiency (externalities, public goods, increasing returns to scale, monopoly), public policy to correct market inefficiency, monopoly and monopsony in the labour market, public policy in the labour market.Choice under uncertainty-expected utility, risk preference

EAM3231 MACRO ECONOMICS

Equivalent: EMA3201

4 Lectures 14 weeks

Assessment: 1 x 2 hours exam paper

Content: National income accounting-discussion of three approaches and identities, Price indices, Real vs. nominal variables, anualization of growth rates. Basic consumption, saving and investment functions; government sector-its composition, revenue and expenditure, government's saving, investment, and borrowing; Aggregate demand, Keynesian model of income determination, and various multipliers, equilibrium in the goods market and IS-model, Effects of fiscal policy. Money demand and its determinants; money supply, its creation and determinants (deposit creation, open market operations, money multiplier, government budget constraint); equilibrium in the money market and the LM curve. AD with IS-LM model, effects of various monetary and fiscal policies in closed economy; AD and AS analysis of output and price determination under varying supply conditions in a closed economy (Classical vs. Keynesian). Exchange rate determination in fixed and flexible regimes; Balance of payment accounting- and its relation with exchange rate and reserves; real exchange rate, its determinants, and Big Mac Index. Effect of trade on goods and money markets, internal and external balance; capital mobility, balance of payment curve (BP) and its determinants; effects of fiscal and monetary policies on alternative assumptions of capital mobility and exchange rate regimes. Business cycles-definition and measurement issues, Sources of various impulses, Keynesian theory of business cycle. Growth accounting, Neo-Classical and Endogenous theories of growth, growth experiences from few economies and policies involved.

EAM3232 MACRO ECONOMICS

Equivalent: EMA3202/3

4 Lectures 14 weeks

Assessment: 1 x 2 hours exam paper

Content: Objectives of macroeconomic policies, and macroeconomic indicators.

Labour market-determination of wage; aggregate supply, wages, prices and employment.

Inflation and unemployment-types, their costs and determinants; natural rate of unemployment, its determinants and policies to reduce it; Inflation indexation; alternative policies to reduce inflation; Phillips curve and its augmented version.

Money, deficits and inflation-quantity theory and factors effecting its variables; Fisher's equation; deficits, money growth and inflation tax; hyperinflation experiences and policies used.

Budget deficits and the public debt, measurement issues, burden of the debt; Barro-Ricardo problem; Social-security and budget.

Financial instruments and markets; an overview of global financial market; term structure of interest rates. Stabilization policies and their effectiveness; rules, discretion and time consistency
In depth data analysis from Namibian National Accounts, SARB-bulletins, IFS, The Economist's economic indicators.

EEM3231 MATHEMATICS FOR ECONOMISTS

Equivalent: EME3201

4 Lectures 14 weeks

Assessment: 1 x 2 hours exam paper
Content: Economic applications of graphs and functions-Supply and demand analysis, National income determination, IS-LM analysis. Functions with two independent variables-utility function, long-run production functions, graphic representations of functions of two variables (Indifference curves and Isoquants). Linear algebra-determinants, solving simultaneous linear equations-graphical method, elimination method, determinants method; vectors and matrix algebra, basic matrix operations, matrix expression of a set of linear equations, use of matrix algebra in economics, Input-output analysis. Linear programming-graphical approach, Simplex algorithm

EEM3232 MATHEMATICS FOR ECONOMISTS

Equivalent: EME3202/3

4 Lectures 14 weeks

Assessment: 1 x 2 hours exam paper
Content Economic applications of Power, Exponential and Logarithmic functions-Investment appraisal, geometric series, loan repayments Differentiation-derivative of a function, rules of differentiation, marginal concepts, partial differentiation, unconstrained optimization, total differentials and total derivatives, constrained optimization and the Lagrange multiplier, differentiation of logarithmic and exponential functions Integral calculus-indefinite integral, rules of integration, integration by substitution, integration by parts, economic applications, definite integral, area under a curve, properties of definite integral, consumer and producer surplus, a note on income distribution and Lorenz curve.

THIRD YEAR MODULES

ETM3351ECONOMETRICS

Equivalent: EMT3301

4 Lectures 14 weeks

Assessment: 1 x 3 hours exam paper
Content: A review of statistics-expectation, variance, joint probability distribution and covariances, conditional probability distribution and conditional expectation. A review of probability distributions such as Normal, Chi-square, T and F with a real data set. Economic vs. Econometric models, Usage and application of econometric models. Simple classical linear regression model-Ordinary least square method, assumptions of CLRM, standard errors of estimators, properties of estimators, hypothesis testing of estimated coefficients and equation, R and R-bar squares. Multiple regression model with three variables-OLS method, assumptions of the model, standard errors of estimators, properties of estimators, hypothesis testing, R-squares, F-statistics, hypothesis testing with restrictions on individual or a set of coefficients; Matrix treatment of Multiple regression model, consequences of violations of CLRM assumptions. Functional forms- various forms used in estimation and their appropriateness; marginal and elasticity derivations and interpretation in each case; effects of change in scale and units of measurement. Multicollinearity- causes; theoretical and practical consequences on estimators, detection and possible remedies. Dummy variables- its significance, intercept and slope dummies and dummy variable trap, more than one intercept dummy variables with more than two categories, interaction dummies; parameter stability –Chow vs. Dummy variable tests, More uses of dummy variables- outliers, seasonality. Heteroscedasticity-its nature and consequences; detection by using t, F and Chi-square statistics, correction for heteroscedasticity with emphasis on specification problems. Autocorrelation- its nature, consequences, detection by using DW and Chi-square statistics, First and higher order autocorrelations, Durbin's h-statistic, Correction methods for autocorrelation with emphasis on specification problems.

ETM3352 ECONOMETRICS

Equivalent: EMT3302/3

4 Lectures 14 Weeks

Assessment 1 x 3 hours examination

Types of specification errors- omission of a relevant variable, inclusion of an irrelevant variable, errors of measurement in dependent and independent variables. Distributed lag models- an introduction to Koyck model, error correction models. Detection of specification errors by using various diagnostic tests. Attributes of a good model and model selection criteria. Time series econometrics- spurious regression problem, stationary vs non stationery series, Random Walk model, difference stationary vs trend stationary, Dickey-Fuller Unit root tests, cointegration- its meaning, condition, Engle-Granger and its augmented test, error-correction mechanism. Forecasting- with classical models, forecast performance statistics.

EIT3351 INTERNATIONAL TRADE

Equivalent: EIE3301

4 Lectures per week 14 weeks

Assessment: 1 x 3 hours exam paper

Content: Theories of international trade- Classical, absolute advantage, comparative advantage, Hecksher-Ohlin; Trade patterns and its effect on consumption and production. Gains and losses from trade- short and long run effects, implications of H-O theory, problems with H-O model. Alternative theories of trade-Economies of scale, imperfect competition models. Growth and trade-sources of economic growth and effect of technology on trade, effects of growth on small and large countries' terms of trade and factor accumulation. Trade policies- Effects of tariff on producers, consumers, revenue and welfare, non-tariff barriers to trade, protectionism, exportism. Customs Union- nature of trading, basic theory of customs unions, consumption and dynamic effects of union, trade blocks in the recent trend. Trade policies in developing economies. Trade and environmental concerns. UN and World's trade organizations- their history, objectives, achievements and failures.

EIF3352 INTERNATIONAL FINANCE

Equivalent: EIE3302/3

4 Lectures per week 14 weeks

Assessment: 1 x 3 hours exam paper

Content: Balance of payments accounts and international investment position.Foreign exchange market-spot exchange rate determination, arbitrage; hedging and speculating using forward exchange market; covered interest arbitrage and covered interest parity; uncovered interest parity; market's and government's role in determination of foreign exchange, effects of balance of payment on exchange rate, effective exchange rate. Determinants of balance of payments-elasticity approach, J-curve, absorption approach, monetary approach. Exchange rate in the short-run- its determination, effect of asset market, expectational factors, exchange rate overshooting, currency substitution. Exchange rate in the long-run- purchasing power parity; money, price level and inflation effects on exchange rate. Fixed exchange rate-internal and external balance, monetary and fiscal policy with varying degree of capital mobility. Flexible exchange rate-internal balance, monetary and fiscal policy with varying degree of capital mobility. Exchange rate arrangements- a bit of history, and the current trends and practices. International financial crises-Mexican crisis, Asian crisis, Russian crisis.

EMU3351 MONETARY ECONOMICS

Equivalent: EMO3301

4 Lectures per week 14 weeks

Assessment: 1 x 3 hours exam paper

Content: Money-nature, definitions and the value of money, role of money in the modern economy

Demand for money-classical approach, Keynesian analysis, Post-Keynesian developments, monetarist approach, empirical evidence. The supply of money-money multiplier approach, credit counterpart approach, Central Bank and the creation of credit, empirical evidence Inflation, Interest Rate, Exchange rate-market theories of inflation, non-market theories of inflation, inflation in the international context, empirical evidence, determinants of interest rate, determinants of the Balance of Payments, theories of Exchange Rate determination, empirical evidence Monetary theory and monetary policy-monetary

transmission mechanisms and the channels of monetary influence, classical system and the neutrality of money, Keynesian system and Monetarism, instruments, targets and objectives of monetary policy, broad problems of implementing macroeconomic policies, techniques of monetary control, empirical evidence on the effectiveness of monetary policy Commercial Banking-development of banking in Namibia, operations and performance of commercial banks, process of commercial bank deposit creation, portfolio characteristics of commercial banks, bank failures. Central Banking-functions of a central bank, central Banking in USA and UK, central Banking in Africa, Bank of Namibia, role of banking in economic development International Banking- scope of international banking activities, services offered by international banks, problems and the future of international banking

EFE3352 FINANCIAL ECONOMICS

Equivalent: EMO3302/3

4 Lectures per week 14 weeks

Assessment: 1 x 3 hours exam paper

Content: Financial intermediation in Namibia-building societies, insurance companies, pension funds, unit trusts, commercial banks, Bank of Namibia Actors in the financial system- consumers, businesses, and government in the financial markets Instruments of financial markets- treasury bills, government securities, negotiable certificates of deposits (NCD), commercial papers, bankers acceptances, repurchase agreements (REPOs) Corporate finance and risk management- hedging instruments, corporate financing instruments, corporate financing techniques, Namibian Stock Exchange International financial system- World Bank, The International Monetary Fund, African Development Bank; Structural Adjustment Programme and stabilization policy of the IMF; sources of IMF funds; international debt crisis and reform proposals; IMF borrowing facilities and Special Drawing Rights (SDR); operations of the World Bank; international liquidity and the problems facing the international monetary system; social, economic and demographic forces and trends shaping the financial system an the challenges and opportunities presented by recent trends.from European integration.

EUP3351 PUBLIC ECONOMICS

4 Lectures per week 14 weeks

Assessment: 1 x 3 hours exam paper

Content: Introduction- framework of welfare economics, economic role of government, form of state intervention in the economy, economic effects of government policies, size of government and measurement problems, tools of Public Economics, criteria for policy evaluation Taxation- classification of taxes, principles of tax design, tax analysis (Efficiency, Incidence, Revenue productivity), tax evasion and tax avoidance, tax reform in developing Countries Government production-types of government production, management of nationalized industries, pricing and profitability in the private and public sectors The government sector and stabilization- Keynesian view, changes in government spending, multiplier, changes in taxation, balanced budget multiplier, some problems with fiscal policy Government borrowing and monetary conditions-Public Sector Borrowing Requirement (PSBR), PSBR and the money supply, recent developments in debt management.

EDE3352 DEVELOPMENT ECONOMICS

Equivalent: EDP3302/3

4 Lectures per week 14 weeks

Assessment: 1 x 3 hours exam paper

Content: The concept and measurement of development-the nature of development economics, growth and development, the measurement of development, the main features of LDCs Domestic barriers to development and policies, dualism Growth, poverty and income distribution Population and development Unemployment Agricultural transformation and rural development Education and Human capital formation – experiences Theories of economic growth and development- theories of capital accumulation, classical theory, Keynesian theory, Harrod-Domar model, Neo-classical model, dual economy models, Lewis theory of development, Rostow's stages of economic growth. Urbanization and rural urban migration Financing development-domestic resources means, foreign resources, debt crisis Development planning- definition, arguments for and against, models of planning, stages of planning, problem of planning in LDCs, project appraisal and cost-benefit analysis, balanced and unbalanced growth. Industrial development- reasons for, industry vs. agriculture, industrialization and trade strategies, technology and choices available.

FOURTH YEAR MODULES

EPT3471 ECONOMIC THEORY & POLICY

Equivalent: ETP3401

4 Lectures per week 14 weeks

Assessment: 1 x 3 hours exam paper
Content: Consumption and Saving Functions- inter-temporal theory of consumption, permanent income and life-cycle models of consumption, empirical works on consumption and saving. Investment functions- definition, measurement problems; Neo-classical, accelerator, capital-stock adjustment, Tobin's q and Credit rationing theories of investment; residential investment and business cycles. National income accounting and open economy- saving (S) , investment (I), and current account; S and I, and International investment; S and I, and balance of payment accounting. Government Sector-Government saving and investment, Government budget and current account, crowding in and out through government's interaction with private sector, Ricardian equivalence and its policy relevance, government deficit and exchange rate regime, inflation tax and seigniorage. Business cycles- characteristics, impulse propagation approach to shocks, Keynesian approach and its defense through inventory propagation and multiplier-accelerator models, new-Keynesian model, Political business cycle theory, new-Classical models. Macroeconomic policy issues- macroeconometric models, policy targets and instruments, Lucas critique, rules vs. discretion. Macroeconomic policies in developing economies. Structural adjustment programmes- tools and targets, experiences from various economies. Growth and productivity experiences of various countries with emphasis on Africa.

EPT3472 ECONOMIC THEORY AND POLICY

Equivalent: ETP3402/3

4 Lectures per week 14 weeks

Assessment: 1 x 3 hours exam paper
Content: Estimating consumer demand functions- Linear Expenditure System (LES), Indirect Addilog Demand System (IADS), calculating demand elasticities, income and substitution effects Estimating production functions- Cobb-Douglas production function, constant elasticity of substitution (CES) production function, supply elasticities, technical change and returns to scale estimation, productivity measures and growth accounting. Measuring market concentration and monopoly distortions, market structure and firm behaviour and performance. Estimating labour demand and supply functions, wage elasticity of labour supply Behaviour under risk and uncertainty: Expected utility, risk preference, measuring risk, market for risky assets, mean-variance model. Measuring income distribution and welfare changes

EER3471 ENVIRONMENTAL ECONOMICS

4 Lectures per week 14 weeks

Assessment: 1 x 3 hours exam paper
Content: Market failure, public goods, common resources, externalities Cost-Benefit Analysis, Discounting and inter-generational equity Valuation methods Management of renewable and non-renewable resources, resource rents, property rights Old and new debates on environmental problems Policy instruments for environment management Economic sustainability-definitions, planning and policy implementation for a better environment Environmental accounting Development, economic growth and the environment International environmental issues- trade and the environment, international treaties.

ENE3472 NAMIBIAN ECONOMY

4 Lectures 14 Weeks
Assessment: 1x 3 hour examination paper
Content: Structure and performance of Namibian economy-National accounts, balance of payments, CPI, Employment, HIES, Population census. Trade and agreements: SACU, SADC, WTO, Lome - in historical perspective, absolute and comparative advantage and alternative theories, effects of tariff. Savings and Investment- private and public, foreign, financial institutions. Land reform- Institutions, economics of property rights, experiences from elsewhere. Monetary aspects- institutions, instruments and limitations, monetary policy and CMA. Fiscal aspects- Taxation; revenue, expenditure and borrowing; public debt. Employment- Human capital, minimum wages and unions, discrimination, unemployment problems and policies. Poverty- state, policies to combat poverty, policies on rural and regional development, agriculture and human capital. Public services- Education and health, public infrastructure.

PMR3471 RESEARCH METHODS

Equivalent: PMR3402

Content: Research methods; introducing scientific methods of research; process and procedures of research that include quantitative and qualitative data collection and analysis. Data collection instruments and ethics in research. Hypothesis formulation and testing; operationalisation of research; research design; measurement; reliability, validity; sources of essay and sampling. Writing a research proposal and research report.

NB: STUDENTS SHOULD CHOOSE ANY TWO COMBO 3RD YEAR COMBINATION.

(i) EIT3351 AND EIF3352
(ii) ETM3351 AND ETM3352
(iii) EMU3351AND EFE3352
(iv) EUP3351 AND EDE3352

ECONOMICS DEPARTMENT: COURSE PREREQUISITES

YEAR	COURSE CODE/ NAME	SEMESTER	PRE/CO-REQUISITE
1	EIE3112 INTRODUCTION TO ECONOMICS	2	NONE
2	EIM3231 MICRO-ECONOMICS	1	BCM311/3112 BUS. MATH OR EQUIVALENT
	EIM3232 MICRO-ECONOMICS	1	EIE3112
	EAM3231 MACRO-ECONOMICS	2	EIE3112
	EAM3232 MACRO-ECONOMICS	2	EIE3112
	EEM3231 MATHEMATICS FOR ECONOMISTS	1	EIE3112
	EEM3232 MATHEMATICS FOR ECONOMISTS	2	EIE3112
3	ETM3351/2 ECONOMETRICS	1/2	EIM3231/2 & EAM3231/2 (at least 1 semester each statistics 1 semester
	EIT3351/2 INTERNATIONAL TRADE	1/2	EIM3231/2 & EAM3231/2 (at least 2 semester each BCM311 or 3112 or equivalent
	EMU3351 MONETARY ECONOMICS	1	EIM3231/2 & EAM3231/2 (at least 2 semester each BCM311 or 3112 or equivalent
	EUP3351 PUBLIC ECONOMICS	1	EIM3231/2 & EAM 3231/2 (at least 2 semester each BCM311 or 3112 or equivalent
	EDE3352 DEVELOPMENT ECONOMICS	2	EIM3231/2 & EAM3231/2 (at least 2 semester each BCM311 or 3112 or equivalent
	EIF3352 INTERNATIONAL FINANCE	2	EIM3231/2 & EAM3231/2 (at least 2 semester each BCM311 or 3112 or equivalent plus EIT3351
	EFE3352 FINANCIAL ECONOMICS	2	EMU3351; ABA3231/3232 or equivalent
4	EPT3471 ECONOMIC THEORY AND POLICY	1	EIM3231/2 & EEM3231/2
	EPT3472 ECONOMIC THEORY AND POLICY	2	EIM3231/2 & EEM3231/2
	ENE3472 NAMIBIAN ECONOMICS	2	EIM3231/2 & EEM3231/2
	EER3471 ENVIRONMENTAL ECONOMICS	1	EIM3231/2 &EAM3231/2; EEM3231/2
	OR		
	PMR3471 RESEARCH METHODS	1	EIM3231/2 & EAM3231/2

B.8.5. GEOGRAPHY AND ENVIRONMENTAL STUDIES DEPARTMENT (IN THE FACULTY OF HUMANITIES AND SOCIAL SCIENCES)

DEPARTMENTAL REGULATIONS

Geography is offered either as a double major subject to be finalised at the end of the fourth year of study. A student in possession of a degree with Geography as a major qualifies to apply for admission to postgraduate (MA) studies in Geography, subject to the University's regulations for postgraduate studies.

1.Year I, students in Geography and Environmental studies take the two (2) modules below:
GES3111 AND GES3132

2. Year II, to be admitted to year II, a student must satisfy one of the following requirements:
Pass in GES 3111 Fundamentals of Geography and GES 3132 Basic Skills in Geography; - on application in writing and approved by the Faculty through the Head of Department, a pass in an equivalent first year Geography study level module and acknowledgement of equivalent University Core Curriculum modules, obtained at another institution of tertiary education. Students in Department of Geography and Environmental Studies must take the modules below:
GES3211, GES3231, GES3202, GES3222.

*Throughout the academic year, the above modules require three (3) hours practical works per week.

3. Year III, to be admitted to the module GES3372 Techniques in Spatial Analysis, a student must apply in writing to the Head of Department, and satisfy the following requirement:
Pass in all Geography modules offered in the second year of study (GES3211, GES3231, GES3202 and GES3222).

Students majoring in Geography and Environmental Studies must take three (3) modules as prescribed below:
GEA3311, GES3331, GES3352, GES3372

All students must register for one (1) excursion: GES3399
*Throughout the academic year, the above modules require three (3) hours practical works per week.

4. Year IV, to be admitted to year IV, a student must satisfy the following requirements:
Pass in all Geography modules in the previous three years of study. For GEA3450 Advanced Techniques in Spatial Analysis, a pass in GES3372 Techniques in Spatial Analysis. Students pursuing Geography as a double major must select their courses according to the following options:

(i) GEA3410.GEA3430, GEA3450 and GEA3479.

OR

(ii) GES3410, GES3430, GES3450.

B.8.5.1 GEOGRAPHY AND ENVIRONMENTAL STUDIES MAJOR

FIRST YEAR MODULES

GES3111 FUNDAMENTALS OF GEOGRAPHY

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: Students acquaint themselves with general foundations and basic concepts of Geography, including the subject's links to auxiliary disciplines (organisational plan). Structures, functions, processes, patterns and phenomena of physical ("natural") and human environments will be introduced with special reference to Namibia, in particular atmosphere, lithosphere, hydrosphere, biosphere; demographic features of population, economic activities and land-use; settlements and infrastructure.

GES3132 BASIC SKILLS IN GEOGRAPHY

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: This module familiarises students with the different techniques and tools essentially used by geographers and the properties of the geographical data or facts necessary in the investigating, studying, solving and application of geographical problems. Furthermore, the module also deals with various methods and techniques of data collection, organisation, processing, representation (skills and techniques) used to give geographers access to tools such as maps, remote sensing images, statistics and digital geographical data for computer processing (GIS).

SECOND YEAR MODULES

GES3211 PHYSICAL GEOGRAPHY 1

GES3202 PHYSICAL GEOGRAPHY 2

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: Two semesters which introduce climatology and hydrology; the climate, weather and water resources of Namibia; fluvial geomorphology, coastal and desert geomorphology; basic pedology; morphology of Namibia.

GES3231 HUMAN GEOGRAPHY 1

GES3222 HUMAN GEOGRAPHY 2

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: Two semesters which introduce themes in: Settlement Geography, namely physical structures, chains and hierarchies, migration and urbanisation, social and economic organisation; Economic Geography, namely distribution of renewable and non-renewable resources, economic sectors, models of agricultural location and location of industries, patterns of economic activity, world economy, development and economic reproduction in an era of post-Fordism; Social Geography, namely types of society, structures, indicators defining social and spatial disparities, gender equality, health and socio-economic development. Practicals: Closely relating to the content taught in the second year of study, exercises aim to develop the reflective skills of students through application of knowledge.

THIRD YEAR MODULES

GEA3311 ENVIRONMENTAL STUDIES

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: In the geographical context of space and time, the content of this module emphasises the interaction and inter-relationship of identified systems in Physical and Human Geography, and their impact on the natural and human environment. It focuses on issues and objectives of the human endeavour aiming at managing renewable and non-renewable resources within a paradigm of sustainability. Topics examine: ecosystems and environmental change; urban sprawl and loss of natural resources; food production, deforestation and desertification; loss of biodiversity; marine environments; transport infrastructure; approaches to energy supply; mining and rehabilitation of landscapes; war.

GES3331 GENERAL METHODS AND TECHNIQUES IN GEOGRAPHY

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: A semester laying the foundation in scientific method; hypothesis formulation; collection and compilation of data; research design and management; field survey and reconnaissance; summarising of results. An exposure to map production; basic geodesy; map and aerial photography analysis and interpretation complements this skills enhancing module.

GES3352 REGIONAL GEOGRAPHY

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: The module aims to further students' knowledge on regional structures and functions (politico-economic, socio-cultural) in Africa and other continents. It reflects facts and figures in a regional context, emphasising the interaction of local and external factors, forces and processes over distance and time. The module incorporates aspects of regional development against the background of different approaches to development (social welfare, structuralist, modernisation) and their paradigms. Students are encouraged to synthesise their knowledge and improve their understanding of regions.

GES3372 TECHNIQUES IN SPATIAL ANALYSIS

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: The module aims to further students' knowledge on regional structures and functions (politico-economic, socio-cultural) in Africa and other continents. It reflects facts and figures in a regional context, emphasising the interaction of local and external factors, forces and processes over distance and time. The module incorporates aspects of regional development against the background of different approaches to development (social welfare, structuralist, modernisation) and their paradigms. Students are encouraged to synthesise their knowledge and improve their understanding of regions.

GES3399 EXCURSION

Content: Excursions seek to familiarise students with methods and techniques required for observing, analysing and assessing environments on site.

FOURTH YEAR MODULES

GEA3410 CONCEPTS IN APPLIED GEOGRAPHY

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Co-requisite: GEA3479
Content: The application of geographical knowledge operates in a set of paradigms and models which are implicit to the analysis and creation of space at local, regional and (inter) national levels. This paper will provide theoretical foundations applied for an advanced understanding of geographical synthesis and problem solving, covering topics such as resource assessments, environmental obligations, land use potential, water demand management, development and spatial planning, poverty, integrated environmental management and urban management.

GEA3430 RESEARCH PROJECT IN SPATIAL PLANNING

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: This paper aims to enhance the capacity of students to apply obtained knowledge, understanding and skills to a 'real' planning problem under investigation. In advance, research projects are selected ad hoc in cooperation with the private and public sector, possibly responding to their needs and demands in the qualified labour market. With potential employment in mind, research projects are guided, and coordinated, by Departmental members in consultation with individual students.

GEA3450 ADVANCED TECHNIQUES IN SPATIAL ANALYSIS

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Prerequisite: A PASS IN GES3372
Content: The course seeks to introduce students to modern spatial data processing, development, implementation and functions of geographic information systems; data models and structures and analytical procedures; as well as applications of GIS to a variety of environmental issues. It also focuses on the basic mapping/database/information science and concepts that are fundamental to the working of any GIS package. The course also includes project work. Lab exercises provide students with advanced skills of ArcView 3.x , ArcInfo 8.x. and IDRISI/ILWIS software packages. They will be using the functionality of these software packages to:

- input and create maps of geographical locations and their attributes;
- perform spatial analyses using spatial and attribute data, and
- display the results of the analyses in the form of maps and tables.

GES3410 GEOGRAPHY OF TOURISM

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: Focusing on aspects such as regional distribution of tourism patterns; mass tourism versus alternative modes of tourism like eco-tourism, cultural tourism and adventure tourism; tourism as alternative economic activity for rural populations and sensitive environments; as mode to broaden the benefits to society; and the social, economic and environmental impacts of tourism; this paper investigates the growing significance of tourism research for Namibia in terms of ethical, environmental and economical responsibility.

GES3430 POLITICAL GEOGRAPHY

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: This paper focuses on changing patterns of politico-economic and socio-cultural landscapes, including Africa, addressing phenomena relating to the restructuring of the world economy.

GES3450 THEMES IN ADVANCED GEOGRAPHY

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: This paper focuses on themes in Physical and Human Geography, which may have been researched by, staff members or visiting lecturers. Themes require a great deal of course work and student presentation.

GEA3479 FIELD WORK

Assessment: Field work report 40%, cf. GEA 3430 Research Project in Spatial Planning
The contents and objective of this field work double-module is closely related to GEA 3430 Research Project in Spatial Planning.

B.8.6. GEOLOGY DEPARTMENT

DEPARTMENTAL REGULATIONS

Fieldwork to mines and places of geological interest are an integral part of the full geology curriculum. The field work activity includes 1-3 day trips and projects of 1-2 weeks duration during semester break or at year end.

B.8.6.1 GEOLOGY MAJOR

FIRST YEAR MODULES

MTS3101 MATHEMATICS 1A

MTS3132 FOUNDATION MATHEMATICS

MTS3121 ANALYTIC GEOMETRY AND COMPLEX NUMBERS

CHM3101 CHEMISTRY 1A

CHM3112 CHEMISTRY 1B

PHC3101 PHYSICS 1A

PHC3112 PHYSICS 1B

PHC3192

STS3101 STATISTICS 1A

UCC3109 COMPUTER LITERACY

UCE3119 ENGLISH COMMUNICATION &STUDY SKILLS

UCA3119 ENGLISH FOR ACADEMIC PURPOSES

UCI3109 CONTEMPORARY SOCIAL ISSUES

* ANY OTHER FIRST YEAR LEVEL MODULE IN SECOND SEMESTER

SECOND YEAR MODULES

GLY3211 INTRODUCTION TO PHYSICAL GEOLOGY (4L/week)

Course Equivalent: GLG3211
Contact time: 56
Practical Hours: 42
Assessment: Continuous 60% - Minimum: 5 practicals, 2 tests, 1 assignment
Exam: 40% -1 x 3 hour theory paper
Pre-requisites: MTS3132 Foundation Mathematics
Co-requisite: MTS3211 Calculus I
Content: The rock cycle; Theory of plate tectonics; the Solar system; Surface and internal Earth processes; Geological time; Minerals and rocks; Geological resources.

GLY3202 CRYSTALLOGRAPHY (2L/week)

Contact time: 28
Practical Hours: 21
Assessment: Continuous 60% -minimum: 5 practicals, 2 test
Exam: 40% - 1x2 hours theory paper; 1x2 hours practical paper
Pre-requisites: MTS3132 Foundation Mathematics
Co-requisites: GLY3211 Introduction to Physical Geology
Content: Crystals; crystal symmetry; crystal morphology; crystal projections; crystal classes and systems; Bravais lattices and Miller indices; space groups; crystal structure; crystal chemistry; X-ray diffraction.

GLY3212 STRATIGRAPHY AND GEOLOGICAL MAPPING (4L/week)

Contact time: 56
Practical Hours: 42
Assessment: Continuous 60% - minimum 7 practicals, 2 tests,1 assignment
Exam: 40% - 1x3 hours theory paper; 1x3 hours practical paper
Pre-requisites: MTS3132 Foundation Mathematics
Co-requisites: GLY3211 Introduction to Physical Geology
Content: Principles of stratigraphy; applications and type examples; geological history; geological time-scale; geological maps and structures; geological mapping techniques.

GLY3200 FIELD GEOLOGY I

Assessment: Field work 80%, Field Reports 20% No Exam
Contents: Introduction to field mapping techniques; Horizontal and dipping strata; field practicals and excursions, mine visits.

THIRD YEAR MODULES

GLY3301 MINERALOGY (2L/week)

Contact time: 28
Practical Hours: 21
Assessment: Continuous 40% - minimum5 practicals, 2 tests, 1 assignment
Exam: 60% - 1x2 hours theory paper; 1x2 hours practical paper
Pre-requisites: GLY3211 Introduction to Physical Geology and GLY3202 Crystallography
Co-requisites: GLY3302 Petrology
Content: Minerals: origin, structure, composition, and classification; Mineral phase diagrams; Rock-forming minerals; optical mineralogy, physical properties; Occurrence and uses.

GLY3331 SEDIMENTOLOGY AND PALAEONTOLOGY (4L/week)

Contact time: 56
Practical Hours: 42
Assessment: Continuous 40% - minimum 7 practicals, 2 tests, 1 assignment
Exam: 60% - 1x3 hours theory paper; 1x3 hours practical paper
Pre-requisites: GLY3211 Introduction to Physical Geology and GLY3212 Stratigraphy and Geological Mapping
Co-requisites: GLY3302 Petrology
Content: Principles of sedimentology and sedimentary analysis; sedimentation and sedimentary environments: processes, facies, stratigraphy, facies models; sedimentary structures; basin analysis; sedimentary petrology. Principles of palaeontology; fossils and the geological record.

GLY3321 PRINCIPLES OF GEOCHEMISTRY (2L/week)

Contact time: 28
Practical Hours: 21
Assessment: Continuous 40% - minimum 5 practicals, 2 tests, 1 assignment
Exam: 60% - 1x2 hours theory paper; 1x2 hours practical paper
Pre-requisites: GLY3211 Introduction to Physical Geology
Co-requisites: GLY3301 Mineralogy & GLY3302 Petrology
Content: Composition and structure of the Earth; Geochemical elements: origin and classification; mineral equilibria and the phase rule; aqueous environmental geochemistry; weathering and geochemical dispersion; Geochemistry of sedimentary, igneous and metamorphic rocks; Ore geochemistry; isotope geochemistry.

GLY3302 PETROLOGY (2L/week)

Contact time: 28
Practical Hours: 21
Assessment: Continuous 40% - minimum 5 practicals, 2 tests, 1 assignment
Exam: 60% - 1x2 hours theory paper; 1x2 hours practical paper
Pre-requisites: GLY3211 Introduction to Physical Geology & GLY3202 Crystallography
Co-requisites: GLY3321 Mineralogy
Content: Petrology of sedimentary, igneous and metamorphic rocks; Petrography; textures, composition, petrogenesis; Distribution and mode of occurrence.

GLY3322 PLATE TECTONICS (2L/week)

Contact time: 28
Practical Hours: 21
Assessment: Continuous 40% - minimum 5 practicals, 2 tests, 1 assignment
Exam: 60% - 1x2 hours theory paper; 1x2 hours practical paper
Pre-requisites: GLY3211 Introduction to Physical Geology & GLY3212Stratigraphy and Geological Mapping
Co-requisites: GLY3332 Structural Geology
Content: Global plate tectonics; Sea-floor spreading and continental drift; Origin and development of crustal plates; Geodynamics; Major crustal structures and plate kinematics.

GLY3332 STRUCTURAL GEOLOGY (4L/week)

Contact time: 56
Practical Hours: 42
Assessment: Continuous 40% - minimum 7 practicals, 2 tests, 1 assignment
Exam: 60% - 1x3 hours theory paper; 1x3 hours practical paper
Pre-requisites: GLY3212 Stratigraphy and Geological Mapping & GLY3211Introduction to Physical Geology, Calculus I (MTS3211) & Calculus II (MTS3232).
Co-requisites: GLY 3322 Plate Tectonics
Content: Geological structures: origin and development of folds, faults, joints, lineations; Field mapping project; Stereographic projection: analysis and interpretation of structures; Rock deformation: mechanisms and microstructures; shear zones and polyphase deformation; Petrofrabric analysis.

GLY3300 FIELD GEOLOGY II

Assessment: Field work 80%, Field Reports 20% No Exam
Geological field mapping exercises; complexly folded areas; field practicals, and excursions, mine visits.

FOURTH YEAR MODULES

GLY3411 IGNEOUS AND METAMORPHIC PETROGENESIS (4L/week)

Contact time: 56
Practical Hours: 42
Assessment: Continuous 50% - minimum 7 practicals, 2 tests, 1 assignment
Exam: 50% - 1x3 hours theory paper; 1x3 hours practical paper
Pre-requisites: GLY3301 Mineralogy & GLY3302 Petrology
Co-requisites: GLY3321 Principles of Geochemistry
Content: Magmatism and global tectonic processes: geochemical characteristics of igneous and metamorphic rocks; partial melting processes; igneous petrogenesis; Metamorphic facies, zones and belts; P-T-t paths and metamorphic mineral equilibria; metamorphic evolution and petrogenesis; Distribution and plate tectonic setting of igneous and metamorphic rocks.

GLY3431 ECONOMIC GEOLOGY (4L/week)

Contact time: 56
Practical Hours: 42
Assessment: Continuous 50% - minimum 7 practicals, 2 tests, 1 assignment
Exam: 50% -1 x 3 hours theory paper; 1x3 hours practical paper
Pre-requisites: GLY3301 Mineralogy & GLY3332 Structural Geology
Co-requisites: GLY3432 Exploration Geology and Geophysics
Content: Mineral economics: resources and reserves; Geological processes; Energy resources; Metallic resources; Nonmetallic resources; Water resources. Introduction to mineral deposit geology: Mineral deposit types and models: metallic ore deposits; industrial minerals and rocks; energy and fossil fuels. Geostatistics; Metallogeny; Ore microscopy.

GLY3432 EXPLORATION GEOLOGY AND GEOPHYSICS (4L/week)

Contact time: 56
Practical Hours: 42
Assessment: Continuous 50% - minimum 7 practicals, 2 tests, 1 assignment
Exam 50% -1 x 3 hours theory paper; 1x3 hours practical paper
Pre-requisites: GLY3332 Structural Geology & GLY3322 Plate Tectonics
Co-requisites: GLY3431 Economic Geology
Content: Geological exploration techniques; exploration surveys; drilling and sampling; remote sensing; exploration geochemistry. Geophysical exploration techniques; geophysical surveys: resistivity, electric, seismic, electromagnetic, gravity, magnetic; applications and case studies.

GLY3422 HYDROGEOLOGY (2L/week)

Contact time: 28
Practical Hours: 21
Assessment: Continuous 50% - minimum 5 practicals, 2 tests, 1 assignment
Exam: 50% -1x2 hours theory paper; 1x2 hours practical paper
Pre-requisites: GLY3332 Structural Geology, Calculus I (MTS3211) & Calculus(MTS3232).
Co-requisites: GLY3342 Principles of Geochemistry
Content: Principles of hydrogeology; Darcy's law, aquifers; surface and groundwater modeling; isotope hydrology, water pollution, water management; groundwater extraction; case studies.

GLY3402 REMOTE SENSING AND GIS (2L/week)

Contact time: 28
Practical Hours: 21
Assessment: Continuous 50% - minimum 5 practicals, 2 tests, 1 assignment
Exam 50% - 1x2 hours theory paper; 1x2 hours practical paper
Pre-requisites:GLY3332 Structural Geology, Calculus I (MTS3211) & Calculus(MTS3232).
Co-requisites: GLY3432 Exploration Geology and Geophysics
Content: Principles of remote sensing, applications, and interpretation; Photogeology, satellite imagery interpretation and analysis; digital mapping and image analysis; modeling with GIS.

GLY3400 FIELD GEOLOGY III

Assessment: Field work 80%, Field Reports 20% No Exam
Contents: Geological field mapping exercises; mineral exploration, hydrogeology; field practicals and excursions, mine visits.

GEOLOGY DEPARTMENT: COURSE EQUIVALENTS

TRIMESTER MODULE (S) FAILED	SEMESTER MODULE (S) TO BE TAKEN
GLG3211 Introduction to Physical Geology	GLY3211 Introduction to Physical Geology
GLG3212 Minerals and Rocks	GLY3211 Introduction to Physical Geology
GLG3213 Stratigraphy and Structural Geology	GLY3212 Stratigraphy and Geological Mapping
GLG3321 Mineralogy	GLY3301 Mineralogy
GLG3322 Petrology	GLY3302 Petrology
GLG3343 Stratigraphy and Paleaontology	GLY3331 Sedimentology and Palaeontology
GLG3331 Structural Geology and Plate Tectonics	GLY3322 Plate Tectonics + GLY3332 Structural Geology
GLG3362 Principles of Geochemistry	GLY3321 Principles of Geochemistry
GLG3353 Earth Resources	GLY3431 Economic Geology
GLG3421 Advanced Petrology	GLY3411 Igneous and Metamorphic Petrogenesis
GLG3431 Structural Geology and Remote Sensing	GLY3332 Structural Geology
GLG3442 Sedimentology	GLY3331 Sedimentology and Palaeontology
GLG3452 Mineral Deposit Geology	GLY3431 Economic Geology
GLG3473 Hydrogeology	GLY3422 Hydrogeology
GLG3453 Exploration Geology and Geophysics	GLY3432 Exploration Geology and Geophysics

GEOLOGY DEPARTMENT: COURSE CO-REQUISITES & PREREQUISITES

YEAR	COURSE CODE/ NAME	SEMESTER	PRE-REQUISITE	CO-REQUISITE
1				
	UCE3119 ENGLISH COMMUNICATION & STUDY SKILLS	1	NONE	
	UCA3119 ENGLISH FOR ACADEMIC PURPOSES	2	UCE3119	
	UCC3109 COMPUTER LITERACY	1	NONE	
	UCI3109 CONTEMPORARY SOCIAL ISSUES	2	NONE	
	MTS3101 MATHEMATICS 1A	1	IGSCSE MATHS OR SPECIAL REMEDIAL COURSE	NONE
	MTS3132 FOUNDATION MATHEMATICS	2	IGSCSE MATHEMATICS	MTS3101
	MTS3121ANALYTIC GEOMETRY AND COMPLEX NUMBERS	1	IGSCSE MATHEMATICS	NONE
	CHM3101 CHEMISTRY 1A	1	NONE	
	CHM3112 CHEMISTRY 1B	2	NONE	
	PHC3101 PHYSICS 1A	1	IGCSE PHYSICAL SCIENCE	MTS3101 Mathematics1A, STS3101 Statistics1A
	PHC3112 PHYSICS 1B	2	IGCSE PHYSICAL SCIENCE	MTS3132 Foundation Mathematics, MTS 3112 Mathematics1B, STS3101 Statistics1 A and PHC3192: LAB1 and PHC3101 Physics 1A.
	PHC3192:LAB1	2	IGCSE PHYSICAL SCIENCE	PHC3112
	STA3101 STATISTICS 1A	1	IGSCSE MATHEMATICS OR A SYMBOL 3 IN HIGCSE MATHEMATICS	
	* ANY OTHER FIRST YEAR LEVEL MODULE IN SECOND SEMESTER	2		
2	GLY3211 INTRODUCTION TO PHYSICAL GEOLOGY	1	MTS3132 Foundation Mathematics	MTS3211 Calculus I
	GLY3212 STRATIGRAPHY & GEOLOGICAL MAPPING	2	MTS3132 Foundation Mathematics	GLY3211 Introduction to Physical Geology
	GLY3202 CRYSTALLOGRAPHY	2	MTS3132 Foundation Mathematics	GLY3211 Introduction to Physical Geology
	GLY3200 FIELD GEOLOGY I	1-2		

3	GLY3301 MINERALOGY		GLY3211 Introduction to Physical Geology; GLY3202 Crystallography	GLY3302 Petrology
	GLY3321 PRINCIPLES OF GEOCHEMISTRY	1	GLY3211 Introduction to Physical Geology	GLY3302 Petrology
	GLY3331 SEDIMENTOLOGY& PALAEONTOLOGY	1	GLY3211 Introduction to Physical Geology; GLY3212 Stratigraphy & Geological Mapping	GLY3302 Petrology
	GLY3302 PETROLOGY	2	GLY3211 Introduction to Physical Geology GLY3202 Crystallography	GLY3301 Mineralogy
	GLY3322 PLATE TECTONICS	2	GLY3211 Introduction to Physical Geology; GLY3212 Stratigraphy & Geological Mapping	GLY3332 Structural Geology
	GLY3332 STRUCTURAL GEOLOGY	2	GLY3211 Introduction to Physical Geology; GLY3212 Stratigraphy & Geological Mapping	GLY3322 Plate Tectonics
	GLY3300 FIELD GEOLOGY II	1-2		
4	GLY3411 IGNEOUS & METAMORPHIC PETNOGENESIS	1	GLY3301 Mineralogy; GLY3302 Petrology	GLY3321 Principle of Geochemistry
	GLY3431 ECONOMIC GEOLOGY	1	GLY3301 Mineralogy; GLY3332 Structural Geology	GLY3432 Exploration Geology & Geophysics
	GLY3432 EXPLORATION GEOLOGY & GEOPHYSICS	2	GLY3332 Structural Geology; GLY3322 Plate Tectonics	GLY3431 Economic Geology
	GLY3402 REMOTE SENSING AND GIS	2	GLY3332 Structural Geology	GLY3432 Exploration Geology & Geophysics
	GLY3422 HYDRO GEOLOGY	2	GLY3332 Structural Geology	GLY3321 Principle of Geochemistry
	GLY3200 FIELD GEOLOGY III	1-2		

B.8.7 MATHEMATICS DEPARTMENT

B.8.7.1 MATHEMATICS MAJOR

DEPARTMENTAL REGULATIONS

Coursework (50%), Examination (50%)

FIRST YEAR MODULES:

MTS3101: MATHEMATICS 1 A (2 L/Week)

Contact time: 28 hours
1 hr practical per week: 14 hours
1 two-hour paper
Prerequisite: IGCSE Mathematics or special remedial course
This course is to be taken by all first year science students
Content: Sets: Notations and diagrams to describe sets, subsets, supersets, equality of sets, empty sets, singletons, intersection, union, disjoint sets, difference of two sets, complement. Simplification and expansion of algebraic expressions. The absolute value, triangle inequality, linear equations, linear inequalities, quadratic equations, quadratic inequalities. Points and lines in a plane: the distance formula, parallel and perpendicular lines, circles and tangent lines.

MTS3132: FOUNDATION MATHEMATICS (4L/week)

Contact time: 56 hours
1 hour practical per week: 14 hours
1 three-hour paper
Prerequisite: IGCSE Mathematics
Co-requisite: MTS 3101
Content: Functions: domain, codomain, range, image, preimage, one-to-one functions, onto functions, composite function, inverse of a function, even and odd functions, increasing and decreasing functions.
Euler's number and natural logarithm, polynomials, remainder and factor theorem, partial fractions,
Trigonometry; limit of a function, Newton quotient, derivative of a function, rules of differentiation, antiderivatives, area under a graph, the definite integral. Introduction to Matrices and Systems of Linear Equations: Matrix algebra, determinants, Inverses, Solutions of systems of linear equations by Cramer's rule and Gauss Elimination.

MTS3112: MATHEMATICS1B (4L/Week)

Contact time: 56 hours
1 hour practical per week: 14 hours
1 three-hour paper
Prerequisite: IGCSE Mathematics or special remedial course
Co-requisite: MTS3101
Course for students who do not major in mathematics.
Content: Functions and their graphs, Euler's number and natural logarithm, the exponential and logarithmic function. Sequences and series with application to life sciences. The binomial formula, binomial expansion and application, small systems of linear equations. 2×2 and 3×3 matrices. Trigonometry, differentiation, applications of the derivative: maxima, minima, increasing and decreasing functions.
Integration.

MTS3121: ANALYTIC GEOMETRY AND COMPLEX NUMBERS (2L/Week)

Contact time: 28 hours
1 hour practical per week: 14 hours
1 two-hour paper
Prerequisite: IGCSE Mathematics
Content: Conic sections: ellipse, parabola, hyperbola. Complex numbers: operations on complex numbers, the complex conjugate, Argand diagram. Vectors in two and three dimensions: addition of vectors, multiplication by a scalar, magnitude, dot product, cross product.

SECOND YEAR MODULES

MTS3211: CALCULUS I (4L/Week)

Contact time: 56 hours
2 hour practical per week: 28 hours
1 three-hour paper
Prerequisite: MTS3132
Content: Inverse trigonometric functions. Sequences and series of numbers: the limit of a sequence, absolutely convergent series, tests of convergence. Limits and continuity of functions: limit at a point, improper limit, continuity. Exponential and logarithmic function, hyperbolic functions, area functions. Derivatives: definition, rules of differentiation, chain rule, derivative of the inverse function, Rolle's theorem, Mean Value theorem, L' Hospital's rule, applications of the derivative. Partial differentiation, chain rule, directional derivative. Integration: antiderivatives, Riemann sums, fundamental theorem of calculus. Approximations of the definite Riemann integral: the trapezoidal rule, Simpson's rule. Applications of the definite Riemann integral.

MTS3201: SETS AND NUMBERS (2L/Week)

Contact time: 28 hours
1 hour practical per week: 14 hours
1 two-hour paper
Prerequisites: MTS3101, MTS3132
Content: Basic logic: implication, negation, contrapositive, conjunction, disjunction, equivalence.
Sets: de Morgan's laws, power set, Cartesian product, definition of a binary relation, functions as binary relations, preorder. Real numbers: natural numbers, integers, positional number systems, induction.
Complex numbers: argument, modulus-argument form, de Moivre's formula, fundamental theorem of algebra.

MTS3232: CALCULUS II (4L/Week)

Contact time: 56 hours
2 hour practical per week: 28 hours
1 three-hour paper
Prerequisite: MTS3132
Content: Integration techniques: integration by substitution, integration by parts, integration of rational functions. Power series: radius of convergence, interval of convergence, Taylor series, binomial theorem.
Simple types of ordinary differential equations. Line integral, surface and volume integrals, parametric representation of surfaces, vector fields, Green's theorem, Stokes theorem, Divergence theorem.

MTS3222: ELEMENTARY LINEAR ALGEBRA (2L/Week)

Contact time: 28 hours
1 hour practical per week: 14 hours
1 two-hour paper
Prerequisites: MTS3132
Content: Systems of linear equations, Gauss elimination and solutions of a system of linear equations, matrix algebra, determinant, inverse of a matrix, Cramer's rule, symmetric and skew-symmetric matrices, orthogonal matrices. Linear algebra in R^2, R^3, R^n: subspace, linear combination, linear independence, linear dependence, basis, dimension. Points, lines, planes and hyperplanes in R^2, R^3, R^n, orthogonality, angle.

THIRD YEAR MODULES

MTS3321: LINEAR ALGEBRA I (2L/Week)

Contact time: 28 hours
2 hour practical per week: 28 hours
1 two-hour paper
Prerequisite: MTS3222
Content: Elements of set theory: ordered pair, set-theoretical definition of a function, image and preimage of a set, family of sets, equivalence relation, partition, ordered set, equipotent set, countable set, Axiom of choice, Zorn's Lemma. Vector spaces: definition and examples, subspaces, operation on subspaces, complement of a subspace, Dedekind's Law, span of a subset, linearly independent set of vectors, basis.

MTS3311: REAL ANALYSIS I (4L/Week)

Contact time: 56 hours
3 hour practical per week: 42 hours
1 three-hour paper
Prerequisite: MTS3211, MTS3232
Content: The field R of the real numbers: bounded set, supremum and infimum, completeness property of R, Archimedean property of R, intervals. Sequences and series of real numbers: bounded sequence, monotonic sequence, the limit of a sequence, limit rules, subsequence, theorem of Bolzano-Weierstrass, Cauchy sequence, completeness of R, convergent and absolutely convergent series, convergence tests. The limit of a function at a point, limit rules, continuous functions, intermediate value theorem, maximum-minimum theorem, uniform continuity.Differentiation: definition of differentiability, rules of differentiation, mean value theorem, theorem of Taylor. The Euclidean space R^n: Euclidean metric, neighborhood, open set, closed set, limit of a sequence, theorem of Bolzano-Weierstrass, completeness of R^n, limit of a function, limit rules, continuous function.

MTS3381: ORDINARY DIFFERENTIAL EQUATIONS (2L/Week)

Contact time: 28 hours
1 hour practical per week: 14 hours
1 two-hour paper
Prerequisites: MTS3211, MTS3232
Content: Second order linear equations: homogenous equations with constant coefficients, complex roots of the characteristic equation, repeated roots ; non-homogenous equations : method of undetermined coefficients, variation of parameters. Series solution of second order linear equations. Bessel's equation. The Laplace transform : solution of initial value problems, inverse Laplace transform. System of first order linear equations, homogeneous linear system with constant coefficient, nonhomogeneous linear system.

MTS3312: LINEAR ALGEBRA II (4L/Week)

Contact time: 56 hours
3 hour practical per week: 42 hours
1 three-hour paper
Prerequisite: MTS3222
Co-requisite: MTS3321
Content: dimension of a vector space, dimension formula for subspaces, linear mappings: kernel, image, rank, defect, image and preimage of a subspace, isomorphism, coset, factor space, homomorphism theorem, dimension formula, linear form, dual. Endomorphisms: involution, projection, eigenvalue, eigenvector, eigenspace. Matrix theory: representation of a linear mapping by a matrix, change of basis, similar matrices. Euclidean vector spaces: scalar product, norm of a vector, Cauchy-Schwarz inequality, orthogonal basis, orthonormal basis, orthogonal mappings. Determinantal forms, determinant of an endomorphism, characteristic polynomial.

MTS3322: REAL ANALYSIS II (2L/Week)

Contact time: 28 hours
2 hour practical per week: 28 hours
1 two-hour paper
Prerequisite: MTS3211, MTS3232
Content: Partial differentiation: gradient, divergence, curl, partial derivatives of higher order.
Differentiation: differentiability, rules of differentiation, Jacobi matrix, Mean value inequality, Taylor's theorem, local extrema. Ordinary differential equations: initial value problem, separable, exact, linear, homogeneous equation,Variation of parameter, integrating factor.

MTS3362: NUMERICAL ANALYSIS I (2L/Week)

Contact time: 28 hours
1 hour practical per week: 14 hours
1 two-hour paper
Prerequisites: MTS3211, MTS3232
Content: Computer representation of numbers: binary numbers, floating point number; errors: definitions, sources, propagation of errors. Root finding: the bisection method, Newton's method, secant method simple fixed point iterative method for solving f(x)=0. The solution of linear equations: Gauss elimination and partial pivoting, tridiagonal matrices. LU decomposition method. Interpolation: polynomial interpolation, divided differences, errors in polynomial interpolation.

FOURTH YEAR MODULES

MTS3411: ALGEBRA (4L/Week)

Contact time: 56 hours
3 hour practical per week: 42 hours
1 three-hour paper
Pre-requisites: MTS3321, MTS3312
Content: Elementary number theory: divisibility, Euclidean division, greatest common divisor and least common multiple of a set of integers, p-exponents, fundamental theorem of arithmetic. Binary operations: properties of binary operations, powers, semigroup, monoid.Groups: definition and examples, subgroups, subgroup generated by a subset, cyclic group, finitely generated group, homomorphism, normal subgroup, isomorphism, automorphism, homomorphism theorem, conjugacy class of an element, conjugacy class of a subgroup.Rings: definition and examples, endomorphism ring of an abelian group, characteristic, subring, homomorphism, ideal, isomorphism, homomorphism theorem, polynomial ring, principal ideal domain.

MTS3431: GENERAL TOPOLOGY (4L/Week)

Contact time: 56 hours
2 hour practical per week: 28hours
1 three-hour paper
Pre-requisites: MTS3311, MTS3321, MTS3322
Content: Topological spaces: topologies on a set, topological space, open set, closed set, boundary, neighbourhood, neighbourhood filter, accumulation point, derived set, dense set, nowhere dense set, cluster points and limits of a sequence, separation axioms, continuous function, connected subset, connected subset of R, quasicompact space, compact space, theorem of Heine-Borel. Metric spaces: metric on a set, metric space, topology induced by a metric, distance between a point and a subset, Cauchy sequence, completeness. Normed vector spaces: norm of a K-vector space, topology of a normed K-vector space.

MTS3422: PARTIAL DIFFERENTIAL EQUATIONS (2L/Week)

Contact time: 28 hours
1 hour practical per week: 14 hours
1 two-hour paper
Prerequisites: MTS3211, MTS3232
Content: First order equations: basic properties of the linear equations, solutions of linear equations, the general first order non-linear equations, Fourier series and applications. Linear second order equations in two independent variables: classification of linear second order equations into parabolic, hyperbolic and elliptic equations. Methods of solutions: separation of variables, the one-dimensional wave equation, the finite vibrating string, boundary conditions associated with the wave equation.

MTS3432: COMPLEX ANALYSIS (4L/Week)

Contact time: 56 hours
3 hours practical per week: 42 hours
1 three-hour paper
Pre-requisites: MTS3311, MTS3322
Content: The field C of the complex numbers: construction of C, absolute value, modulus-argument form, roots of unity, non-orderability of C, complex number plane. Sequences and series: bounded sequence, convergent sequence, theorem of Bolzano-Weierstrass, completeness of C, convergent series, absolutely convergent series, rearrangement of a series, product of two series, Cauchy product. Differentiation: definition, rules of differentiation, Cauchy-Riemann equations.
Holomorphic functions: definition, mean value inequality, analyticity of holomorphic functions. Power series: set of convergence, radius of convergence, Abel's lemma, differentiability of the sum, exponential function, circular functions, Euler's formula.
Integral of a complex-valued function, rules of integration, standard estimate, fundamental theorem, path, operation on paths, rectifiable path, piecewise C^1-path, path integral, Goursat's Lemma, star-shaped region, Cauchy's integral theorem, Cauchy's integral formula, Taylor series, analyticity of holomorphic functions, Liouville's theorem, fundamental theorem of algebra, maximum principle, open mapping theorem, isolated singularity, Laurent series, residue, residue theorem.

MTS3412: NUMERICAL ANALYSIS II (2L/Week)

Contact time: 28 hours
1 hour practical per week: 14 hours
1 two-hour paper
Prerequisites: MTS3362
Content: Approximations of functions: the discrete and continuous least squares approximation problems; first degree and second degree splines, natural cubic splines. Numerical quadrature: Newton-Cotes methods, Gaussian quadrature methods, Romberg integration. Ordinary differential equations: Taylor series methods , Runge-Kutta methods. Boundary value problems of ordinary differential equations: the shooting method, the finite difference method.

NB: STUDENTS OPTING FOR A MAJOR IN MATHEMATICS, STATISTICS, GEOLOGY, CHEMISTRY, COMPUTING, AND PHYSICS (SHOULD REGISTER FOR MTS3121 ANALYTIC GEOMETRY AND COMPLEX NUMBERS IN FIRST YEAR, MTS3211 CALCULUS I AND MTS3232 CALCULUS II IN SECOND YEAR)

MATHEMATICS DEPARTMENT: COURSE PREREQUISITES/ CO-REQUISITE

YEAR	COURSE CODE/ NAME	SEMESTER	PREREQUISITE	CO-REQUISITE
1	MTS3301: Mathematics 1A	1	IGCSE Mathematics Special remedial course	none
	MTS3121: Analytic Geometry and Complex Numbers	1	IGCSE Mathematics	none
	MTS3132: Foundation Mathematics	2	IGCSE Mathematics	MTS3101
	MTS3112: Mathematics 1B	2	IGCSE Mathematics Special remedial course	MTS3101
2	MTS3211: Calculus I	1	MTS3132	none
	MTS3201: Sets and Numbers	1	MTS3101, MTS3132	none
	MTS3232: Calculus II	2	MTS3132	none
	MTS3222: Elementary Linear Algebra	2	MTS3132	none
3	MTS3321: Linear Algebra I	1	MTS3222	none
	MTS3311: Real Analysis I	1	MTS3211, MTS3232	none
	MTS3381:Ordinary Differential Equations	1	MTS3211, MTS3232	none
	MTS3312: Linear Algebra II	2	MTS3222	MTS3321
	MTS3322: Real Analysis II	2	MTS3211, MTS3232	none
	MTS3362: Numerical Analysis I	2	MTS3211, MTS3232	none
4	MTS3411: Algebra	1	MTS3321, MTS3312	none
	MTS3431: General Topology	1	MTS3311, MTS3321, MTS3322	none
	MTS3422: Partial Differential Equations	2	MTS3211, MTS3232	none
	MTS3432: Complex Analysis	2	MTS3311, MTS3322	none
	MTS3412: Numerical Analysis II	2	MTS3362	none

MATHEMATICS DEPARTMENT: COURSE EQUIVALENTS

Trimester module(s) failed	Semester module (s) to be taken	NEW
MAT0101/2/3	MTH3101: Mathematics 1A	MTS3101: Mathematics 1A
	MTH3121: Linear Algebra I	MTS3121: Analytic Geometry and complex numbers
MAT0101/2/3	MTH3132: Foundation Mathematics	MTS3132: Foundation mathematics
MAT0101/2/3	MTH3112: Mathematics 1B	MTS3112: Mathematics 1B
MAT3211, MAT3212	MTH 3211: Calculus I	MTS3211: Calculus I
MAT3221, MAT3391	MTH 3201: Set Theory and Functions	MTS3201: Sets and numbers
MAT3213, MAT3333	MTH 3232: Calculus II	MTS3232: Calculus II
MAT3222		MTS3222: Elementary Linear Algebra
MAT 3311	MTH 3311: Linear Algebra II	MTS3321: Linear Algebra I
MAT3331	MTH3382: Ordinary Differential Equations	MTS3381:Ordinary Differential Equations
MAT3321, MAT3322,MAT3392	MTH 3321: Real Analysis I	MTS3311: Real Analysis I
MAT3312, MAT3313		MTS3312: Linear Algebra II
MAT3322, MAT3323	MTH 3322: Real Analysis II	MTS3322: Real Analysis II
	MTH3362:Numerical Analysis I	MTS3362: Numerical Analysis I
MAT3411, MAT3412	MTH3301: Group Theory MTH3342: Ring Theory	MTS3411: Algebra
MAT3432, MAT3433	MTH3431: Complex Analysis	MTS3432: Complex Analysis
MAT3421, MAT3423	MTH3432:Topology and Normed Linear Spaces	MTS3431: General Topology
MAT3441	MTH3411: Partial Differential Equations	MTS3422:Partial Differential Equations
MAT3442, MAT3443	MTH3412:Numerical Analysis II	MTS3412: Numerical Analysis II

B. 8.8. PHYSICS DEPARTMENT

B.8.8.1 PHYSICS MAJOR

DEPARTMENTAL REGULATIONS

All physics modules have practical sessions attached to them. However, the practical component of a given module has been separated and included in a purely practical or laboratory module that is offered in the corresponding semester. While the contact time (time for lectures) for a full theoretical or physics module is 56 hours, there is no contact time for the laboratory modules although the practical work will take 3 hours per week. Many physics modules also have attached time which can be used for additional non-lecture activities such as special practical work. A student registering for a physics module (except PHC3101 and PHC2102) must also register for the corresponding laboratory module unless the student has passed the laboratory module in previous years. For a student to pass or successfully complete a year, the student must pass both the theoretical and associated laboratory modules.

The code structure employed in this curriculum is:

	[Subject Code]	[Degree]	[level]	[Module type]	[Semester]
i.e.	[PHC]	[3]	[1 – 4]	[full or half]	[1 or 2]

FIRST YEAR MODULES

PHC3101: PHYSICS 1A (2L/week)

Equivalent: PHY3119
Contact Time: 28 hours
Practical Time: 14 sessions (42 hours)
Assessment: Continuous 50 Exam 50% (1 x 3-hour paper)
Pre-requisites: IGCSE Physical Science
Co-Requisites: MTS 3101Mathematics1A, STS3101 Statistics1A
Content: Units and unit conversion; Vectors; Motion in one and two dimensions; Newton's laws of motion and applications; Static's; Gravitation; Work, energy and power; Introduction to momentum; (Practical lessons)

PHC3112: PHYSICS 1B (4L/week)

Equivalent: PHY3119
Contact Time: 56 hours
Attached Time: 0
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: IGCSE Physical Science
Co-Requisites: MTS3132 Foundation Mathematics, (rec)/ MTS 3112 Mathematics 1B,STS3101 Statistics1 A and PHC3192: LAB1and PHC3101 Physics 1A.
Content: electric charge; insulators and conductors; Electric force and coulomb's law
Electric field and Gauss's law; Electric potential; Capacitance and capacitors; Direct current; Ohm's law and simple circuits; Concept of magnetic field; Alternating current; Transformers; Phenomenological approach to RL and RC circuits; Temperature, gas and thermal expansion; Basic geometrical optics; Radioactivity and its detection.

PHC3192: LAB1 (1S/week)

Contact Time: 0
Practical Time: 14 sessions (42 hours)
Assessment: Continuous Only 100% minimum: 5 items
Pre-requisites: IGCSE Physical Science
Co-Requisites: PHC3112: Physics 1B
Content: Experiments related to PHC3112.

PHC2102: PHYSICS FOR RADIOGRAPHERS (2L/week)

Equivalent: PHY3143 (This course is for students in the Faculty of Medical & Health Science.)
Contact Time: 28 hours
Practical Time: 7 sessions (21 hours)
Assessment: Continuous 50% Exam 50% (1 x 2-hour paper)
Pre-requisites:
Co-Requisites:
Content: Electromagnetic radiation; Quantum theory of radiation; X-rays, gamma-rays and apparatus; Interaction of radiation with matter; Radioactivity and its detection; Radiological protection; (Practical sessions).

SECOND YEAR MODULES

PHC3211: MECHANICS (4L/week)

Equivalent: PHY3211/PHY3202
Contact Time: 56 hours
Attached Time: 14 hours
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: PHC3101Physics 1A, PHC3112: Physics 1B, MTS3101 Mathematics 1A and MTS3132 Foundation Mathematics
Co-Requisites: PHC3291: LAB2S1 & MTS3211 Calculus 1
Content: Units, Physical quantities and vectors; Motion along a straight line; Motion in 2 or 3 dimensions; Newton's laws of motion; Applications of Newton's laws; Work and kinetic energy;
Potential energy and energy conservation; Momentum, impulse and collisions; Rotation of rigid bodies; Dynamics of rotational motion; Equilibrium and elasticity; Gravitation; Periodic motion; Fluid mechanics

PHC3201: THERMODYNAMICS; WAVES (2L/week)

Course Equivalent:
Contact Time: 28 hours
Attached Time: 7 hours
Assessment: Continuous 50% Exam 50% (1 x 2-hour paper)
Pre-requisites: PHC3101Physics 1A, PHC3112: Physics 1B, MTS3101 Mathematics 1A and MTS3132 Foundation Mathematics
Co-Requisites: PHC3291: LAB2S1, PHC3211: Mechanics and MTS3211 Calculus I
Content: Temperature and heat; Thermal properties of matter; The First Law of thermodynamics; The Second Law of thermodynamics; Mechanical waves; Wave interference and normal modes; Sound and hearing.

PHC3291: LAB2S1 (1S/week)

Course Equivalent:
Contact Time: 0
Practical Time: 14 sessions (42 hours)
Assessment: Continuous 50% minimum: 5 items Practical Exam 50% (1 x 3-hour exam)
Pre-requisites: PHC3192: LAB1
Co-Requisites: PHC3211: Mechanics/ PHC3201: Thermodynamics; Waves
Content: Experiments on topics related to PHC3211 and PHC3201.

PHC3212: ELECTROMAGNETISM; OPTICS (4L/week)

Course Equivalent: PHY3222 / PHY3202
Contact Time: 56 hours
Attached Time: 14 hours
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: PHC3101Physics 1A, PHC3112: Physics 1B, MTS3101 Mathematics 1A and MTS3132 Foundation Mathematics
Co-Requisites: PHC3292: LAB2S2, PHC3211: Mechanics and MTS3232 Calculus II
Content: Electric charge and electric field; Gauss's Law; Electric potential; Capacitance and dielectrics; Current, resistance and electromotive force; Direct current circuits; Magnetic field and magnetic forces;

Sources of magnetic fields; Electromagnetic induction; Inductance; Alternating current; Electromagnetic waves; The nature and propagation of light; Geometric optics; Interference; Diffraction.

PHC3202: MODERN PHYSICS (2L/week)

Course Equivalent: PHY3233/ PHY3203
Contact Time: 28 hours
Attached Time: 7 hours
Assessment: Continuous 50% Exam 50% (1 x 2-hour paper)
Pre-requisites: PHC3101Physics 1A, PHC3112: Physics 1B, MTS3101 Mathematics 1A and MTS3132 Foundation Mathematics
Co-Requisites: PHC3292: LAB2S2, PHC3211: Mechanics, PHC3201: Thermodynamics; Waves PHC3212: Electromagnetism; Optics & MTS3232: Calculus II
Content: Relativity; Photons, electrons and atoms; The wave nature of particles; Quantum mechanics; Atomic structure; Molecules and condensed matter; Nuclear physics; Particle physics and cosmology

PHC3292: LAB2S2 (1S/week)

Course Equivalent:
Contact Time: 0
Practical Time: 14 sessions (42 hours)
Assessment: Continuous [50%] minimum: 5 items Exam 50% (1 x 3-hour exam)
Pre-requisites: PHC3192: LAB1
Co-Requisites: PHC3212: Electromagnetism; Optics & PHC3202: Modern Physics
Content: Experiments on topics related to PHC3212 and PHC3202.

THIRD YEAR MODULES

PHC3311: CLASSICAL MECHANICS A (4L/week)

Course Equivalent: PHY3319 (1st half)
Contact Time: 56 hours
Attached Time: 42 hours
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: PHC3211: Mechanics, MTS3211: Calculus I & MTS3232: Calculus II
Co-Requisites: PHC3391: LAB3S1
Content: MATHEMATICAL PRIMER; Relative motion; Galilean and Lorentz transformations; Four-vectors; Translating and rotating coordinate systems; Newtonian kinematics and dynamics; Central forces; Friction; Variable mass, multi-particle and rigid-body dynamics; Special relativity and Doppler shifts; Degrees of freedom; Constraints.

PHC3331: ELECTRONICS (4L/week)

Course Equivalent: PHY3361
Contact Time: 56 hours
Attached Time: 0
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: PHC3212: Electromagnetism; Optics MTS3211: Calculus I
Co-Requisites: PHC3391: LAB3S1
Content: Conduction in semiconductors; p-n junction; diodes and diode circuits; transistors; amplifiers; op-amps; transfer functions; feedback and oscillation; mixers and detectors; digital codes; logic devices; logic.

PHC3391: LAB3S1 (1S/week)

Course Equivalent:
Contact Time: 0
Practical Time: 14 sessions (42 hours)
Assessment: Continuous 50% minimum: 5 items Exam 50% (1 x 3-hour exam)
Pre-requisites: PHC3291: LAB2S1 PHC3292: LAB2S2
Co-Requisites: PHC3311: Classical Mechanics A/ PHC3331: Electronics
Content: Experiments on topics related to PHC3311 and especially PHC3331.

PHC3312: CLASSICAL MECHANICS B (4L/week)

Course Equivalent: PHY3319 (2nd half)
Contact Time: 56 hours
Attached Time: 21 hours
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: PHC3211: Mechanics, MTS3211: Calculus I & MTS3232: Calculus II
Co-Requisites: PHC3392: LAB3S2 & PHC3311: Classical Mechanics A
Content: Lagrangian and Hamiltonian mechanics; Free, damped and forced simple harmonic motion; Travelling waves; Transmission and reflection by impedances; The 1-dimensional wave equation and its solution(s); The 3-dimensional wave equation

PHC3332: ELECTRODYNAMICS (4L/week)

Course Equivalent: PHY3322
Contact Time: 56 hours Attached Time: 21 hours
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: PHC3212: Electromagnetism; Optics & MTS3211: Calculus I and MTS3232: Calculus II
Co-Requisites: PHC3392: LAB3S2, PHC3311: Classical Mechanics A, & PHC3312: Classical Mechanics B
Content: The electrostatic field E and its divergence and curl; Electric potential, work and energy in electrostatics; Poisson's and Laplace's equations; The method of images; Polarisation and electric displacement; Linear dielectrics; The magnetostatic field B and its divergence and curl; Vector potential; Magnetisation and the auxiliary field H; Linear and non-linear media; Faraday's Law and Maxwell's equations in vacuum and matter; Electrodynamic potential formulation; Energy and momentum in electrodynamics; Electromagnetic waves in vacuum, non-conducting and conducting media; Electromagnetic radiation.

PHC3392: LAB3S2 (1S/week)

Course Equivalent:
Contact Time: 0
Practical Time: 14 sessions (42 hours)
Assessment: Continuous 50% minimum: 5 items Exam 50% (1 x 3-hour exam)
Pre-requisites: PHC3291: LAB2S1& PHC3292: LAB2S2
Co-Requisites: PHC3312: Classical Mechanics B & / PHC3332: Electrodynamics
Content: Experiments related to topics from PHC3312 and PHC3332.

FOURTH YEAR MODULES

PHC3411: QUANTUM MECHANICS (4L/week)

Course Equivalent: PHY3411
Contact Time: 56 hours
Attached Time: 21 hours
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: PHC3312: Classical Mechanics B & PHC3202: Modern Physics
Co-Requisites: PHC3491: LAB4S1
Content: MATHEMATICAL PRIMER; Historical review; The postulates of quantum mechanics; Operators, eigenfunctions and eigenvalues; Preparatory concepts; Spaces and Hermitian operators; Superposition and compatible observables; Time development, conservation and parity; 1-dimensional problems; Bound and unbound states; Finite potential well, periodic lattice; Problems with 2 degrees of freedom; Angular momentum; Problems in 3 dimensions; Elements of matrix mechanics; Spin wave functions; Applications to atomic, molecular, solid state and nuclear physics; Quantum statistics; Peturbation theory.

PHC3431: THERMODYNAMICS AND STATISTICAL MECHANICS (4L/week)

Course Equivalent: PHY3422
Contact Time: 56 hours
Attached Time: 21 hours
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: PHC3201: Thermodynamics; Waves / PHC3311: Classical Mechanics A
Co-Requisites: PHC3491: LAB4S1& PHC3411: Quantum Mechanics
Content: Fundamental concepts; Equations of state; The First Law of thermodynamics and its consequences; Entropy and the Second Law of thermodynamics; The combined First and Second Laws;

Thermodynamic potentials; Applications to simple systems; Kinetic theory; Intermolecular forces and transport phenomena; Thermodynamic statistics; Applications of quantum statistics to gasses and other systems.

PHC3491: LAB4S1 (1S/week)

Course Equivalent:
Contact Time: 0
Practical Time: 14 sessions (42 hours)
Assessment: Continuous 50% minimum: 5 items Exam 50% (1 x 3-hour exam)
Pre-requisites: PHC3391: LAB3S1& PHC3392: LAB3S2
Co-Requisites: PHC3411: Quantum Mechanics & PHC3431: Thermodynamics and Statistical Mechanics
Content: Experiments related to topics from PHC3411 and PHC3431.

PHC3412: SOLID STATE PHYSICS (4L/week)

Course Equivalent: PHY3451
Contact Time: 56 hours
Attached Time: 3 hours
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: PHC3202: Modern Physics & PHC3312: Classical Mechanics B
Co-Requisites: PHC3411: Quantum Mechanics, PHC3431: Thermodynamics and Statistical Mechanics & PHC3492: LAB4S2
Content: Crystal structure; Crystal diffraction; Crystal binding, Lattice dynamics; Electrons in metals; Semiconductors; Superconductivity.

PHC3492: LAB4S2 (3S/term)

Course Equivalent:
Contact Time: 0
Practical Time: 3 sessions (9 hours)
Assessment: Continuous Only 100% minimum 1 item
Pre-requisites: PHC3391: LAB3S1 & PHC3392: LAB3S2
Co-Requisites: PHC3412: Solid State Physics
Content: Experiment(s) on topics related to PHC3412.

PHC3402: APPLIED PHYSICS A (2L/week + 12S/term) each

Course Equivalent: PHY3433 (1st half)
Contact Time: 28 hours each
Attached Time: 36 hours each
Assessment: Continuous 50% Exam 50% (1 x 2-hour paper)
Pre-requisites: PHC3311: Classical Mechanics A, PHC3331: Electronics, PHC3312: Classical Mechanics B, PHC3332: Electrodynamics
Co-Requisites: PHC3411: Quantum Mechanics, PHC3431: Thermodynamics and Statistical Mechanics & PHC3412: Solid State Physics
Content: Applied Physics A is a half module that has the aim of introducing students to more specific areas of application. The module is to be extremely flexible. It may take the form of a lectured course in an applied field with attached practicals or a small number of project-like practicals,. On the other end of the spectrum, it may take the form of a project under the guidance of an expert. The detail depends on the availability of expertise within the Department and the availability of experts (and projects) from within Namibia or abroad. Topics like Geophysics, Nuclear Physics, Laser Physics; Astrophysics; Solid State Physics, Atmospheric Physics, Instrumentation and Computational Physics are foreseen to be available. Initially the Department will make a choice of two topics but during later years, when major projects are up and running, we aim to have the students choose one individual project.

PHC3422: APPLIED PHYSICS B (2L/week + 12S/term) each

Course Equivalent : PHY3422(2nd half)
Contact Time: 28 hours each
Attached Time: 36 hours each
Assessment: Continuous 50% Exam 50% (1 x 2-hour paper)
Pre-requisites: PHC3311: Classical Mechanics A, PHC3331: Electronics PHC3312: Classical Mechanics B & PHC3332: Electrodynamics

Co-Requisites: PHC3411: Quantum Mechanics, PHC3431: Thermodynamics and Statistical Mechanics & PHC3412: Solid State Physics
Content: As described under PHC3402 - Applied Physics A but with topics different from those chosen for PHC3402 in a particular semester.

NON-PHYSICS CODES USED IN THE TABLE BELOW:

H.Math.	HIGCSE Mathematics
H.Sci.	HIGCSE Physical Science
STS 3121	Statistics 1A
MTS3101	Mathematics 1A
MTS3121	Analytic Geometry and Complex numbers
MTS3132	Foundation Mathematics
MTS3211	Calculus I
MTS3232	Calculus II

PHYSICS DEPARTMENT: COURSE EQUIVALENTS

Trimester Module(s) Failed	Semester Module(s) to be Taken
PHY3119 Introductory Concepts	PHC3112 Physics 1 B PHC3101 Physics 1A
PHY3143 Physics for Radiographers	PHC2102 Physics for Radiographers
PHY3153 Introductory Modern Physics	Repeat of PHY3153 Introductory Modern Physics
PHY3201 General Physics 1	PHC3211 Mechanics
PHY3202 General Physics 2	PHC3212 Electromagnetism: Optics
PHY3203 General Physics 3	PHC3202 Modern Physics
PHY3319 Classical Mechanics	PHC3311 Classical Mechanics A + PHC3312 Classical Mechanics B
PHY3361 Electronics	PHC3331 Electronics
PHY3322 Electromagnetism	PHC3332 Electrodynamics
PHY3333 Waves	PHC3312 Classical Mechanics B
PHY3373 Advanced Modern Physics	Repeat of PHY3373 Advanced Modern Physics
PHY3411 Quantum Mechanics	PHC3411 Quantum Mechanics
PHY3452 Properties of Matter	PHC3412 Solid State Physics
PHY3422 Thermostatistics	PHC3431 Thermodynamics and Stastistical Mechanics
PHY3433 Applied Physics	PHC3402 Applied Physics A + PHC3422 Applied Physics B

PHYSICS DEPARTMENT: PRE-REQUISITES AND CO-REQIUSITES

YEAR	MODULE	PRE-REQUISITE	CO-REQUISITE
1	PHC3101: Physics 1A	IGCSE Physical Science	MTS3101, STS3121
	PHC3112: Physics 1B	IGCSE Physical Science	PHC3101, PHC3129, MTS3101, STS3121 MTS3132/MTS3112
	PHC3192: LAB1	IGCSE Physical Science	PHC3112
2	PHC3211: Mechanics	PHC3101/H.Sci PHC3112 / H.Sci. MTS3132 / H.Math. MTS3101	PHC3291, MTS3211
	PHC3201: Thermodynamics; Waves	PHC3101/ H.Sci PHC3112 / H.Sci. MTS3132 / H.Math. MTS3101	PHC3291 PHC3211 MTS3211
	PHC3291: LAB2S1	PHC3192	PHC3211/ PHC3201
	PHC3212: Electromagnetism; Optics	PHC3101/H.Sci PHC3112 / H.Sci. MTS3132 / H.Math. MTS3101	PHC3292 PHC3211 MTS3232
	PHC3202: Modern Physics	PHC3101/H.Sci PHC3112 / H.Sci. MTS3101 MTS3132 / H.Math.	PHC3292 PHC3211 PHC3201 PHC3212 MTS3232
	PHC3292: LAB2S2	PHC3192	PHC3212/ PHC3202
3	PHC3311: Classical Mechanics A	PHC3211, MTS3211 MTS3232	PHC3391
	PHC3331: Electronics	PHC3212, MTS3211	PHC3391
	PHC3391: LAB3S1	PHC3291, PHC3292	PHC3311/ PHC3331
	PHC3312: Classical Mechanics B	PHC3211, MTS3211 MTS3232	PHC3392 PHC3311
	PHC3332: Electrodynamics	PHC3212, MTS3211 MTS3232	PHC3392, PHC3311 PHC3312
	PHC3392: LAB3S2	PHC3291, PHC3292	PHC3312/ PHC3332
4	PHC3411: Quantum Mechanics	PHC3312, PHC3202	PHC3491
	PHC3431: Thermodynamics and Statistical Mechanics	PHC3201, PHC3311	PHC3491, PHC3411
	PHC3491: LAB4S1	PHC3391, PHC3392	PHC3411/ PHC3431
	PHC3412: Solid State Physics	PHC3202, PHC3312	PHC3492, PHC3411PHC3431
	PHC3492: LAB4S2	PHC3391, PHC3392	PHC3412
	PHC3402 & PHY3422: Applied Physics A & B	PHC3311, PHC3331 PHC3312, PHC3332	PHC3411, PHC3431 PHC3412

B. 8.9. PSYCHOLOGY DEPARTMENT (IN THE FACULTY OF HUMANITIES AND SOCIAL SCIENCES)

DEPARTMENTAL REGULATIONS

A student in possession of a Bachelor degree with Psychology as a major and who complies to the University's regulations for postgraduate studies, qualifies to apply for admission to postgraduate (MA) studies in Psychology.

1. Year I, students in Psychology must take two (2) modules below:
   PSG3111 and PSG3132

2. Year II and Year III, to be admitted to year II, a student must satisfy the following requirement:
   Pass in PGS3111 and PGS3132.

   Students must take note of the fact that the modules of the second and third years are interchangeable. The modules are therefore not related to a specific year. Students majoring in Psychology must take six (6) modules from the list below during the second and third years.
   PSG3211, PSG3311, PSG3232, PSG3252, PSG3332 and PSG3352,

3. Year IV, to be admitted in year IV, a student must satisfy the following requirements:
   A pass in both first year modules PSG3111 and PSG3132, a pass in at least four (4) Psychology modules in second and third year.

B.8.9.1 PSYCHOLOGY MAJOR

FIRST YEAR MODULES

PSG3111 FOUNDATIONS OF PSYCHOLOGY

During the course of this module students will become familiar with the major themes of Psychology as a discipline. Major areas of psychology such as cognition, emotion and motivation will be covered.

PSG3132 SOCIAL PSYCHOLOGY

This module will introduce students to the social basis of behaviour in a multi-cultural society. Students will become familiar with the following: group processes and dynamics, social categorisation, concepts of socialisation, conflict and conflict management.

SECOND YEAR AND THIRD YEAR MODULES

PSG3211 DEVELOPMENTAL PSYCHOLOGY OF CHILDHOOD AND ADOLESCENCE

This will be an introduction to different theoretical approaches of developmental psychology with specific reference to childhood and adolescence. Themes such as intellectual/cognitive development, physical development and socio-emotional development will be addressed.

PSG3232 THEORISING THE PERSON

Students will be introduced to different approaches of conceptualizing the person in psychology. This will include the conflict model with Freud as the major representative, the fulfillment model with Rogers' theory as the prototype, social cognitive learning theory as articulated by Bandura, and existentialism.

PSG3252 RESEARCH METHODOLOGY AND METHODS

Students will be familiarised with different research traditions, and with basic research criteria, i.e. validity, reliability, norms and objectivity. Basic statistical procedures and techniques, which will include inferential statistics and hypothesis testing, will be introduced.

PSG3311 PSYCHOPATHOLOGY

This module strives to maintain a balance between a universalistic approach as epitomized by the DSM (Diagnostic and Statistical Manual for Mental Disorder) and local conceptualisations of psychological disturbance. Students will become familiar with a range of psychological disorders, including ways of conceptualising and understanding these.

PSG3352 THERAPEUTIC PSYCHOLOGY

Students will become familiar with different approaches to psychotherapy. This module will also engage students in critical discussion of the values, processes and ethics pertaining to different approaches to psychotherapy.

PSG3332 APPLIED PSYCHOLOGY

This module will be tailored to the needs of students who are interested in the practice of psychology in various fields. Themes to be addressed will include: assessment, counselling skills, interview skills, negotiation skills, and the presenting of training workshops.

FOURTH YEAR MODULES

PSG3410 ADVANCED RESEARCH METHODOLOGY AND METHODS

Students will learn how to conceptualise a research project and will develop the skills which would enable them to carry out a research project. Students will develop an understanding of different research paradigms such as positivism and against that background will become familiar with quantitative methods (including statistical methods such as factor analysis, regression analysis, analysis of variance) as well as with qualitative methods for research.

PSG3430 DEVELOPMENTAL PSYCHOLOGY OF ADULTHOOD AND OLD AGE

This course will serve to familiarise students with various approaches to human development, specifically as these pertain to early, middle and late adulthood. So-called critical life events such as marriage, divorce, first employment, unemployment, retirement and death and their relevance for development will be dealt with.

PSG3450 INTRA-AND INTERPSYCHOLOGICAL THEORIES

The focus of this course is on the self-in-society and on social historical construction of the human mind. The theorists relevant for this paper are amongst others, Freud, Lacan and Vygotsky.

B. 8.10. STATISTICS DEPARTMENT

DEPARTMENTAL REGULATIONS

Service Courses:

STS3221 Statistics for Life Science I
STS3222 Statistics for Life Science II
STS3452 Statistics for Educators

B.8.10.1 STATISTICS MAJOR

FIRST YEAR MODULES

STS3101 STATISTICS 1A — 2L Per Week

14 weeks
1 x 2 hours exam paper
Pre-requisite: At least a credit in IGCSE Mathematics or at least a symbol 3 in HIGCSE Mathematics
Assessment: Continuous - 40%, Examination - 60%
Content: What is Statistics and who is the Statistician? Definition of the word 'data' and 'information': quantitative versus categorical, discrete versus continuous data. Variables: qualitative/ quantitative. Sources of data: primary versus secondary sources, population versus sample. Sampling techniques: why sample? Probability versus non-probability sampling methods; Simple Random Sampling, Stratified Sampling, Systematic Sampling, Cluster Sampling; use of random numbers tables. Types of measurement: nominal, ordinal, interval and ratio scales. Presentation of data: tabular forms- frequency tables, graphical methods- histograms, pie charts, compound bar chart, stem and leaf plot, box-and-whisker plot, frequency polygon, etc. Measures of Central tendencies: Mean, median and mode; Measures of dispersion- standard deviation and variance, inter-quartile range; skew ness and kurtosis, identifying outliers; sigma notation.

STS3112 STATISTICS 1B — (= 1 module)

4 Lectures per week
14 weeks
Assessment: Continuous- 40%, Examination- 60% 1 x 3 hour examination
Content: Index numbers: Definition, price, quantity, value indices, Composite price and quantity indices; Link and chain relatives, Laspeyre's and Paasche's price and quantity indices, Fisher's Ideal Index-- advantages and disadvantages of each, changing base of index numbers. Introduction to time series analysis — definition, decomposition of time series data using moving average method, ratio to trend; deasonalization, predictions using the trend line and exponential method. Components of Time Series, measurement of trend, the seasonal index, the cyclical component and random fluctuations. Social correlation, correlogram. Stationary Time Series: second Order Stationarity, the auto correlation function, auto regressive process, moving average process of mixed models

SECOND YEAR MODULES

STS3201 INFERENCE I (= 1/2 module) 2L Per Week

14 weeks
1x 2-hour Examination
Pre-requisite: STS 3101
Assessment: Continuous- 40%, Examination- 60%
Content: Discussion of Normal, Binomial, Poisson, and Exponential Distributions. Test of hypothesis. Tests involving one and two population means and proportions in small and large samples (dependent and independent samples). Linear regression and correlation. Tests involving the regression coefficient and correlation coefficient

STS3211 PROBABILITY (= 1 module) 4L Per Week

14 weeks
1 x 3-hour exam paper
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS 3101
Content: Elementary set theory. Techniques of Counting-- permutation and combination. Sample space and events. Basic notions of probability: Definition, axioms and laws. Simple conditional probability and independence. Bayes' Theorem. Probability distribution of discrete and continuous for one and two dimensional random variables. Tchebychev's inequality. Laws of large numbers and Central Limit Theorem. Normal Approximation to Binomial distribution, Binomial approximation to the Poisson.

STS3221 STATISTICS FOR LIFE SCIENCES I (1/2Module)

2Lectures per week + 1 PS
14 Weeks
1 x 2-hour Examination
Assessment: Continuous- 40%, Examination- 60%
Content: Grouping data, Measures of Central tendencies and dispersion—mean, median, mode, standard deviation and variance; Graphical Representation: Histogram, Pie Chart, Frequency Polygon. Tests of Hypotheses: one sample and two sample cases for dependent and independent samples; Confidence Intervals. Nonparametric tests: Use of Chi-square- test for independence, homogeneity and Goodness of fit tests.

STS3202 NON-PARAMETRIC METHODS (1/2 module) 2L Per Week) 2L Per Week

14 Weeks
1x 2 hours exam paper
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS 3112
Non-parametric versus parametric inference. Distribution free statistics. Kolmogorov type of test statistics, Exact and asymptotic methods. Kruskal - Wallies, Wilcoxon, Mann-Whitney and Friedman's tests, Sign tests.

STS3212 INFERENCE II (= 1 module) 4L Per Week

14 Weeks
Pre-requisite: STS 3112
1 x 3 hour Examination
Assessment: Continuous- 40%, Examination- 60%
Content: Estimation by method of moment and maximum likelihood for the parameters of the Binomial, Poisson, Normal, Uniform, Beta, Gamma distributions. Characteristics of the Binomial, Poisson, Normal, Uniform, Beta, Gamma, distributions. Properties of estimators–unbiasedness, consistency, efficiency, sufficiency, minimum variance, Optimal tests. Sampling distributions of the mean and proportion. Interval Estimation for means and proportions and their differences, and variance. The performance of a test. Contingency tables: Model, measures of association and test of independence, homogeneity and goodness of fit. F-test for variances. Moment generating and characteristic functions for Binomial, Poisson, Normal, Gamma distributions.

STS3222 STATISTICS FOR LIFE SCIENCES II (½ Module)

2 Lectures per week + 1 PS
14 Weeks
1 x 2-hour Examination
Assessment: Continuous- 40%, Examination- 60%
Content: Design of Biological and Agricultural Experiments: Choice of factors, sampling units, Analysis of variance: One- and two-way. Selecting samples, replications Simple regression and correlation: Test of Significance of Regression and Correlation coefficients. Predictions using regression models.

THIRD YEAR MODULES

STS3311 DATA PROCESSING (=1 module)

4 Lectures + 3hours practical session per week
14 Weeks
1 x 3 hour Examination
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS3211, STS 3212 and STS3201
Content: Notation and revision of statistical concepts: Simple Linear regression, correlation; Parameter Estimation, use of R^2, residual measures, hypothesis testing- F and t-tests; Confidence intervals, Multiple Linear Regression—Model Selection: Forward, backward and Stepwise procedures; Categorical variables in regression, Logistic regression: parameter estimation, interpretation of odds ratio, estimated probabilities. This course is expected to be more practical oriented than theoretical and statistical packages will be used. Students will be required to learn the techniques of report writing using data drawn from some of the above topics.

STS3331 SAMPLING THEORY AND SURVEY METHODS (=1module)

4 Lectures + 3hours practical session per week
14 Weeks
1x 3 hour Examination
Assessment: Continuous- 40%,
Examination- 60%
Pre-requisite: STS3212, MTS3211 or MTS3232
Content: Data collection in social investigation- design and use of questionnaire, Planning surveys. Response and non-response errors. Estimation of population mean, total, proportions, variances and sample size allocation in simple random sampling (with and without replacement), stratified random sampling, systematic sampling. Sample size allocation. Cluster sampling — two stage cluster sampling.

STS3312 DISTRIBUTION THEORY (=1module)

4 Lectures + 3 hour practical session per week
14 Weeks
1 x 3 hour Examination
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS 3211, MTS3211 and MTS3212
Content: Bivariate Normal distribution, gamma, Chi-square, 2 types of beta, F and t distributions. Distribution of functions of random variables– sums, products and quotients. Moment Generating Functions of the random variable drawn from normal, gamma, beta, chi-square distributions. First and second moments for Bernoulli, Binomial, Geometric, Poisson, Normal, Exponential. Probability Integral transformations. Order statistics and their functions.

STS3332 DEMOGRAPHY (=1module)

4 Lectures + 3 hour practical session per week
14 Weeks
Pre-requisite: STS 3112
1x 3- hour Examination
Assessment: Continuous- 40%, Examination- 60%
Content: Demographic data — definition, sources, concept and scope. Components of population change: fertility, mortality and migration. Demographic indicators: fertility– crude birth rate, general fertility rate, age specific fertility rate, total fertility rate and mean age at child bearing; Mortality– crude death rate, age

specific death rate, infant mortality rate. Determinants of levels of fertility, mortality and migration. Life tables, Population projections, Age structure (population pyramids), Use of proportion, ratios and rates.

FOURTH YEAR MODULES

STS3411 DESIGN AND ANALYSIS OF EXPERIMENTS (=1module)

4 Lectures + 3 hour practical session per week
14 Weeks
Pre-requisite: STS 3212
1x 3- hour Examination
Assessment: Continuous- 40%, Examination- 60%
Content: Analysis of one, two and multiple classifications of balanced and unbalanced data in crossed and nested arrangements. Analysis involving incomplete tables and missing values. Meaning, Need, Purpose and Basic principles of experimental design. Efficient design of one factor and multi-factor experiments in: CRD, RCBD, Latin Square and Split-plots. Consideration of each experiment under the following headings: definition, properties, construction and analysis with or without response data. BIB designs. 2^k Factorial experiments with and without confounding. Factorial replications. Estimation of missing values.
Multiple comparison methods.

STS3400 PROJECT (=1module)

28 Weeks
Assessment: Project report 70% Oral presentation 30%
Pre-requisite: At least 2 of the third year modules must have been passed
Assessment- 100% (Based on the project report and oral presentation)
Content: A piece of work on a selected topic showing the applications of relevant statistical tools and embodied in a project report. The project is expected to run throughout the two semesters (from the first week in the first semester till the tenth week in the second semester). Students are expected to work under the supervision of a member of academic staff. The internal and external examiners will examine the student's project report at the end of the second semester. A student may be expected to do an oral on the project.

STS3401 MULTIVARIATE ANALYSIS (=1/2Module)

2 Lectures + 3 hour practical session every other week
14 Weeks
1x 2- hour Examination
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS 3312
Content: The multivariate normal distribution: Definition, Moment generating function, conditional distributions. Estimation of the mean vector, covariance matrix and distribution of the estimates. The Hotellings T^2 Distribution, Chi-square Distribution. Inference about the mean vectors: One or two sample cases, Tests of independence.

STS3412 STATISTICAL QUALITY CONTROL (=1module)

4 Lectures + 3 hour practical session per week
14 Weeks
1x 3- hour Examination
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS 3312
Content: Sampling inspection: OC curve average length run, process curve and method of choosing sample plans. Mood's theorem. Dodge and Romig's schemes and inspection by variables. Control charts: Simple control charts for variables, properties of charts, economic designs of - charts, charts for variables and qualitative data. CUSUM charts: economic design of control charts and use of monogram to design interval schemes. Practical construction of control charts. Continuous sampling plans: CSP-1, AOQL and AEDL (average extra defective limit).

STS3402 REGRESSION ANALYSIS (=1/2module)

2 Lectures + 3 hour practical session every other week
14 Weeks
1x 2- hour Examination
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS 3312
Content: Use of least squares method in estimating coefficient of linear regression model. Matrices. Multiple linear regression models, polynomial regression. Test of goodness of fit, inference on the regression parameters. Use of dummy variables and examination of residuals. Reparameterization of non-linear models. Multiple and partial Correlation; covariance matrices. Logistic regression.

STS3452 STATISTICS FOR EDUCATORS (=1module)

4 Lectures + 1 hour practical session per week
1x 3- hour Examination
Assessment: Continuous 40%, Examination 60%
Content: Definitions and Scope of Statistics. Types of data. Methods of collecting data: Sampling techniques-Simple random sampling, Stratified sampling, Cluster sampling, Systematic sampling, Multi-stage sampling, Quota sampling, Convenience sampling, Participant observation, Experiments. Data presentation: Frequency distribution, pie charts, bar charts, multiple bar charts. Descriptive Statistics: Mean, Median, Mode, Range, Standard deviation& Variance, Quartiles and Percentiles. Probability: Laws of probability, Random variables, Sets-Union and Intersection, conditional probability. Simple linear regression & correlation. Chi-square, t-distribution, normal distribution, binomial, One-way ANOVA

NB: TO MAJOR IN STATISTICS A STUDENT MUST PASS ALL THE ABOVE MODULES AS WELL AS MTS3121: ANALYTIC GEOMETRY AND COMPLEX NUMBERS.

STATISTICS DEPARTMENT: COURSE EQUIVALENTS

Trimester Module(s) Failed	Semester Module(s) to be Taken
STA0122 Introduction to Statistics	STS3101 Statistics 1A
STA3211 Probability & Statistics	STS3211 Probability
STA3222 Non parametric & Regression	STS 202 Nonparametric Methods
STA3233 Applied Statistics	STS3201 Inference I
STA3311 Statistical Distribution	STS 3312 Distribution Theory
STA3321Multivariate Statistics	STS3401 Multivariate Methods
STA3312 Inferential Statistics	STS3212 Inference II
STA3322 Analysis of Variance	STS3411 Design & Analysis Experiments
STA3313 sampling, Survey & Sampling	STS3331 Sampling Theory & Survey Methods
STA3350 Demographic Techniques	STS3332 Demography
STA3323 Data Processing	STS3311 Data Processing
STA3411 Distribution Theory	STS3401 Multivariate Analysis
STA3422 Project	STS3400 Project
STA3433 Analysis of Variance & Quality Control	STS3412 Statistical Quality Control
STA3443 Population and Migration	STS3432 Population Migration

STATISTICS DEPARTMENT: COURSE PRE-REQUISITES

YEAR	COURSE/ CODE	SEMESTER	HOURS	PRE-REQUISITES
1	STS 3101 Statistics 1A	1	28 (L/T)	IGCSE/HIGCSE MATHS
	STS 3112 Statistics 1B	2	56(L/T)	
2	STS3211 Probability	1	56(L/T)	STS 3101
	STS3201 Inference I	1	28(L/T)	STS 3101
	STS3221Statistics for Life Sciences I	1	28(L/T) + 14PS	
	STS3202 Non-parametric Methods	2	28(L/T)	STS 3112
	STS 3212 Inference II	2	56(L/T)	STS3101
	STS3222 Statistics for Life Sciences II	2	28(L/T) + 14PS	
3	STS 3311 Data Processing	1	56L+42PS	STS3211, STS 3201 and STS3212
	STS 3331 Sampling Theory and Survey Methods	1	56L+42PS	STS3212; MTS 3211 or MTS3232
	STS 3312 Distribution Theory	2	56L+42PS	STS3211, MTS3211 and MTS3232
	STS 3332 Demography	2	56L+42PS	STS 3112
4	STS3411 Design and Analysis of Experiments	1	56L+42PS	STS 3212
	STS 3401 Multivariate Analysis	1	28(L/T) + 14PS	STS3312
	STS 3400 Project	1 & 2	28PS	At least 2 of third year modules
	STS3412 Statistical Quality Control	2	56(L/T) + 42PS	STS3312
	STS 3402 Regression Analysis	2	28(L/T) + 14PS	STS3312

C. B.SC. (SPECIAL IN POP & DEV) DEGREE (=11BSCP)

C. 1. ADMISSION REQUIREMENTS

To register in a B.Sc.(Special Population and Development) course of study, a candidate must hold a valid IGCSE or HIGCSE Certificate (with passes in at least five subjects), which add up to 25 points, calculated using a specified UNAM scale. Equivalent qualifications are acceptable. The Degree programme will be introduced as a major with either Statistics and Population and Development; Sociology and Population and Development; or Geography and Population and Development.

In addition to the above, admission to the B.Sc. (Special Population and Development) course of study requires at least a symbol "C" on IGCSE or equivalent qualification in Mathematics for the students who want to major in Statistics and Population and Development, whereas admission to the B.Sc. (Special in Population and Development) course of study requires at least a symbol "D" on IGCSE or equivalent qualification in Mathematics for students who want to major in either Sociology and Population and Development or in Geography and Population and Development. This is due to the fact that the degree programme is an interfaculty course of study and most of the modules do not require strong Mathematics background.

C. 2. DURATION OF STUDY

B.Sc. (Special Population and Development) cannot be completed in less than four (4) years. The B.Sc. degree must be completed within six (6) years of full-time study.

C.3. EXEMPTIONS

UNAM will give exemptions for equivalent courses taken at other tertiary institutions but the exemptions shall not exceed 50% of the program in the Bachelor of Science. For Detailed Exemptions rules See The General Prospectus, Information, Regulations & Fees book.

C. 4. CURRICULUM COMPILATION

The curriculum for the B.Sc.(Special Population and Development degree is compiled as follows:
The B.Sc. (Special in Pop and Dev) degree is a multidisciplinary cross faculty programme which follows a a fixed degree curriculum. The degree programme is managed by the Faculty through the Department of Statistics.

C. 4. 1. UNIVERSITY CORE CURRICULUM

Similar to those in B.4.2. above.

C. 4. 2 FACULTY CORE CURRICULUM

Similar to those in B.4.3. above

C. 5. EXAMINATION REGULATIONS

For Detailed Examination And Promotion rules See The General Prospectus, Information. Regulations & Fees book. A candidate will be eligible to write the examination if he/she has obtained the required continuous assessment mark of 40%. Examination will be administered at the end of each semester.

C. 6. RE-REGISTRATION RULES

C. 6. 1. MINIMUM NUMBER OF MODULES TO BE PASSED FOR RE-REGISTRATION IN THE FACULTY

Take Note:

4 (of 10) modules after 1st year of registration. 40% of the curriculum. At least 1 of these modules should be non-core

9 (of 18) modules after 2nd year of registration. 50% of the curriculum including all UNAM core modules (3)

16 (of 26) modules after 3rd year of registration. 62% of the curriculum including all 1st year modules

24 (of 34) modules after 4th year of registration. 71-75% of the curriculum including all 2nd year modules

PLEASE NOTE: IF YOU DO NOT MEET THE ABOVE MENTIONED CRITERIA, YOU WILL NOT BE ALLOWED TO CONTINUE YOUR STUDIES IN THE FACULTY OF SCIENCE

C. 6. 2. PASS REQUIREMENTS

C. 6. 2. 1. ACADEMIC ADVANCEMENT RULES

1st → 2nd year

At least 3 of the modules of the prescribed 1st year curriculum (excluding the UNAM core modules)

* a student who has passed only 3 of 1st year content modules will be allowed to register for not more than ½ of the prescribed 2nd year level modules, but will still be regarded as a 2nd year student
* a student who has passed less than 3 of the 1st year content modules will not be allowed to register for modules on 2nd year level, and will remain a 1st year student

2nd → 3rd year

All ten 1st year modules (including the UNAM core modules) + at least 4 (i.e. ½) of the prescribed 2nd year curriculum

* a student who has passed only 4 of the 2nd year modules will be allowed to register for not more than ½ of the prescribed 3rd year level modules, but will still be regarded as a 3rd year student
* a student who has passed less than 4 of the 2nd year modules will not be allowed to register for modules on 3rd year level, and will remain a 2nd year student

3rd → final year

All eight 2nd year modules + 6 (i.e. ¾) of the prescribed 3rd year curriculum, provided that the outstanding 3rd year modules are not pre-requisites for any of the 4th year modules, i.e. a student can only be regarded as a final year student if such a student is able to complete all outstanding modules in one year

* a student who has passed only 5 of the 3rd year modules will be allowed to register for not more than ½ of the prescribed 4th year level modules, and will thus be regarded as a non-final year student
* a student who has passed less than 5 of the 3rd year modules will not be allowed to register for modules on 4th year level, and will remain a 3rd year student

C. 6. 3. MAXIMUM NUMBER OF MODULES PER YEAR

NO STUDENT WILL BE ALLOWED TO REGISTER FOR MORE THAN 10 MODULES PER YEAR

C. 6.4. MODULE RESTRICTIONS

A student will be admitted to a specific course/module only if he/she meets the requirements for the particular course/module. The UNAM CORE, as well as STS 3101 Statistics 1A, MTS3101 Mathematics 1A and either MTS3112 Mathematics 1B or MTS3132 Foundation Mathematics are compulsory for all first year B.Sc. Degree students, including all students from other Faculties who wish to major in a subject offered by the Faculty of Science.

C. 7. PRACTICALS

Attendance of practical classes is compulsory

C. 8. BACHELOR OF SCIENCE (Special in pop and dev.) DEGREE

C.8.1 COURSES: CODES, RESTRICTIONS, EQUIVALENTS AND CONTENTS

FIRST MODULES

UCE3119 ENGLISH COMMUNICATION & STUDY SKILLS 4L/week

Contact time: 56 hours theory (4L / week)
Assessment: Continuous 60% Examination 40% (1 x 2 hour exam)
Pre-requisite: C in IGCSE English
Content: Reading: the role of the reader; the purpose / aim of the reading; different reading strategies: skimming and scanning; reading for pleasure; reading for content; text mapping; finding unknown words using contextual clues; identifying main and supporting sentences in a text; the role of audience; differentiating different register in reading; introducing high order reading skills; reading and writing as combined skills. Writing: the role and purpose of writing; identifying different kinds of writing; writing different sentence types: simple, complex, interrogatives; using cohesion devices: conjunctions and linking words; referencing: anaphoric and cataphoric; writing clear and coherent sentences and paragraphs; word-building strategies; the role of register; paragraph structure; writing of topic and supporting sentences; main aspects of grammar in context: tenses, articles, pronouns, active and passive voice, adjectives and adverbs. Speaking: conversation, presentation and general speaking skills; small group discussions. Listening: the role and purpose of listening; listening to general information; listening and note-taking during a lecture; identifying main points; deducing meaning from context. Study Skills: dictionary skills; library science information skills (OPAC).

UCA3119 ENGLISH FOR ACADEMIC PURPOSES 4L/week

Contact time: 56 hours theory (4L / week)
Assessment: Continuous 60% Examination 40% (1 x 2 hour exam)
Pre-requisite: UCE3119
Content: Reading: structure of paragraphs; using cohesive devises to write coherent paragraphs; expressing opinion in paragraphs; writing different types of paragraphs: argumentative, discursive, explanatory; analysing and explaining graphic; paraphrasing; summarising; the process approach; academic writing (essay); analysing of essay titles and instruction words; note-taking for essays; planning essays; referencing and plagiarism; academic register; writing introduction and conclusions; selecting information, organising ideas, drafting, revising and editing essays. Writing: differentiating between facts and opinions in text; understanding and reacting to the writer's view in text; reading methods: overview, close reading, critical reading; critical reading skills; reading strategies for different genres; identifying main and supporting arguments in text; synthesizing information; reading for comprehension; inferring meaning from text. Listening: note-taking techniques during lectures. Speaking: academic speaking; effective presentation skills; preparing for speaking.

UCC3109 COMPUTER LITERACY 2L/week

Contact time: 28 weeks
Assessment: Continuous 100%
Pre-requisite: none
Content: The practical use of computers - Windows, Word processing, Spreadsheets, Databases and other common software.

UCI3109 CONTEMPORARY SOCIAL ISSUES 2L/week

Contact time: 28 hours (2L / week)
Assessment: Continuous 100%
Pre-requisite: none
Aims and Objectives: To equip students with essential social skills in the areas of ethics, gender and HIV/AIDS.
Content: The course will cover three topics of equal length, namely Orientation in Ethics, Introduction to Gender Issues and HIV/AIDS. Orientation in Ethics: Values, standards and attributes; roots of values, standards and attitudes; importance to agree on core values; "golden rule"(every human must be treated humanely); towards a culture of non-violence and respect for life; towards a culture of solidarity and just economic order; towards a culture of tolerance and life in truthfulness; towards a culture of equal rights and partnership; Plagiarism and academic honesty Introduction to gender issues: social perspectives and concepts relating to gender studies; basic theories of gender relations; historical/colonial aspects of gender relations; gender relations in contemporary Namibian society; negative aspects of gender relations; examining approaches to gender equality HIV/AIDS: Background status of HIV/AIDS - national and international, physiological approach of HIV/AIDS, stages, modes of transmission, cause and symptoms of HIV/AIDS, including psycho-social causes for the spread of HIV/AIDS; HIV testing and pre-and post-counselling - diagnosing HIV infection, HIV antibody test, HIV infection, counselling; Primary prevention of HIV/AIDS and opportunistic infections - promoting safe sex protocols, reduce risk behaviors, promoting a healthy life style; primary care for symptomatic and a symptomatic HIV disease and AIDS - principle of management, anti-retroviral therapy, treatment of opportunistic infections, including nutritional care; Namibian HIV/AIDS Charter of rights; HIV/AIDS support systems on campus and within the community

MTS 3101: MATHEMATICS 1 A (2 L/Week)

Contact time: 28 hours
1 hr practical per week: 14 hours
1 two-hour paper
Prerequisite: IGCSE Mathematics or special remedial course
This course is to be taken by all first year science students
Content: Sets: Notations and diagrams to describe sets, subsets, supersets, equality of sets, empty sets, singletons, intersection, union, disjoint sets, difference of two sets, complement. Simplification and expansion of algebraic expressions. The absolute value, triangle inequality, linear equations, linear inequalities, quadratic equations, quadratic inequalities. Points and lines in a plane: the distance formula, parallel and perpendicular lines, circles and tangent lines.

MTS 3112: MATHEMATICS 1B (4L/Week)

Contact time: 56 hours
1 hour practical per week: 14 hours
1 three-hour paper
Prerequisite: IGCSE Mathematics or special remedial course
Co-requisite: MTS3101
Course for students who do not major in mathematics.
Content: Functions and their graphs, Euler's number and natural logarithm, the exponential and logarithmic function. Sequences and series with application to life sciences. The binomial formula, binomial expansion and application, small systems of linear equations. 2×2 and 3×3 matrices. Trigonometry, differentiation, applications of the derivative: maxima, minima, increasing and decreasing functions Integration.

MTS3132: FOUNDATION MATHEMATICS (4L/week)

Contact time: 56 hours
1 hour practical per week: 14 hours
1 three-hour paper
Prerequisite: IGCSE Mathematics
Co-requisite: MTS 3101
Content: Functions: domain, codomain, range, image, preimage, one-to-one functions, onto functions, composite function, inverse of a function, even and odd functions, increasing and decreasing functions.
Euler's number and natural logarithm, polynomials, remainder and factor theorem, partial fractions,
Trigonometry; limit of a function, Newton quotient, derivative of a function, rules of differentiation, antiderivatives, area under a graph, the definite integral. Introduction to Matrices and Systems of Linear Equations: Matrix algebra, determinants, Inverses, Solutions of systems of linear equations by Cramer's and Gauss Elimination.

MTS3121 ANALYTIC GEOMETRY AND COMPLEX NUMBERS (2L/Week)

Contact time: 28 hours
1 hour practical per week: 14 hours
1 two-hour paper
Prerequisite: IGCSE Mathematics
Content: Conic sections: ellipse, parabola, hyperbola. Complex numbers: operations on complex numbers, the complex conjugate, Argand diagram. Vectors in two and three dimensions: addition of vectors, multiplication by a scalar, magnitude, dot product, cross product.

STS3101 STATISTICS 1A 2L Per Week

14 Weeks
1 x 2 hours exam paper
Pre-requisite: At least a credit in IGCSE Mathematics or at least a symbol 3 in HIGCSE Mathematics
Assessment: Continuous-40%, Examination- 60%
Content: What is Statistics and who is the Statistician? Definition of the word 'data' and 'information': quantitative versus categorical, discrete versus continuous data. Variables: qualitative/ quantitative. Sources of data: primary versus secondary sources, population versus sample. Sampling techniques: why sample? Probability versus non-probability sampling methods; Simple Random Sampling, Stratified Sampling, Systematic Sampling, Cluster Sampling; use of random numbers tables. Types of measurement: nominal, ordinal, interval and ratio scales. Presentation of data: tabular forms- frequency tables, graphical methods- histograms, pie charts, compound bar chart, stem and leaf plot, box-and-whisker plot, frequency polygon, etc. Measures of Central tendencies: Mean, median and mode; Measures of dispersion- standard deviation and variance, inter-quartile range; skew ness and kurtosis, identifying outliers; sigma notation

SOG3111 FOUNDATIONS OF SOCIOLOGY

3 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content:
This semester module introduces the students to the basic concepts, theories and applications of sociology, focusing on the empirical evidence of Namibian society. Students are also introduced to the process of sociological research in its various forms.

SOG3132 BASICS OF SOCIOLOGY

3 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content: This module is a continuation of the first semester module. Its major focus is on social institutions such as the family, the educational system, religion, power, politics and government, economy and work. It also introduces issues around collective behavior and social cultural change.

GES3122 BASIC SKILLS IN GEOGRAPHY

3 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content: This module familiarises students with the different techniques and tools essentially used by geographers and the properties of the geographical data or facts necessary in the investigating, studying, solving and application of geographical problems. Furthermore, the module also deals with various methods and techniques of data collection, organisation, processing, representation (skills and techniques) used to give geographers access to tools such as maps, remote sensing images, statistics and digital geographical data for computer processing (GIS).

STS3112 STATISTICS 1B (= 1 module) (4L/Week)

4 Lectures per week
14 weeks
Assessment: Continuous- 40%, Examination- 60%
1 x 3 hour examination
Content: Index numbers: Definition, price, quantity, value indices, Composite price and quantity indices; Link and chain relatives, Laspeyre's and Paasche's price and quantity indices, Fisher's Ideal Index-- advantages and disadvantages of each, changing base of index numbers. Introduction to time series analysis — definition, decomposition of time series data using moving average method, ratio to trend; deasonalization, predictions using the trend line and exponential method. Components of Time Series, measurement of trend, the seasonal index, the cyclical component and random fluctuations. Social correlation, correlogram. Stationary Time Series: second Order Stationarity, the auto correlation function, auto regressive process, moving average process of mixed models

GES3111 FUNDAMENTALS OF GEOGRAPHY

3 Lectures per week
14 weeks
1 x 3 hour exam paper
Content: Students acquaint themselves with general foundations and basic concepts of Geography including the subject's links to auxiliary disciplines (organizational plan). Structures, functions, processes, patterns and phenomena of physical ("natural') and human environments will be introduced with special reference to Namibia, in particular atmosphere, lithosphere, hydrosphere, biosphere; demographic features of population, economic activities and land use; settlements and infrastructure.

EIE3112 INTRODUCTION TO ECONOMICS

4 Lectures per week
14 weeks
1 x 2 hour exam paper
Content: Concept of scarcity and wants, market organization of economies, production possibility curve. Demand, supply and elasticities. Theory of costs, production and price determination under various industry structures, concept of efficiency. Market failure, private and social cost, public goods. Linkage of various sectors at an aggregate level, national income accounting. Determination and fluctuations of aggregate economic activity under different supply conditions. Inflation and unemployment. Money supply and monetary policy.

SECOND YEAR MODULES

STS3211 PROBABILITY (= 1 module) 4L Per Week

14 weeks
1 x 3 -hour exam paper
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS 3101
Content: Elementary set theory. Techniques of Counting-- permutation and combination. Sample space and events. Basic notions of probability: Definition, axioms and laws. Simple conditional probability and independence. Bayes' Theorem. Probability distribution of discrete and continuous for one and two dimensional random variables. Tchebychev's inequality. Laws of large numbers and Central Limit Theorem. Normal Approximation to Binomial distribution, Binomial approximation to the Poisson.

SOG3211 SOCIAL RESEARCH METHODS

14 Weeks
1 x 3 hour exam paper
Content: This module will introduce students to concepts and methods in the application of research to and social topics on Namibian society. The focus of this course is on applying knowledge through conducting field research. Themes to be addressed include ethics in research, the research process and report preparations, as well as qualitative and quantitative research methods.

GES3231 HUMAN GEOGRAPHY I

GES3222 HUMAN GEOGRAPHY II

4 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content: Two semesters which introduce themes in : Settlement Geography, namely physical structures, chains and hierarchies, migration and urbanization, social and economic organization; Economic Geography, namely distribution of renewable and non renewable resources, economic sectors, models of agricultural location and location of industries, patterns of economic activity, world economy, development and economic reproduction in an era of post-Fordism; Social Geography, namely types of society, structures, indicators defining social and spatial disparities, gender equality, health and socio-economic development. Practicals closely relating to the content taught in the second year of study, exercises aim to develop the reflective skills of students through application of knowledge.

GES3211 PHYSICAL GEOGRAPHY I

GES3202 PHYSICAL GEOGRAPHY II

4 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content: Two semesters which introduce climatology and hydrology; the climate, weather and water resources of Namibia; fluvial geomorphology, coastal and desert geomorphology; basic pedology; morphology of Namibia.

SOG3252 SOCIAL DEMOGRAPHY

3 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content: Demography is the study of human populations in relation to the changes in their sizes, structures and spatial distributions as a result of the interplay of fertility, mortality and migration. Our focus is on giving sociological understanding of the place of demography in the process of socio-economic development. The major demographic concepts, sources of demographic data; dynamic elements of demography; their determinants and consequences of demographic components and structural factors are introduced. So are the major theoretical approaches to understanding demographic dynamics and development. Also dealt with are techniques for formulation, implementation and evaluation of national population policies; techniques for planning in health, social services, education and environment; local area and regional demographic analysis, and the application of demography in the development of human resources in various public and private sector decision making situations.

NCH3200 COMMUNITY HEALTH

2 Lectures per week
28 Weeks
1 x 3 hours exam paper
Content: Concepts with regard to a comprehensive health approach. Levels of disease prevention, health care delivery in Namibia. Primary health care/community based health care regarding approaches and strategies. Human and physical resources in public health. Community development and participation. Health indicators. Introduction to epidemiology and biostatistics. Influence of environmental factors in health. Nutrition. HIV/AIDS and communicable diseases. Demographic factors in health. Community health education. Multi-disciplinary and inter-sectoral health care team. Reproductive health and family health.

ISA3232 INFORMATION AND COMMUNICATION FOR DEVELOPMENT

3 Lectures per week
14 weeks
1 x 3 hour exam paper
Content: The aim of this module is to familiarize students with the basic concepts and theories which govern the communication of information to aid social development.

SOG3232 SOCIOLOGY OF DEVELOPMENT

3 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content: This semester module gives an introductory guide to the sociological aspects of development. The structural context of social change in Southern Africa and Namibia in both its internal and external aspects will be in the center of interest.

SOG3272 SOCIAL PROBLEMS

3 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content: This module shall analyze various key social problems with the goal of determining sociological causes and policy solutions. Subjects discussed involve poverty and inequality, crime, HIV/AIDS, violence in the media, alcohol abuse, the land issue, impact of globalization and technology and society. Students must also produce an original research project based on one of the above stated or related social problem.

ISA 3292 TECHNICAL COMMUNICATION AND PRESENTATION

3 Lectures per week
14 weeks
1 x 3 hour exam paper
Content: The aim of this module is to enable students to learn to communicate effectively. The content includes: Barriers to effective communication of technical information. Planning presentations, visual aids for technical representations, delivery techniques, effective style of technical writing, editing technical documents and effective public speaking

LAW3241 HUMAN RIGHTS LAW

2 Lectures per week
14weeks
1 x 3 hour exam paper
Content: Development of Universal and regional human rights instruments; The three generations of human rights; international remedies of human rights violations; The African Charter on human and people's rights; International human rights instruments and domestic law; selection of international instruments with special reference to instruments signed by Namibia.

LAW3221 CUSTOMARY LAW 1

2 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content: The course will give an overview of the societal relevance of customary law and traditional authority; determine customary law as legal system; describe the framework for the application and the ascertainment of customary law (including the conflict of laws) and set out the principles applying to traditional government and traditional courts.

STS3202 NON-PARAMETRIC METHODS (1/2 module) 2L Per Week

14 Weeks
1 x 2 hours exam paper
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS 3112
Content: Non-parametric versus parametric inference. Distribution free statistics. Kolmogorov type of test statistics, Exact and asymptotic methods. Kruskal - Wallies, Wilcoxon, Mann-Whitney and Friedman's tests, Sign tests.

NHM 3311 HEALTH SERVICE PLANNING

4 Lectures per week
14 Weeks
1 x 2 Hour Examination
Assessment: CA – 40%; Exam. – 60%
Contents: Introduction to health service planning; Factors influencing health service planning; Project planning.

NHM 3312 HEALTH SERVICE MANAGEMENT

Core-requisite: NHM 3311
4 Lectures per week
14 Weeks
1 x 2 Hour Examination
Assessment: CA – 40%; Exam. – 60%
Contents: Management principles in health service delivery; Human resources management.

THIRD YEAR MODULES

STS3391 FUNDAMENTALS OF DATA PROCESSING (=1 module)

4 lectures + 3hours practical session per week
14 Weeks
1x3 hour Examination
Assessment: Continuous – 40% Examination - 60%
Pre-requisite: STS3101, STS3112
Content: Use of SPSS: Data entry, Variable labels, Cross-tabulation: use of Chi-square test for independence, Graphical representation. Simple Linear Regression, Correlation, Testing significance of regression, Multiple Linear regressions – Model Selection: Forward, Backward, and Stepwise Procedure Categorical variables: create dummy variables, interpretation of categorical variables in the regression model. Logistic Regression: Parameter estimation, interpretation of odd ratio, estimated probabilities. This course is more practical oriented and statistical packages will be used. Students will be required to learn the techniques of report writing using real data and tested on statistical interpretation.

STS3331 SAMPLING THEORY AND SURVEY METHODS (=1module)

4 Lectures + 3 hours practical session per week
14 Weeks
1 x 3 hour Examination
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS 3212, MTH 3211 or MTH 3232
Content: Data collection in social investigation- design and use of questionnaire, Planning surveys. Response and non-response errors. Estimation of population mean, total, proportions, variances and sample size allocation in simple random sampling (with and without replacement), stratified random sampling, systematic sampling. Sample size allocation. Cluster sampling — two stage cluster sampling.

SOG3352 SOCIOLOGY OF GENDER

3 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content: This module will examine issues in women's studies as well as gender relations between men and women. Issues of women dominate, with particular emphasis being on women in Namibian society. Subjects examined will be marriage and the family, women and violence, ethnicity and class, education, work and the professions, rural women as well as an introduction to gender theory. It is hoped that students will gain a sociological understanding of the causes of gender inequality, as a basis for policy construction and practice around women's rights and advancement as citizens.

ISA3311 INFORMATION AND KNOWLEDGE MANAGEMENT

3 Lectures per week
14 Weeks
1 x 3 hour exam paper
Content: The aim of this module is to enable students to learn the basic concepts of information and knowledge management and their application to development at the micro and macro levels.

STS3312 DISTRIBUTION THEORY (=1module)

4 Lectures + 3 hour practical session per week
14 Weeks
1 x 3 hour Examination
Assessment: Continuous- 40%, examination- 60%
Pre-requisite: STS 3211, MTH3211 and MTH3212
Content: Bivariate Normal distribution, gamma, Chi-square, 2 types of beta, F and t distributions. Distribution of functions of random variables– sums, products and quotients . Moment Generating Functions of the random variable drawn from normal, gamma, beta, chi-square distributions. First and second moments for Bernoulli, Binomial, Geometric, Poisson, Normal, Exponential. Probability Integral transformations. Order statistics and their functions.

STS3332 DEMOGRAPHY (=1 MODULE)

4 Lectures + 3 hour practical session per week
14 Weeks
1 x 3- hour Examination
Assessment: Continuous- 40%, Examination- 60%
Content: Demographic data — definition, sources, concept and scope. Components of population change: fertility, mortality and migration. Demographic indicators: fertility– crude birth rate, general fertility rate, age specific fertility rate, total fertility rate and mean age at child bearing; Mortality– crude death rate, age specific death rate, infant mortality rate. Determinants of levels of fertility, mortality and migration. Life tables, Population projections, Age structure (population pyramids), Use of proportion, ratios and rates.

EDE3352 DEVELOPMENT ECONOMICS

4 lectures per week
14 Weeks
1 x 3 hour exam paper
Content: The concept and measurement of development – the nature of development economics, growth and development, the measurement of development, the main features of LDCs. Domestic barriers to development and policies, dualism Growth, poverty and income distribution Population and development Unemployment Agricultural transformation and rural development Education and human capital formation-experiencesTheories of economic growth and development –theories of capital accumulation, classical theory, Keynesian theory, Harrod-Domar model, Neo-classical model, dual economy models, Lewis theory of development, Rostow's stages of economic growth. Urbanization and rural urban migration Financing development-domestic resources means, foreign resources, debt crisis Development planning –definition, arguments for and against, models of planning, stages of planning, problem of planning in LDCs, project appraisal and cost-benefit analysis, balanced and unbalanced growth. Industrial development –reasons for, industry vs agriculture, industrialization and trade strategies, technology and choices available.

SOG3311 CLASSICAL AND MODERN SOCIOLOGICAL THEORY

3 lectures per week
14 Weeks
1 x 3 hour exam paper
Content: Theories have been central to the development of the sociological tradition. This module will survey the main theories and approaches to the study of modern industrial societies. The methods, concepts and philosophies of social theory old and new will be examined. Also how these mainly Western theories can be fruitfully applied to African-Namibian contexts is discussed. Apart from the classical work of Marx, Weber and Durkheim, we critically analyze phenomenology, symbolic interactionism, critical theory and ethno-methodological approaches. In addition, current influential new theories are looked at : globalization, postmodernism and structuration theory.

SOG3372 SOCIOLOGY OF NAMIBIAN SOCIETY

3 lectures per week
14 Weeks
1 x 3 hour exam paper
Content: This is an introductory course that aims at understanding and applying sociological perspectives to aspects of Namibian social life. Themes to be addressed include applying sociological concepts to the study of traditional and contemporary Namibian social life, traditional indigenous social organization, the impact of colonial contact on traditional social structures and aspects of contemporary Namibian social life.

ISA3331 SYSTEM ANALYSIS, DESIGN AND EVALUATION

3 lectures per week
14 Weeks
1 x 3 hour exam paper
Content: The aim of this module is to introduce students to methods of analysis, design and evaluation of information systems. Contents include: system concepts, system development, design and implementation phases, systems development life cycles, system analysis, system evaluation.

GEA3311 ENVIRONMENTAL STUDIES

4 Lectures
14 Weeks
1 x 3 hour exam paper
Content: In the geographical context of space and time, the content of this module emphasises the interaction and inter-relationship of identified systems in Physical and Human Geography, and their impact on the natural and human environment. It focuses on issues and objectives of the human endeavour aiming at managing renewable and non-renewable resources within a paradigm of sustainability. Topics examine: ecosystems and environmental change; urban sprawl and loss of natural resources; food production, deforestation and desertification; loss of biodiversity; marine environments; transport infrastructure; approaches to energy supply; mining and rehabilitation of landscapes; war.

GES3331 GENERAL METHODS AND TECHNIQUES IN GEOGRAPHY

4 Lectures
14 Weeks
1 x 3 hour exam paper
Content: A semester laying the foundation in scientific method; hypothesis formulation; collection and compilation of data; research design and management; field survey and reconnaissance; summarising of results. An exposure to map production; basic geodesy; map and aerial photography analysis and interpretation complements this skill-enhancing module.

GES3309 EXCURSION

Content: Excursions seek to familiarize students with methods and techniques required for observing, analyzing and assessing environments on site.

GES3352 REGIONAL GEOGRAPHY

Assessment: Continuous assessment 60%, examination 40% (1x3 hour examination)
Content: The module aims to further students' knowledge on regional structures and functions (politico-economic, socio-cultural) in Africa and other continents. It reflects facts and figures in a regional context, emphasising the interaction of local and external factors, forces and processes over distance and time. The module incorporates aspects of regional development against the background of different approaches to development (social welfare, structuralist, modernisation) and their paradigms. Students are encouraged to synthesise their knowledge and improve their understanding of regions.

FOURTH YEAR MODULES

PMR3471 RESEARCH METHODOLOGY

4 lectures per week
14 Weeks
1 x 3 hour exam paper
Research methods: introducing scientific methods of research; processes and procedures of research that includes quantitative and qualitative data collection and analysis. Data collection instruments and ethics in research. Hypothesis formulation and testing; operationalisation of research, research design; measurement, reliability, validity, sources of essay and sampling. Writing a research proposal and research report.

STS3400 PROJECT (=1module)

Pre-requisite: At least 2 of the third year modules must have been passed
Assessment- 100% (Based on the project report and oral presentation)
Content: A piece of work on a selected topic showing the applications of relevant statistical tools and embodied in a project report. The project is expected to run throughout the two semesters (from the first week in the first semester till the tenth week in the second semester). Students are expected to work under the supervision of a member of academic staff. The internal and external examiners will examine the student's project report at the end of the second semester. A student may be expected to do an oral on the project.

ISA3450 SPECIAL TOPICS: INFORMATION, EDUCATION AND COMMUNICATION

3 Lectures
14 weeks
1 x 3 hour exam paper
Content: The aim of this course is to equip students with skills and the conceptual framework which forms the basis of IEC programmes in the context of the HIV/AIDS pandemic in Africa.

SOG3410 INDEPENDENT RESEARCH PROJECT

Content: In this course students will undertake independent and practical research (either literature or documentary research or field research), which will be presented as a research report. This course aims to teach students independence in work and thought, ensure students can see a project through from inception to completion, and illustrates the relationship between all phases of the research process.

STS3411 DESIGN AND ANALYSIS OF EXPERIMENTS (=1module)

4 Lectures + 3 hour practical session per week
14 Weeks
Pre-requisite: STS 3212
1 x 3- hour Examination
Assessment: Continuous- 40%, Examination- 60%
Content: Analysis of one, two and multiple classifications of balanced and unbalanced data in crossed and nested arrangements. Analysis involving incomplete tables and missing values. Meaning, Need, Purpose and Basic principles of experimental design. Efficient design of one factor and multi-factor experiments in: CRD, RCBD, Latin Square and Split-plots. Consideration of each experiment under the following headings: definition, properties, construction and analysis with or without response data. BIB designs. 2^k Factorial experiments with and without confounding. Factorial replications. Estimation of missing values. Multiple comparison methods.

STS3432 POPULATION MIGRATION

4 lectures per week
14 Weeks
1 x 3 hour exam paper
Content: Definition and terminologies in migration studies. International migration. Sources of data, quality of statistics. Evaluation and estimation of international migration. Intercensal component method. Intercensal cohort – component method. Net migration, gross migration (migration turnover) and migration ratios. Migration rates: crude immigration rate. Crude emigration rate. Crude net migration rate. Crude gross migration rate. Contribution of migration to population change. Graphic techniques of analysis (population pyramids. Internal migration: concepts of mobility. Area of origin vs out migrant. Gross migration (migration turnover). Life-time migration. Migration streams and counter streams. Return migration. Longitudinal migration. Bases of migration rate. Sources of migration statistics. Quality of the statistics. Measurement of mobility. National growth rate method. Residual methods; vital statistics method. Residual method: survival rate method. Place of birth vs place of enumeration statistics. Residence at a fixed past date. Migration selectivity: By sex, By age, By educational level; etc. Causes of migration; Ravenstein's push and pull theory. Lee's Intervening Obstacles theory. Other theories. Contribution of migration to urbanization. Other consequences of migration at the place of origin and at the place of destination.

SOS 3470 SOCIOLOGY OF GENDER

3 Lectures
14 Weeks
1 x 3 hour exam paper
Content: This module will build upon the Year 3 Gender course. Theories of gender construction and sexuality will be critically analyzed in the context of key concepts such as masculinity, femininity, sexual identity, patriarchy and genderisation. Studies related to these terms will be both of men and women. Theories will be applied to relevant areas of study such as gender in traditional and modern cultures, homosexuality, women and class, the family, work and gender, women in politics, social movement, crime, rape and domestic violence. Also considered will be a critical analysis of official gender policies, including empowerment of women.

STS3412 STATISTICAL QUALITY CONTROL (=1module)

4 Lectures + 3 hour practical session per week
14 Weeks
1 x 3- hour Examination
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS3312
Content: Sampling inspection: OC curve average length run, process curve and method of choosing sample plans. Mood's theorem. Dodge and Romig's schemes and inspection by variables. Control charts: Simple control charts for variables, properties of charts, economic designs of $\bar{x}$ charts, charts for variables and qualitative data. CUSUM charts: economic design of control charts and use of monogram to design interval schemes. Practical construction of control charts. Continuous sampling plans: CSP-1, AOQL and AEDL(average extra defective limit).

STS3402 REGRESSION ANALYSIS (=1/2module)

2 Lectures + 3 hour practical session every other week
14 Weeks
1 x 2- hour Examination
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS3312
Content: Use of least squares method in estimating coefficient of linear regression model. Matrices. Multiple linear regression models, polynomial regression. Test of goodness of fit, inference on the regression parameters. Use of dummy variables and examination of residuals. Reparameterization of non-linear models. Multiple and partial Correlation; covariance matrices. Logistic regression.

GEA3430 RESEARCH PROJECT IN SPATIAL PLANNING

2 lectures per week + fieldwork
28 Weeks
1 x 3 hour exam paper
Content: This paper aims to enhance the capacity of students to apply obtained knowledge, understanding and skills to a real planning problem under investigation. In advance, research projects are selected ad hoc in cooperation with the private and public sector, possibly responding to their needs and demand in the qualified labour market. With potential employment in mind, research projects are guided and coordinated, by departmental members in consultation with individual students.

GEA3450 ADVANCED TECHNIQUES IN SPATIAL ANALYSIS

2 lectures per week + practical sessions
28 weeks
1 x 3 hour exam paper
Content: The course seeks to introduce students to modern spatial data processing, development, implementation and functions of geographic information systems; data models and structures and analytical procedures; as well as applications of GIS to a variety of environmental issues. It also focuses on the basic mapping / database / information science and concepts that are fundamental to the working of any GIS package. The course also includes project work.
Lab exercises provide students with advanced skills of ArcView 3.x , ArcInfo 8.x. and IDRISI/ILWIS software packages. They will be using the functionality of these software packages to:

- input and create maps of geographical locations and their attributes;
- perform spatial analyses using spatial and attribute data, and
- display the results of the analyses in the form of maps and tables.

GEA3410 CONCEPTS IN APPLIED GEOGRAPHY

2 lectures per week + practical sessions
28 weeks
1 x 3 hour exam paper
The application of geographical knowledge operates in a set of paradigms and models which are implicit to the analysis and creation of space at local, regional and (inter) national levels. This paper will provide theoretical foundations applied for an advanced understanding of geographical synthesis and problem solving, covering topics such as resource assessments, environmental obligations, land use potential, water demand management, development and spatial planning, poverty, integrated environmental management and urban management.

GEA3479 FIELDWORK

Content: The contents and objective of this field work course is closely related to GEA 3430 Research Project in Spatial Planning.

STS3401 MULTIVARIATE ANALYSIS (=1/2Module)

2 Lectures + 3 hour practical session every other week 14 Weeks
1x 2- hour Examination
Assessment: Continuous- 40%, Examination- 60%
Pre-requisite: STS 3312
Content: The multivariate normal distribution: Definition, Moment generating function, conditional distributions. Estimation of the mean vector, covariance matrix and distribution of the estimates. The Hotellings T^2 Distribution, Chi-square Distribution. Inference about the mean vectors: One or two sample cases, Tests of independence.

B.SC. WITH SPECIALIZATION IN POPUL ATION AND DEVELOPMENT (STATISTICS & POPULATION AND DEVELOPMENT)

Year	Semester 1	Semester 2
1	UCE 3119 English Communication & Study skills	UCA3119 English for Academic Purpose
	UCC 3109 Computer Literacy	UCI3109 Contemporary Social Issues
	MTS 3101 Mathematics 1A	MTS3132 Foundation Mathematics
	STS 3101 Statistics 1A	STS3112 Statistics 1B
	SOG 3111 Foundation of Sociology	EIE 3112 Introduction to Economics
	GES 3111 Fundamentals of Geography	SOG 3132 Basics of Sociology
2	STS 3211 Probability	SOG3252 Social Demography
	STS3201 Inference 1	STS 3212 Inference II
	MTS3211 Calculus 1	MTS3232 Calculus II
	SOG 3211 Social Research Methods	STS3202 Non-Parametric Methods
	NCH3200 Community Health	NCH 3200 Community Health
3	STS 3311 Data Processing	STS3332 Demography
	STS 3331 Sampling Theory and Survey Methods	STS3312 Distribution Theory
	NHM3311 Health Service planning	NHM3312 Health Service Management
	SOG 3311 Classical and Modern Sociological Theory	EDE3352 Development Economics
4	PMR 3471 Research methodology	STS3432 Population Migration
	STS 3400 Project	STS3400 Project
	ISA 3450 Special Topics: Information, Education and Communication	ISA3450 Special Topics: Information, Education and Communication
	SOS3470 Sociology of Gender	SOS3470 Sociology of Gender
	STS 3411 Design and Analysis of Experiments	STS3412 Statistical Quality Control
		STS3402 Regression Analysis
		STS3401 Multivariate Analysis

NB: TO MAJOR IN STATISTICS A STUDENT MUST PASS ALL THE ABOVE MODULES AS WELL AS MTS3121: ANALYTIC GEOMETRY AND COMPLEX NUMBERS, MTS3211 CALCULUS I AND MTS3232 CALCULUS II

B.SC. WITH SPECIALIZATION IN POPULATION AND DEVELOPMENT (MAJOR: GEOGRAPHY & POPULATION AND DEVELOPMENT)

Year	Semester 1	Semester 2
1	UCE 3119 English Communication & Study skills	UCA 3119 English for Academic Purpose
	UCC 3109 Computer Literacy	UCI 3109 Contemporary Social Issues
	STS 3101 Statistics 1A	STS 3112 Statistics 1B
	MTS3101 Mathematics 1A	MTS3112 Mathematics 1B
	SOG 3111 Foundation of Sociology	SOG 3132 Basics of Sociology
	GES 3111 Fundamentals of Geography	GES 3132 Basic Skills in Geography
2	SOG 3211 Social Research Methods	SOG 3252 Social Demography
	NCH3200 Community Health	NCH 3200 Community Health
	GES 3231 Human Geography 1	GES 3222 Human Geography 2
	GES 3211 Physical Geography 1	GES 3202 Physical Geography 2
		ISA 3292 Technical Communication and Presentation
		ISA 3232 Information and Communication for Development
3	STS3391 Fundamentals of Data Processing	STS3332 Demography
	GES3331 General Methods and Techniques in Geography	SOG3352 Sociology of Gender
	NHM3311 Health Service Planning	NHM3312 Heath Service Management
	GEA3311 Environmental Studies	
	GES3399 Excursion	GES3352 Regional Geography
4	GEA3430 Research Project in Spatial Planning	GEA3430 Research Project in Spatial Planning
	ISA3450 Special Topics: Information, Education and Communication	ISA3450 Special Topics: Information, Education and Communication
	GEA3450 Advance Techniques in Spatial Analysis	GEA3450 Advance Techniques in Spatial Analysis
	GEA3479 Field Work	STS3432 Population Migration
	GEA3410 Concepts in Applied Geography	GEA3410 Concepts in Applied Geography

B.SC. WITH SPECIALIZATION IN POPULATION AND DEVELOPMENT
(SOCIOLOGY & POPULATION AND DEVELOPMENT MAJOR)

Year	Semester 1	Semester 2
1	UCE 3119 English Communication & Study skills	UCA 3119 English for Academic Purpose
	UCC 3109 Computer Literacy	UCI 3109 Contemporary Social Issues
	MTS 3101 Mathematics 1A	MTS 3112 Mathematics 1B
	STS 3101 Statistics 1A	STS 3112 Statistics 1B
	SOG 3111 Foundation of Sociology	SOG 3132 Basics of Sociology
	GES 3111 Fundamentals of Geography	EIE 3112 Introduction to Economics
2	STS 3211 Probability	SOG 3252 Social Demography
	SOG 3211 Social Research Methods	SOG 3232 Sociology of Development
	LAW 3221 Customary Law 1	SOG 3272 Social Problems
	NCH 3200 Community Health	NCH 3200 Community Health
	LAW 3241 Human Rights Law	ISA 3292 Technical Communication and Presentation
3	STS 3391 Fundamentals of Data Processing	STS 3332 Demography
	SOG 3311 Classical and Modern Sociological Theory	SOG 3372 Sociology of Namibian Society
	NHM3311 Health Service Planning	NHM3312 Heath Service Management
	ISA 3331 System Analysis, Design and Evaluation	SOG 3352 Sociology of Gender
	ISA 3311 Information and Knowledge management	
4	PMR 3471 Research methodology	STS 3432 Population Migration
	ISA 3450 Special Topics: Information, Education and Communication	ISA 3450 Special Topics: Information, Education and Communication
	SOS 3470 Sociology of Gender	SOS 3470 Sociology of Gender
	SOG 3410 Independent Research Project	SOG 3410 Independent Research Project

D. B.SC. (ENGINEERING) DEGREE (=11BSCE)

D. 1. ADMISSION REQUIREMENTS

In addition to the General Admission Requirements into the Faculty of Science, admission to the Bachelor of Science (Engineering) degree requires a student who registers to have at least a grade "B" (or equivalent qualification in either Mathematics of Physical Science or a grade "3" on HIGCSE (or equivalent qualification) in either Mathematics of Physical Science. Engineering department may administer an entrance test.

NB: MEETING THE MINIMUM ADMISSION REQUIREMENTS DO NOT NECESSARILY ENSURE ADMISSION, AS THIS DEPENDS ON PLACES AVAILABLE.

D. 2. DURATION OF STUDY

The first TWO (2) years of the programme are spent at the UNAM. After the second year, successful candidates are transferred to the selected universities in the SADC region, where they complete the remaining three years. The B.Sc. (Engineering) programme will normally be completed in FIVE years of study, as it requires transfer to another university.

D 3. EXEMPTIONS

Candidates with HIGCSE qualifications with 1 and 2 symbols in Mathematics, Physics and Chemistry may be exempted from some first year modules but there is no direct admission into second year. Candidates holding recognized 'A' level qualifications with two principal passes in Physics and Mathematics, and at least a subsidiary pass in Chemistry or a C grade in Physical Sciences or Chemistry at IGCSE or 'O' level, may be admitted directly into the second year. Candidates holding a Full Technician Certificate (FTC) or a Diploma in Engineering from a recognized institution, may be exempted from some first year modules the provided they attained a minimum grade of 'C' in mathematics and an overall average of 'C' or above in all courses examined during their final year. Note that there is no direct admission into second year Engineering.

UNAM will give exemptions for equivalent courses taken at other tertiary institutions. For Detailed Exemption rules See The General Prospectus, Information, Regulations & Fees book.

D. 4. CURRICULUM COMPILATION

The contents of the first Two years at UNAM have been tailored so as to enable students to undertake degree programmes from the second year onwards, in Civil, Mechanical, Electrical and Electronics, Mining, Mineral processing, Metallurgy and Chemical Engineering.

D. 4. 1. UNIVERSITY CORE CURRICULUM

Similar to those in B.4.2. above.

D. 4. 2. FACULTY CORE CURRICULUM

Similar to those in B.4.3. above

D. 5. EXAMINATION REGULATIONS

For detailed examination and promotion rules see the general information and regulations prospectus. A candidate will be eligible to write the examination if he/she has obtained the required continuous assessment mark of 40%. Examination will be administered at the end of each semester.

D. 6. ACADEMIC ADVANCEMENT RULES

Admission to second year is based on competitive basis. To register into second year of Engineering, must students must have attained an average C grade in Mathematics, Physics and Chemistry and must pass all the remaining first year modules without exception.

D. 6. 1. TRANSFER TO OTHER UNIVERSITIES

Progression to third year requires transfer to another specified university. Although UNAM has transfer agreement with Universities in the SADC region, entrance to this programme is not automatic. Transfer will be given only if all second year modules have been successfully passed within two years of study at UNAM.

D. 7. PRACTICALS

Attendance of practical classes is compulsory

A student must pass all modules/courses and pre/co-requisites as listed for the particular subject. This section lists all the course codes for a specific course, followed thereafter by the course contents in the same order.

D.8. DEPARTMENT OF ENGINEERING AND TECHNOLOGY

DEPARTMENTAL REGULATIONS

D.8.1 COURSES: CODES, RESTRICTIONS, EQUIVALENTS AND CONTENTS

FIRST YEAR MODULES

UCE3119 ENGLISH COMMUNICATION & STUDY SKILLS 4L/week

Contact time: 56 hours theory (4L / week)
Assessment: Continuous 60% Examination 40% (1 x 2 hour exam)
Pre-requisite: C in IGCSE English
Content: Reading: the role of the reader; the purpose / aim of the reading; different reading strategies: skimming and scanning; reading for pleasure; reading for content; text mapping; finding unknown words using contextual clues; identifying main and supporting sentences in a text; the role of audience; differentiating different register in reading; introducing high order reading skills; reading and writing as combined skills. Writing: the role and purpose of writing; identifying different kinds of writing; writing different sentence types: simple, complex, interrogatives; using cohesion devices: conjunctions and linking words; referencing: anaphoric and cataphoric; writing clear and coherent sentences and paragraphs; word-building strategies; the role of register; paragraph structure; writing of topic and supporting sentences; main aspects of grammar in context: tenses, articles, pronouns, active and passive voice, adjectives and adverbs. Speaking: conversation, presentation and general speaking skills; small group discussions. Listening: the role and purpose of listening; listening to general information; listening and note-taking during a lecture; identifying main points; deducing meaning from context. Study Skills: dictionary skills; library science information skills (OPAC).

UCA3119 ENGLISH FOR ACADEMIC PURPOSES 4L/week

Contact time: 56 hours theory (4L / week)
Assessment: Continuous 60% Examination 40% (1 x 2 hour exam)
Pre-requisite: UCE3119
Content: Reading: structure of paragraphs; using cohesive devises to write coherent paragraphs; expressing opinion in paragraphs; writing different types of paragraphs: argumentative, discursive, explanatory; analysing and explaining graphic; paraphrasing; summarising; the process approach; academic writing (essay); analysing of essay titles and instruction words; note-taking for essays; planning essays; referencing and plagiarism; academic register; writing introduction and conclusions; selecting information, organising ideas, drafting, revising and editing essays. Writing: differentiating between facts and opinions in text; understanding and reacting to the writer's view in text; reading methods: overview, close reading, critical reading; critical reading skills; reading strategies for different genres; identifying main and supporting arguments in text; synthesizing information; reading for comprehension; inferring meaning

from text. Listening: note-taking techniques during lectures. Speaking: academic speaking; effective presentation skills; preparing for speaking.

UCC3109 COMPUTER LITERACY 2L/week

Contact time: 28 weeks
Assessment: Continuous 100%
Pre-requisite: none
Content: The practical use of computers - Windows, Word processing, Spreadsheets, Databases and other common software.

UCI3109 CONTEMPORARY SOCIAL ISSUES 2L/week

Contact time: 28 hours (2L / week)
Assessment: Continuous 100%
Pre-requisite: none
Aims and Objectives: To equip students with essential social skills in the areas of ethics, gender and HIV/AIDS.
Content: The course will cover three topics of equal length, namely Orientation in Ethics, Introduction to Gender Issues and HIV/AIDS. Orientation in Ethics: Values, standards and attributes; roots of values, standards and attitudes; importance to agree on core values; "golden rule"(every human must be treated humanely); towards a culture of non-violence and respect for life; towards a culture of solidarity and just economic order; towards a culture of tolerance and life in truthfulness; towards a culture of equal rights and partnership; Plagiarism and academic honesty Introduction to gender issues: social perspectives and concepts relating to gender studies; basic theories of gender relations; historical/colonial aspects of gender relations; gender relations in contemporary Namibian society; negative aspects of gender relations; examining approaches to gender equality HIV/AIDS: Background status of HIV/AIDS - national and international, physiological approach of HIV/AIDS, stages, modes of transmission, cause and symptoms of HIV/AIDS, including psycho-social causes for the spread of HIV/AIDS; HIV testing and pre-and post-counselling - diagnosing HIV infection, HIV antibody test, HIV infection, counselling; Primary prevention of HIV/AIDS and opportunistic infections - promoting safe sex protocols, reduce risk behaviors, promoting a healthy life style; primary care for symptomatic and a symptomatic HIV disease and AIDS - principle of management, anti-retroviral therapy, treatment of opportunistic infections, including nutritional care; Namibian HIV/AIDS Charter of rights; HIV/AIDS support systems on campus and within the community.

EGT3101 FUNDAMENTALS OF ENGINEERING 2L/week + 1 T Week

Contact Time: 28 hours
Assessment: Continuous 50% Exam 50% (1 x 2 hour paper)
Pre-requisites: None
Co-requisites: None
Content: Introduction to Engineering: Engineering as a profession and common traits of good engineers; Engineering disciplines and engineering organizations. Engineering problem solving and presentation: Engineering problems and fundamental dimensions; Engineering components and systems; Physical laws and observations in engineering; Basic steps involved in the solution of engineering problems. Communication skills and presentation of engineering work. Length and length-related parameters. Time and time –related parameters. Mass and mass related parameters. Force and force related parameters. Temperature and temperature related parameters. Electricity. Energy and power. Some common engineering materials. Engineering standards and codes. Engineering symbols and abbreviations.

PHC3101: PHYSICS 1A (2L/week)

Equivalent: PHY3119]
Contact Time: 28 hours
Practical Time: 14 sessions (42 hours)
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: IGCSE Physical Science
Co-Requisites: MTS3101Mathematics1A, STS3121 Statistics1A
Content: Units and unit conversion; Vectors; Motion in one and two dimensions; Newton's laws of motion and applications; Static's; Gravitation; Work, energy and power; Introduction to momentum; (Practical lessons)

PHC3112: PHYSICS 1B (4L/week)

Equivalent: PHY3119]
Contact Time: 56 hours
Attached Time: 0
Assessment: Continuous 50% Exam 50% (1 x 3-hour paper)
Pre-requisites: IGCSE Physical Science
Co-Requisites: MTS3132 Foundation Mathematics, (rec)/ MTS3112 Mathematics 1B, STS3121 Statistics 1A and PHC3192: LAB1and PHC3101 Physics 1A.
Content: electric charge; insulators and conductors; Electric force and coulomb's law
Electric field and Gauss's law; Electric potential; Capacitance and capacitors; Direct current; Ohm's law and simple circuits; Concept of magnetic field; Alternating current; Transformers; Phenomenological approach to RL and RC circuits; Temperature, gas and thermal expansion; Basic geometrical optics; Radioactivity and its detection.

PHC3192: LAB1 (1S/week)

Contact Time: 0
Practical Time: 14 sessions (42 hours)
Assessment: Continuous Only 100% minimum: 5 items
Pre-requisites: IGCSE Physical Science
Co-Requisites: PHC3112: Physics 1B
Content: Experiments related to PHC3112.

MTS3101: MATHEMATICS 1 A (2 L/Week)

Contact time: 28 hours
1 hr practical per week: 14 hours
1 two-hour paper
Prerequisite: IGCSE Mathematics or special remedial course
This course is to be taken by all first year science students
Content: Sets: Notations and diagrams to describe sets, subsets, supersets, equality of sets, empty sets, singletons, intersection, union, disjoint sets, difference of two sets, complement. Simplification and expansion of algebraic expressions. The absolute value, triangle inequality, linear equations, linear inequalities, quadratic equations, quadratic inequalities. Points and lines in a plane: the distance formula, parallel and perpendicular lines, circles and tangent lines.

MTS3132: FOUNDATION MATHEMATICS (4L/week)

Contact time: 56 hours
1 hour practical per week: 14 hours
1 three-hour paper
Prerequisite: IGCSE Mathematics
Co-requisite: MTS 3101
Content: Functions: domain, codomain, range, image, preimage, one-to-one functions, onto functions, composite function, inverse of a function, even and odd functions, increasing and decreasing functions.
Euler's number and natural logarithm, polynomials, remainder and factor theorem, partial fractions,
Trigonometry; limit of a function, Newton quotient, derivative of a function, rules of differentiation, antiderivatives, area under a graph, the definite integral. Introduction to Matrices and Systems of Linear Equations: Matrix algebra, determinants, Inverses, Solutions of systems of linear equations by Cramer's and Gauss Elimination.

MTS3121 ANALYTIC GEOMETRY AND COMPLEX NUMBERS (2L/Week)

Contact time: 28 hours
1 hour practical per week: 14 hours
1 two-hour paper
Prerequisite: IGCSE Mathematics
Content: Conic sections: ellipse, parabola, hyperbola. Complex numbers: operations on complex numbers, the complex conjugate, Argand diagram. Vectors in two and three dimensions: addition of vectors, multiplication by a scalar, magnitude, dot product, cross product.

CHM3101 CHEMISTRY 1A (= ½ semester/module)

Course equivalent: NONE

Pre-requisite: NONE

Contact time: 2L/T + 1PS per week; 28 lectures/tutorials; 14 practical sessions; 1 x 3 hours exam paper

Assessment: [60%]; minimum 2 tests; laboratory component: minimum 15% of CA. Final exam: 40%

Content: An Introduction to Chemistry. Measurements and SI units. Matter: physical state and chemical constitution. Atoms and molecules, naming compounds, chemical equations and reactions, moles, atomic masses, stoichiometry, the periodic table, electronic structure of atoms, chemical bonding. Selected chemical reactions and modelling of structures.

CHM3112 CHEMISTRY 1B (=1 semester/module)

Course equivalent: CHE3100

Pre-requisite: CHM3101 or permission of the department

Contact time: 4L/T + 1PS per week 56 lectures/tutorials; 14 practical sessions; 1 x 3 hours exam paper

Assessment: [60%]; minimum 2 tests; laboratory component: minimum 15% of CA. Final exam: 40%

Content: The gaseous state and the gas laws; the ideal gas equation; kinetic-molecular theory of gases. Thermochemistry; energy; enthalpy; heat capacity, standard enthalpy of formation and reaction. Quantum theory and electronic structure of atoms; atomic orbitals; electron configuration; building-up principle. Periodic relationships among elements; ionization energy, electron affinity; variations in chemical properties. Chemical bonding: ionic and covalent bonding; electronegativity; Lewis structures; molecular geometry; dipole moments; liquids and solids; intermolecular forces in liquids and solids. Rate of reaction. Chemical equilibrium; equilibrium constants; Le Chatelier's principle; Entropy, free energy and spontaneity. Solubility and solubility product constant. Acids and bases; Brønsted and Lewis acidity; acid strength, pH; weak acids and bases;acid-base reactions; buffer solutions. Oxidationand reduction: redox reactions; galvanic cells; standard potentials; Nernst equation; electrolysis; batteries. Introduction of Organic Chemistry.

CMP3101 COMPUTING 1A 2L+ 1PS/ week

Exam: 1 x 2 hours exam

Prerequisites: Departmental entry Test

Assessment: Continuous- 60% Examination- 40%

Content: understanding computer systems and technology: The problem-solving approach. The structure and components of a modern computer (PC) - processor, memory, hard drives, interfaces. Principles of information processing (Windows, word-processing, spreadsheets, presentation and databases)The nature and use of software.

CMP3112 COMPUTING 1B 4L+1PS/Week

Exam: 1x 3 hours

Assessment: Continuous- 60%, Examination- 40%

Prerequisites: Departmental Entry Test Co-requisite: CMP3101 Computing 1A Content: The logical Basis of Computing. The binary system, boolean logic and number representation. Elementary information theory. Logic gates and fundamental circuits. The von Neumann model of the computer. The nature of algorithms. Computer languages. Procedural programming constructs. Concepts of operating systems and networks. Elements of machine architecture.

STS3101 STATISTICS 1A 2L Per Week

14 weeks

1 x 2 hours exam paper

Pre-requisite: At least a credit in IGCSE Mathematics or at least a symbol 3 in HIGCSE Mathematics

Assessment: Continuous - 40%,Examination- 60%

Content: What is Statistics and who is the Statistician? Definition of the word 'data' and 'information': quantitative versus categorical, discrete versus continuous data. Variables: qualitative/ quantitative. Sources of data: primary versus secondary sources, population versus sample. Sampling techniques: why sample? Probability versus non-probability sampling methods; Simple Random Sampling, Stratified Sampling, Systematic Sampling, Cluster Sampling; use of random numbers tables. Types of measurement: nominal, ordinal, interval and ratio scales. Presentation of data: tabular forms- frequency tables, graphical methods- histograms, pie charts, compound bar chart, stem and leaf plot, box-and-whisker plot, frequency polygon, etc. Measures of Central tendencies: Mean, median and mode; Measures of dispersion- standard deviation and variance, inter-quartile range; skew ness and kurtosis, identifying outliers; sigma notation

SECOND YEAR MODULES

EGT3211: ENGINEERING MECHANICS I (4L+ 2 T per week)

Contact Time: 56 hours
Assessment: Continuous 50% Exam 50% 1 x 3 hour paper
Pre-requisites: MTS3132, PHC3112, EGT3101.
Co-requisites: None
Content: Vectors: Introduction to vectors, vector algebra, geometric vectors, dot and cross products. Forces and equilibrium: Force at a point, coplanar forces, addition of forces, couples and moments, resultants and equivalent systems. Equilibrium of a rigid body, line of action, free body diagram, adequacy of constraints and equilibrium positions. Analysis of forces in a truss: Method of joints, method of sections; Forces in submerged surfaces, buoyancy. Distributed forces: centroids and center of gravity; Pappu's second moment. Friction: Dry friction, wedges, screws, journal and thrust bearings, rolling resistance, belt friction.

CMP 3221 COMPUTER SCIENCE FOR ENGINEERS I (2L +1 PS/WEEK)

Contact Time: 28 hrs
Assessment: Continuous- 60%, Examination- 40% (1x 2 hours paper)
Pre-requisites: CMP 3112 Computing 1B
Content: Data structures and algorithms. Object-oriented programming. Problem solving and algorithm development with Java. Linear abstract data structures, including Lists, Stacks and Queues. Binary Trees and their applications. Applets, Events and Graphics. Use of Java to illustrate classic algorithms. Modular programming. Programming project.

CMP 3222 COMPUTER SCIENCE FOR ENGINEERS II (2L +1 PS/WEEK)

Contact Time: 28 hrs
Assessment: Continuous- 60%, Examination- 40% (1x 2 hours paper)
Co-requisites: CMP 3221 Computer Science for Engineers I
Content: Programming using MATLAB. Application of programming principles to an engineering situation using a technique such as MATLAB. Computer Architecture: the design and structure of computers. An introduction to Assembly-level programming.

EGT3212: ENGINEERING MECHANICS II (4L+ 2T per week)

Contact Time: 56 hours
Assessment: Continuous 50% Exam 50% (1 x 3 hour paper)
Pre-requisites: MTS3132, PHC3112, EGT3101.
Co-requisites: EGT3211
Content: Kinematics of particles: Laws of motion, Relative motion, Projectiles. Angular motion. Kinetics of particles: Equation of motion; Work and energy; Impulse and momentum. Concept of stress and strain: internal effects of forces, axial tension test- modulus of elasticity; Hooke's Law; Stress strain relations. Normal stress and normal strain. Beams: shear force and bending moment diagrams, Bending Stress, Shear stress.

EGT3251: ENGINEERING DRAWING (4L+ 2 T per week)

Contact Time: 56 hours
Assessment: Continuous 50% Exam 50% (1 x 3 hour paper)
Pre-requisites: EGT3101
Content: Foundations of Representing Technical Bodies: Principle of orthographic projection, drawing equipment, drawing formats, types of lines, simplified representations, scales, advice to free-hand sketching, free – hand drawing of machine parts in orthographic projection, cut section-dimensioning, lettering, little block, elaboration of part drawings. Essential Problems Descriptive Geometry: Isometric and oblique representations, sections of cones – interpenetrations, developments. Particular mechanical and civil engineering drawings; assembly –reading of drawings, part drawings and assembly drawing, particular dimensioning rules, surface finish symbols, semi-finished products. Various kinds of civil engineering drawings.

EGT3202: COMPUTER AIDED DRAWING (2L/week/2T per Week)

Contact Time: 28 hours
Assessment: Continuous 100%
Pre-requisites: CMP3101, CMP3112
Co-requisites: EGT3251
Content: Getting started; Setting up the drawing Environment; Using commands and system variables; Using coordinate systems; Creating objects; Drawing with precision; Controlling the drawing display; Editing methods; Using layers and object properties; Adding text to drawings; Creating dimensions; Using blocks and external references; Managing content with AutoCAD design Center; Creating a layout to plot; Plotting your drawing; Working in three-dimensional space; Creating three-dimensional objects.

EGT3221: MATERIALS SCIENCE AND ENGINEERING (2L/ 1T per week)

Contact Time: 28 hours
Assessment: Continuous 50% Exam 50% (1 x 2 hour paper)
Pre-requisites: CHM3101, CHM3102
Co-requisites: None
Content: Structure of materials: Atomic structure, electronic configuration, atomic bonding; Crystallographic planes and directions using Miller indices; Bragg's law; Defects in crystals; Diffusion in solids; Metals and alloys; Equilibrium phase diagrams: unary, binary and ternary systems. Invariant reactions: eutectic, eutectoid, peritectic, peritectoid systems. Proportion of phases based on the lever rule. Practical phase diagrams from ferrous alloy systems and non-ferrous alloy systems. Properties of materials: Mechanical, Electrical, Magnetic, Optical, and Thermal properties. Determination of material properties in a laboratory environment. Strengthening of metals: Solid solution strengthening, strain hardening, cold working, precipitation-hardening, martensitic transformation. Heat treatment of steels, hardenability, surface hardening. Environmental effects on materials: Corrosion and oxidation of metals. Corrosion prevention. Degradation of polymeric materials. Protection of polymers & plastics.

EGT3291: FUNDAMENTALS OF ELECTRICAL ENGINEERING (4L/week /IPS Per Week)

Contact Time: 56 hours
Assessment: Continuous 50% Exam 50% (1 x 2 hour paper)
Pre-requisites: PHC3112, EGT3101, MTS3132
Co-requisites: None
Content: The magnetic field: Ampere's Law and the determination of magnetic field strength for a variety of geometries. Induction, transient and steady state. Field and circuit models for inductive coupling. The magnetic circuit. Loss in magnetic circuits. The transformer. Phasor methods of analysis. Elementary electromagnetic transfers. The electric field: Charge, field strength and potential. Capacitance in a variety of geometries. Charge accumulation, including "static electricity". Coupling models. Elementary transducers. Conduction fields: Current and potential in a resistive medium. Resistance in a variety of geometries. Earth electrodes and step potential. Elementary transducers. The duals in field studies. Electromechanical energy conversion: The general theory of electromechanical energy conversion. The application of the theory to a variety system. Dynamics of elementary transducers. Introduction to electric circuits: Ohm's law, Resistance, Resistor networks, Resistors in series and parallel, Superposition Theorem, Thevenin's Theorem, Power, Capacitance, Capacitors in series and Parallel, Time constant, Electromagnetic Induction, Inductance, RMS Value of an ac waveform, Resistive circuit at ac, Capacitive circuit at ac, Inductive circuit at ac, Capacitive reactance, Inductive reactance, The series CR and LR circuits, Impedance of series CR and LR circuits, Impedance of a series LCR circuit. Parallel impedances, Power at ac, Series resonance, Parallel resonance. Electrical machines: transformer, motors, generators. Elementary power systems: Three phase ac systems. Power rectification. The components in a modern power system. Tariff philosophies and power factor correction.

EGT3271: ENGINEERING MATHEMATICS I (4L + 2T/WEEK)

Contact Time: 56 hours
Assessment: Continuous 50% Exam 50% (1 x 3 hour paper)
Pre-requisites: MTS3132, MTS 3121
Algebra: (1) Function: Definition of a function, composite function, inverse function, absolute value function, Domain and range, symmetry, piecewise-defined functions, mathematical modelling, exponential and logarithmic functions with applications, transformations of functions. (2) Radian measure and applied problems, trigonometric identities, inverse trigonometric functions, polar graphs. (3) Vector algebra in two and three dimensions, vector diagrams, vector equation of a line, Cartesian and parametric equation of a plane, intersections of lines and planes.

(4). Matrix Algebra: Definition, addition and subtraction, multiplication, row reduced echelon for transpose of a matrix, square matrices, singular and non-singular matrices, inverse matrices, systems of linear equations, solution by Cramer's rule, Gauss algorithm, inversion of a matrix, eigenvalues and eigenvectors, physical and engineering applications.

Calculus: (1) Differential - Limits and continuity, definition of the derivative, differentiation rules, derivatives of higher order, concavity and curve sketching, optimization, rates of change, differentiation of trigonometric functions.
(2)Integral: - Riemann sums, the fundamental theorem of calculus, integration techniques, integration of trigonometric functions. Double and triple integrals, area under a curve, solids of revolution.

EGT 3272 ENGINEERING MATHEMATICS II 4L + 2T/WEEK

Contact Time: 56 hours
Assessment: Continuous 50% Exam 50% (1 x 3 hour paper)
Co-requisites: EGT3271
Content: Calculus: Advanced Techniques of differentiation and integration: chain rule, differentiation of algebraic functions, derivatives of trigonometric functions, derivatives of composite functions. The definite and indefinite integral, integration by parts, integration of powers of trigonometric functions (sine, cosine, tangent, cotangent, secant and cosecant), integration by trigonometric substitution.

Differential equations: Meaning and solutions. First order ordinary differential equations; separable, homogeneous, exact and linear types; Graphical solutions. Second order linear equations with initial or boundary value conditions. Numerical methods: Zeros of functions, boundary value problems, different numerical differentiation and integration, numerical methods for ordinary differential equations.**Laplace transforms with applications to differential equations, Fourier transforms. Special functions. Boundary value problems.**

EGT3200: WORKSHOP PRACTICE (4 weeks at WVTC during inter-semester break)

Contact Time: 56 hours
Assessment: Continuous 100%
Pre-requisites: EGT3101
Co-requisites:
Content: Woodworking, Building, Plumbing and Pipe fitting, Welding and Fabrication, Boiler making, Auto Mechanics, Turner Machining, Electrical Installation, Air-Conditioning and Refrigeration, Radio and TV. Selected Topics in Engineering.

EGT3262 INTRODUCTION TO CIVIL ENGINEERING (2L+ 1PS per week)

Contact Time: 28 hours
Assessment: Continuous 50% Exam 50% 1 x 2 hour paper
Pre-requisites: EGT3101
Co-requisites:
Content: Civil engineering and physical infrastructure; Transportation systems; Water resource engineering; Environmental engineering and public health; Building design and construction. concepts: materials, ventilation, energy efficiency and insulation, lighting. Maintenance and safety concepts.

EGT3242 INTRODUCTION TO MECHANICAL ENGINEERING AND DESIGN (2L + 1PS per Week)

Contact Time: 28 hours
Assessment: Continuous 50% Exam 50% 1 x 2 hour paper
Pre-requisites: EGT3251 Engineering Drawing
Co-requisites:
Content: The mechanical engineering profession. General solution of design problems; Standardization; Tolerances and fits; Design Criteria; Stress and strain; Bolted and threaded joints; Welded joints; Riveted joints. Beams. General design rules.

EGP3282 FUNDAMENTALS OF ELECTRONICS (2L/week/1PS Per Week)

Contact Time: 28 hours
Assessment: Continuous 50% Exam 50% 1 x 2 hour paper
Pre-requisites: PHC3112
Co-requisites: EGT3291
Content: Electronic components: Inductor, capacitors, resistors, diodes, transistors, thyristors/triacs, IC's. Simple electronic circuits: Clamping circuits, rectifying circuits, simple amplifier (single stage RC), Logic operation of integrated circuits. Applications: Digital circuits, analogy circuits, hybrid circuits (digital plus analog), electronic control circuits.

EGM3282 INTRODUCTION TO MINING ENGINEERING (2L+ 1PS per week)

Contact Time: 28 hours
Assessment: Continuous 50% Exam 50% 1 x 2 hour paper
Pre-requisites: EGT3101
Content: Minerals and mineral ores. Mineral deposits. The economic significance of the Namibian Mining industry. Structure of the Namibian Mining Industry. Drilling equipment, tunnelling, and explosives. Shallow and deep mining. Blasting and loading equipment. Rock transportation systems and their applications. Diamond mining technologies and methods. Gold mining methods. Extraction and refining of Gold. Copper mining and refining methods; Lead mining and processing methods. Introduction to mine safety, mine ventilation, strata control. Environmental considerations. Mine visits.

ENGINEERING DEPARTMENT: COURSE EQUIVALENTS

Trimester Module (S) Failed	Semester Module (s) To be taken
CHE3281 Chemistry for Engineers	EGT3221 Materials Science and Engineering
EGG3229 Engineering Drawing	EGT3251 Engineering Drawing EGT3202 Computer Aided Drawing
EGG3200 Statics / Mechanics	EGT3211 Engineering Mechanics I EGT3212 Engineering Mechanics II
CFS3221 Advanced Programming	CMP3221/3222 Computer Science for Engineers I and II
EGG3210 Engineering Mathematics	EGT3271 Engineering Mathematics I EGT3272 Engineering Mathematics II
PHY3201 General Physics I	Covered in EGT3212 Engineering Mechanics II
PHY3202 General Physics II	EGT3291 Fundamentals of Electrical Engineering
PHY3203 General Physics III	-
EGG3243 Workshop Practice	EGT3200 Workshop Practice
PHY3361 Electronics	EGP3282 Fundamentals of Electronics
EGG3253 Civil Engineering Materials	EGT3262 Introduction to Civil Engineering
EGG3263 Machine Design	EGT3242 Introduction to Mechanical Engineering and Design
EGG3273 Introduction to Mining	EGM3282 Introduction to Mining Engineering

ENGINEERRING DEPARTMENT: COURSE PRE-REQUISITES

YEAR	MODULE/COURSE CODE	SEMESTER	HOURS	PRE/CO REQUISITES
1	EGT3101 Fundamentals of Engineering	1	28	
2	EGT3211 Engineering Mechanics 1	1	56	EGT3101, MTS3132 PHC3112
	EGT3212 Engineering Mechanics 2	2	56	EGT3101, MTS3132 PHC3112 /EGT3211
	EGT3251Engineering Drawing	1	56	EGT3101
	EGT3202 Computer Aided Drawing	2	28	CMP3101, CMP3112/ EGT3251
	EGT3221 Materials Science & Engineering	2	28	EGT3101, CHM3102
	EGT3291 Fundamentals of Electrical Engineering	1	56	PHC3112, EGT3101, MTS3132
	EGT3271 Engineering Mathematics 1	1	56	MTS3132
	EGT3272 Engineering Mathematics 2	2	56	MTS3132/ EGT3271
	EGT3200 Workshop Practice	1	160	EGT3101
	CMP3221 Computer Science for Engineers I	1	28	CMP3112
	CMP3222 Computer Science for Engineers II	2	28	CMP3221
	EGT3262 Introduction to Civil Engineering	2	28	EGT3101
	EGT3242 Introduction to Mechanical Engineering and Design	2	28	EGT3101/ EGT3251
	EGP3282 Fundamentals of Electronics	2	28	PHC3112/EGT3291
	EGM3282 Introduction to Mining Engineering	2	28	EGT3101

E. POSTGRADUATES PROGRAMMES

The Faculty may award the degree Master of Science (MSC.) by thesis in all the disciplines.
Currently all masters programme are offered by research except M.Sc. in IT and M.Sc, Biodiversity Management & Research, but students may be required to undertake specific courses that will enhance their capability in the field of research. Refer to Regulations for Postgraduate Course in the General Regulations Prospectus: Information, Regulation & fees. Candidates who intend to pursue MSC studies should approach the head of the department in which they would like to undertake their studies before 31 October of the year preceding intended registration.

E.1. MSC. INFORMATION TECHNOLOGY (IT) PROGRAMME (11MSCI)

E.1.1 DEPARTMENTAL REGULATIONS

All the courses will be FOUR (4) Lecture hours/week (16Hrs. per week)
Other regulations and guidelines governing the Master degree program remains same as per section of the general prospectus. Subject to the provisions of the Regulations for Postgraduate courses of study of the University of Namibia, the following Departmental Regulations shall apply. The programme is based on a pool of taught courses and the completion of a dissertation.

E.1.2 ADMISSION REQUIREMENTS

To qualify for entry into MSc. (IT) programme applicants should hold:

- Bachelor degree with Computer Science as a major, having at least B-grade average.
- Graduates of accredited and recognized Universities who are in possession of a Bachelor's degree with at least a B-grade average or upper second in a Computer related field.
- Graduates of accredited and recognized Universities who are in possession of a Bachelor's degree with at least a B-grade average or upper second in any field plus a Diploma in Computer Science.

The admitted candidates for taught Master's degree courses will have to do their Master's studies on a part time/ full time basis. An extension of the registration period of up to one academic year beyond the stipulated deadlines, may be granted by the FACULTY, given full reasons. Consent of the supervisor is a precondition for an extension of the registration

E. 1.3 DURATION OF STUDY

The MSC cannot be completed in less than (1) year. Candidates will have the option of conducting their MA studies on a full-time or part-time basis. Full time candidates should complete their studies within two (2) calendar years. Part-time candidates will be allowed up to three (3) years to complete their studies. An extension of the registration period of up to six (6) months beyond the stipulated deadlines may be granted by relevant committees if valid reasons are advanced.

E. 1.4 CURRICULUM COMPILATION

The curriculum for the MSc. degree consists of the writing of a research thesis. Refer to the Regulations for Postgraduate Courses of Study in the General Prospectus: Information, Regulations & Fees.

E. 1.5 EXAMINATION REGULATIONS

Formal examination will take place at the end of each semester. Examinations will be subject to external assessment. The candidate should pass the formal examinations in the taught courses, to submit a written dissertation and to attend viva-voce. A candidate who fails any part of his/her Masters Degree Programme and who is allowed to repeat that part may be exempted by Senate, on the recommendations of the Departmental panel of examiners from those courses or components from that part s/he passed.

E.1.6 FORMAT AND E VALUATION OF DISSERTATION WORK

A candidate shall be required to submit a complete report in loose bound form for verification and approval to the concerned supervisors in the following format: Paper size: A4 (International format, 210 x 297 mm) Line space:1.5 Top and Bottom margins: 20mm Left margin: 30mm Right margin: 10 mm Figures/flowchart/circuits/block diagrams: No restrictions. Font size: 12 After the dissertation has been approved by the panel the candidate shall submit at least four bounded copies with the chairman of the department in accordance with the following specifications: Color of the report: White Type of binding: Artvellum or cloth Front page should include: University Logo Title of the Project Title of the Degree Name of the candidate Month and Year The relevant department will retain one copy and two copies will be deposited in the university Library. Unless senate has agreed to the contrary the Library copies shall be open to public reference. One copy to the supervisor. The candidate should submit the completed project work in all respects before the end of the academic calendar as announced by the respective department. The candidates will be informed in advance the date, time and the venue of the viva-voce examination. Other regulations and guidelines are same shown in the section (9.4.7) page no. 28 of the general prospectus 2002 are holds good. Concept and Evaluation of Mini Project: Concept of mini project is introduced in each course in order to strengthen the programming skills and ideas to develop the real time project as the time goes. It not only gives the skills but also gives the confidence in the candidates to go ahead with the project developments and practical implementations with different types of tools. The evaluation will be done by a group of examiners constituted by the course co-ordinator. The candidate has to submit a complete project report according to the format given by the respective supervisors. Evaluation also involves the demonstration and viva-voce.

E.1.7 PRACTICALS

Attendance of practical classes is compulsory.

NB: STUDENT MUST PASS ALL MODULES/COURSES AND PRE/CO-REQUISITES AS LISTED FOR THE PARTICULAR MODULES. THIS SECTION LISTS ALL THE COURSE CODES FOR MSC (IT), FOLLOWED THEREAFTER BY THE COURSE CONTENTS IN THE SAME ORDER.

E.1. 8 COURSES: CODES, RESTRICTIONS, EQUIVALENTS AND CONTENTS

FIRST YEAR MODULES

FIRST SEMESTER

CMP6111 DATA STRUCTURES AND ALGORITHMS

Exam: 1x 3 hours
Assessment: Continuous- 60%, Examination- 40%
Content: Abstract data types and data structures, Classes and objects, Complexity of algorithms: worst case, average case, and amoritized complexity. Algorithm analysis. Algorithm Design Paradigms. Lists: stacks, queues, implementation, garbage collection. Dictionaries: Hash tables, Binary search trees, AVL trees, B-Trees. Priority queues. Graphs: Shortest path algorithms, minimal spanning tree algorithms, depth-first and breadth-first search. Sorting: Advanced sorting methods and their analysis.

CMP6131 DISCRETE MATHEMATICS

Exam: 1x 3 hours
Assessment: Continuous- 60%, Examination- 40%
Content: Discrete models, Concepts of sets and functions, Foundations, Finite series logic, Propositional logic, predicate logic, Combinational theory, Concepts of AI.

CMP6151 OBJECT ORIENTED PROGRAMMING & ANALYSIS

Exam: 1x 3 hours
Assessment: Continuous- 60%, Examination- 40%
Content: Classes and objects, constructors and destructors, operator overloading and type conversions, Inheritance: Extending Classes, Pointers, virtual functions and polymorphism, Managing console I/o operations, working with files, Object oriented system developments, templates.

CMP6171 ADVANCED OPERATING SYSTEMS

Exam: 1x 3 hours
Assessment: Continuous- 60%, Examination- 40%
Content: User Level Specification of OS. Fundamental Concepts of Multi programmed OS, Basic Concepts and Techniques for Implementation of Multi programmed OS. Processes and the Kernel, Microkernel Architecture of OS. Multiprocessor, Multimedia, and Real-Time OS. POSIX Standards. Management and Control of Processes. Basic Concept of Threads, Types of Threads, Models of Thread Implementations. Traditional and Real-Time Signals. Clocks, Timers and Callouts. Thread Scheduling for Unix, Windows, and Real-Time OS, Real-Time Scheduling. Interprocess/Interthread Synchronization and Communication, Mutual Exclusion/Critical Section Problem, Semaphores, Monitors, Mailbox, Deadlocks. Concepts and Implementation of Virtual Memory(32-bit and 64-bit), Physical Memory Management. File Organization, File System Interface and Virtual File Systems, Implementation of File Systems. I/O Software: Interrupt Service Routines and Device Drivers. Protection and Security. Case Study of Unix, Windows, and Real-Time OS.

SECOND SEMESTER

CMP6112 RELATIONAL DATABASE MANAGEMENT SYSTEMS (RDBMS) (4L/1PS /Week)

Exam: 1x 3 hours
Assessment: Continuous- 60%, Examination- 40%
Content: Concepts of DBMS, Data models, File organization, Relational model, Relational database manipulation, Relational database design, Normalization, Network and Hierarchical data model, Queries, database security and Integrity, Distributed databases.

CMP6132 COMPUTER GRAPHICS (4L/1PS /Week)

Exam: 1x 3 hours
Assessment: Continuous- 60%, Examination- 40%
Content: Overview of graphics systems, Output primitives, Attributes of output primitives, Two dimensional geometric transformations and viewing, Graphical user interfaces and Interactive input methods, Three dimensional concepts, Three dimensional object representations, Computer animation, Color models and color applications.

CMP6152 ADVANCED SOFTWARE ENGINEERING (4L/1PS /Week

Exam: 1x 3 hours
Assessment: Continuous- 60%, Examination- 40%
Content: Software – the process and its management, project management: software metrics, estimation, planning, system and software requirements analysis: Computer system analysis, analysis fundamentals, structured analysis, object oriented analysis and data modeling, Design and implementation of software, Ensuring, verifying and maintaining software integrity, The role of automation.

CMP6172 DATA COMMUNICATION AND COMPUTER NETWORKS (4L/1PS /Week)

Exam: 1x 3 hours
Assessment: Continuous- 60%, Examination- 40%
Content: Introduction to data communications, Fundamentals of communications, Data transmission coding and framing, Data switching, Hardware media and software, Network software, Reference models, Network standardization, Complete study of OSI reference models, Designing.

SECOND YEAR MODULES

FIRST SEMESTER

CMP6211 CRYPTOGRAPHY AND NETWORK SECURITY (4L/1PS /Week)

Exam: 1x 3 hours
Assessment: Continuous- 60%, Examination- 40%
Content: Introduction, Conventional encryption: classical technologies, Conventional Encryption: Modern Techniques, Confidentiality using conventional encryption, Public-key cryptography, introduction to number theory, message authentication and hash functions, Digital signatures and authentication protocols, electronic mail security, IP security, Firewalls.

CMP6231 INFORMATION SYSTEM AUDITING (4L/1PS /Week)

Exam: 1x 3 hours
Assessment: Continuous- 60%, Examination- 40%
Content: Introduction, The management control framework, Application control framework, Evidence collection, evidence evaluation.

SECOND SEMESTER

CMP6212 DISSERTATION/THESIS

E.2. MSC BIODIVERSITY MANAGEMENT & RESEARCH (11MSCB) (In Collaboration with Humboldt)

E.2.1 DEPARTMENTAL REGULATIONS

All the courses will be taught on a block basis- the duration of each course is indicated in the course contents (E.2.8). Other regulations and guidelines governing the Master programme remain the same as per section of the general prospectus. Subject to the provisions of the Regulations for Postgraduate courses of study of the University of Namibia, the following Departmental Regulations shall apply. The programme is based on a pool of taught courses, internship and the completion of a Master thesis/dissertation.

E.2.2 ADMISSION REQUIREMENTS

The MSc Biodiversity Management & Research degree is internationally exposed. Admission requirements may be granted to those who hold a first university degree (e.g. Bachelor, Magister or German Diplom) in a relevant discipline (e.g. Biology, Geography, Ecology, Agronomy). Applications from non-academic persons can also be taken into account , if a professional career in a subject relevant to the objectives of the Masters Course can be verified (certificate only). In case of international degrees, the approved equivalence agreements of the conferences by the minister of education and arts, and by the rectors of universities have to be considered. The adjudication behooves to the committee of admission and examination. For students whose first language is not English, an evidence of proficiency in English is required.

E.2.3 DURATION OF STUDY

The MSc Biodiversity Management & Research degree will be offered in a 2-years rhythm in January, at the beginning of the Namibian academic year. The first year consists of coursework while the second year will offer coursework and internship during the first semester. The research for the Dissertation and its write up will take place throughout the second year.

E.2.4 CURRICULUM COMPILATION

The curriculum for the MSc Biodiversity Management & Research consists of coursework, internship and the writing of a research thesis. Refer to the Regulations for Postgraduate Courses of study in the General Prospectus: Information, Regulations & Fees.

E.2.5 EXAMINATION REGULATIONS

All module examinations will be carried out after each module. Examinations will be subject to external assessment. The Admission & Examinations Committee will decide on admission to the module examinations. In addition to module-specific regulations, attendance of at least 80% in a particular module is a requirement for examination admission. Students must pass all modules for them to proceed to the master thesis. A mixture of assessment modes will be used: written, oral or practical examinations, reports and presentations.

E.2.6 FORMAT AND EVALUATION OF DISSERTATION WORK

Before a candidate can proceed to the thesis, he/she must first successfully complete the coursework examinations. Each student will submit a Master Thesis/Dissertation during the second year. The thesis must be drafted in English language. The processing time of the Master thesis comprises six months including data survey. The thesis must be in a format given by the Coordinators. The thesis will be evaluated by the supervisor and another examiner within one month after submission. The UNAM grading system will be used for the evaluation. Each student will defend the thesis in a viva voce examination.

E.2.7 PRACTICALS AND INTERNSHIP

Attendance of practical classes, field trips and internship is compulsory.

E.2.8 COURSES, CODES, AND CONTENTS

FIRST YEAR MODULES

EBL 6109 BIODIVERSITY: AN OVERVIEW

Duration: 1 week (20 contact hours, 40 other forms)
Mode of examination: Written report
Contents: Introduction of co-ordinators, contact people, lecturers etc; introduction of students and their academic background and expectations of the course; introduction to the programme; background and career opportunities, Guidance at UNAM – laboratories, IRLC, logistics etc.; Guidance in Windhoek (locality and contact people): e.g. Ministry of Environment and Tourism (DEA, Permits), National Museum of Namibia, National Botanical Research Institute (Herbarium), DRFN (Desert Research Foundation Namibia),History of Biodiversity, Excursion to Neudamm Agricultural College or Avis-Dam; Reflection & Orientation for courses to follow.

EBM6119 APPLIED BIOMETRICS

Duration: 2 weeks (40 contact hours, 50 hours other forms)

Mode of examination: Continuous assessment (40%); 1 x 3 hour examination (60%)
Contents: Agricultural Experimentation: Principles of experimental design for on-station and adaptive on-farm research trails, repeated measurements; Analysis of data from balanced designs. Some basic designs: Latin squares, Randomized Complete Block Designs, Completely randomised designs, Split-plot designs – applications to farm experiments and trails. Methods of analysing multiple experiments, data management. Multivariate analysis – additive main effects and multiplicative interaction models; Spatial Statistics: Basic concepts of time series; exponential smoothing forecasting, ARIMA models

EBM6139 ADVANCED DATA EXPLORATION

Duration: 2 weeks (40 contact hours (incl. hours advised in-lab-exercises), 50 hours individual self-study.
Mode of examination : Practical examination
Contents: Conception of databases for monitoring. Database management, input standardisation, coding, searching, reporting. Ex: internet data bases with monitoring data. Exploration of data, visualisation techniques, hypothesis generation, statistical evaluation, final description. Ex: modern methods of visualising space time data: GIS, data movies. Modelling and simulation. Simulating data at population level (resource use, habitat use, competition, abundance devolution etc.)Simulating data at mechanistic level (from individual to population). Modelling land-use patterns and diversity distributions. Ex: Simulation of monitoring under changing sampling conditions: seasonal data, inhomogeneous spatial configuration etc.

EBM6159 ASSESSING BIODIVERSITY I

Duration: 2 weeks (40 contact hours, 50 hours other forms
Mode of examination : Poster and 1 x 3 hours examination

Contents: Rapid biodiversity appraisal versus long-term ecological monitoring; Statement of problem and formulation of hypotheses. Initial conception – designing assessment/monitoring programmes in space and time to test hypotheses rigorously & cost-effectively. Identification of design flaws in different practical contexts, relative to spatial and temporal needs of the study and natural ecological variation. Sampling methods for different kinds of data in space and time, drawbacks, habitat heterogeneity; Local applicability versus broader comparability of methods and data. When to adapt a monitoring programme that is not meeting needs. Working with landowners and local communities.

EBM6109 COMMUNICATION AND PRESENTATION

Duration: 1 week (20 contact hours, 40 hours other forms (incl. independent student work)

Mode of examination :There will be no formal examination – all assignments will be marked critically and constructively. Students require a continuous assessment mark of at least 50% to obtain a pass for this course.

Contents: Various aspects of scientific communication will be addressed: writing review articles, journal papers, presentations (oral), poster; Powerpoint as well as presenting proposals for funding

EBB6119 EVOLUTION OF BIODIVERSITY

Duration: 2 weeks (40 contact hours, 50 hours other forms)

1st week: contact hours: 2h lecture per day, followed by 2h of demonstrations/lab work/consultation;other forms: 20-30h of self study: preparation of oralpresentation/poster

2nd week: contact hours: 2h lecture per day, followed by 2-4h seminar with presentation and consultation; maybe demonstrations, lab work;
other forms: 20-30h of preparation for the presentation

Mode of examination :Oral presentation and poster

Contents: History of evolutionary ideas. Evidence of past evolution (fossil record, faunal mass extinctions, biogeography).Modern concepts and theories in evolutionary biology. Mechanisms of evolution.

Evolutionary genetics. Speciation and species concepts. Phylogenetic methods. Introduction to mammalian phylogeny. Current issues in mammalian phylogeny.

EBB6139 FORM AND FUNCTION

Duration: 2 weeks (40 contact hours, 50 hours other forms)
Mode of examination: Written report and oral examination
Contents: Methods in taxonomy and comparative morphology, dissection of selected animals and analysis of diagnostic characters of important terrestrial groups (e.g. mammals and other vertebrates), introduction to the ecological and biological significance of organismic structures and their relation to behavioural and physiological aspects.

EBB6159 BIOGEOGRAPHY

Duration: 2 weeks (40 contact hours, 50 hours other forms (incl.1 week field trip)
Mode of examination: 1x3 hour examination
Contents: What is biogeography? Patterns of distribution of plants, animals and communities: distribution on different scales from local to global, distribution maps, general explanation of distribution patterns: environmental factors, species interactions, geographical barriers, historical developments. Communities, ecosystems and biomes; From species to ecosystems, relations of ecosystems to climate and soils, climate zones and ecoregions: global and African perspectives, environmental gradients, ecotones and ecoclines, forest lines. Biodiversity: aggregation of observations and explanation. Global, regional and local patterns of diversity and explanatory theories. Dynamics: special problems. Species: evolution and extinction, seasonal variations, migration with examples from Namibia. Communities: invasions and extinctions, disturbance regimes, global change. Humans and the biosphere: special problems. Human geography and biogeography, human habitat alteration, human use of biodiversity. Applied biogeography: application. Conservation: red lists, design of nature reserves, ecological landscape design. Bioindication: assessment of the state of natural resources, environmental impact assessment, environmental. monitoring; deforestation, desertification; Extension and education: nature interpretation.

EBB6179 EVOLUTIONARY ASPECTS OF AGRICULTURE (+AQUACULTURE)

Duration: 2 weeks (40 contact hours, 50 hours other forms)

Mode of examination: CA (60%), seminar presentationexam (40%)
Contents: Patterns of evolution in plants, with special reference to crop plants: role of sexual reproduction, mutation, polyploidy and inter-specific hybridisation. The Origin or agriculture. Plant/animal domestication and introduction. Primary and secondary gene centres. Role of breeding in the evolution of agriculture. Internationalisation of agriculture and its impact on the conservation of genetic resources. Intellectual Property Rights and Variety/Breed Protection Rights.

EBM3179 MODERN MUSEUM MANAGEMENT

Duration: 3 weeks (60 contact hours, 120 hours other forms)

Mode of examination : CA: symposium & self-study reports, laboratory results, products, 1x3 hour examination

Contents: Purpose of collections (Definition of collections; Ethics; Operational planning); Specimen acquisition (Field preservation; Preservation fluids and fixatives; Specimen labeling; Microscope preparation; Field selection and preparation of plant materials; Skeletal reconstruction); Collection management (Infrastructure management; Principles of archiving; Specimen management; Principles for developing information systems; Optical Character Recognition (OCR)); Information dissemination (Exhibitions and Education; Practical display techniques; Practical education techniques); Specimen identification (Character sets; Use of glossaries and thesauri; Paper based identification media; Morphometric identification media; Electronic identification media; Building character sets for identification keys; Constructing keys; Verification of keys)

EBF6119 FUNCTIONAL BIODIVERSITY OF ARID AND SEMIARID ECOSYSTEMS

Duration: 2 weeks (40 contact hours, 50 hours other forms)
Mode of examination : Oral presentation & report

Contents: Introduction to Hot Arid Lands of the World and Namibia, geographic & climatological background, with emphasis on Namib. Ecophysiology in conditions of water limitation, food limitation, and heat: sources, limitations, time-space windows. Desert Ecology: life history patterns, community and population processes, food-webs, autecology, Biodiversity in deserts: source-sink effects, patchiness,

speciation processes and local extinction/persistence, biogeography (connect to other courses). Introduction to natural resources and their management in deserts. Desertification: causes, occurrence, criteria for indicators, possibilities of combating. Optional integration of a 2-days-seminar with emphasis on the specific problems of another arid region e.g. Land Degradation and Desertification in the Sahel – Examples from the Butana Region in the Rep. of the Sudan.

EBF6139 FUNCTIONAL BIODIVERSITY OF WOODLAND AND FOREST ECOSYSTEMS

Duration: 2 weeks (40 contact hours, 50 hours other forms)

Mode of examination : CA (30%) written assignments, Written examination (70%)
Contents: Determinants of the woodland system. Modifiers of the woodland system. Problems associated with woodland management. The importance of the savanna woodland system. The exchange of genetic material within the sub-region. Carbon storage / climate change. Climatic factors determining the woodland system: Rainfall & humidity; temperature; light. Different regeneration requirements (mosaic of age classes). Different abilities to withstand fire effects. Soil Factors. Light in the savanna woodland system; Fire effects in the woodland system; Fuel characteristics; Causes of fire. The effect of herbivory on grass plants; Cattle as a management tool (reduce fuel load); Human impacts (Poverty and woodland resource use). Timber harvesting; Fruit harvesting; Insects in savanna woodlands; Nutrient Cycling.

EBF6159 FUNCTIONAL BIODIVERSITY OF FRESHWATER ECOSYSTEMS

Duration: 2 weeks (40 contact hours, 50 hrs other forms)
Mode of examination : Written report, orally presented during a concluding seminar
Contents: Typology of freshwater-bodies, water resources, climate, seasonality. Taxonomy, biogeography, systematics, and evolution of major limnic invertebrate and vertebrate groups. Exercises in determination, measurement, preparation, and conservation. Feeding system and reproductive system: anatomy, functional morphology, basics in physiology, behaviour. Reproductive guilds of fishes; seasonality, spawning-grounds, growth, age, population estimates, recruitment, methodology and calculations. Techniques of observation, measurement of abiotic parameters, and fisheries. Public and economical outreaches: fisheries, protection measures, engineering, aquaculture.

EBF6179 FUNCTIONAL BIODIVERSITY OF MARINE ECOSYSTEMS

Duration: 2 weeks (40 contact hours, 50 hours other forms)
Mode of examination: Oral presentation & written report

Contents: Investigation of the structure of Marine Coastal Systems: Hard bottom sub- and intertidal (exposed vs sheltered; natural vs artificial; zonation), kelp forests, sandy and muddy sub- and intertidal, lagoons. Physical and temporal (literature sources) heterogeneity of these systems. Taxonomy and biology of the respective constituent animal and plant species. Identification of species - specific ecological 'functions' in different areas (e.g. longevity, reproduction, trophic level, manner of prey capture, growth form, degree of specialization, niche width, locomotion, etc.). Distribution of species in the multidimensional niche-space (number of dimensions ~ number of functional areas investigated).Functional vs taxonomic redundancy and diversity in each system. Relationship between functional diversity and diversity-relevant parameters (habitat size, disturbance regime, abiotic and biotic stress) within each system. Comparisons across systems.

EBL6119 PARADIGMS AND ECOMOMICS OF MANAGEMENT PRINCIPLES

Duration: 2 weeks (40 contact hours, 50 hours other forms)
Mode of examination : Oral presentation & report
Contents: Factors and principles of population and economic growth; changes in the structure of economy. Spatial patterns of economic growth; basic principles of locational decision; theories of locational decision of different sectors of economy. Regional multiplier effects, Instruments and strategies of spatial economic development. Empirical evidence of economic development and spatial change (with special reference to southern Africa)

EBL6139 LANDUSE PRACTICES

Duration: 2 weeks (40 contact hours, 50 hours other forms)

Mode of examination : CA (oral presentations); Oral examination

Contents: Introduction to eco-geography of agricultural landuse systems. The agricultural environment, abiotic, biotic and economic factors. Land resource utilisation concepts, types and time horizons of

sustainability concepts, environmental impact assessment and ecological health. Evolution of landuse systems and agricultural production systems. Landscape ecology and agriculture, production systems and their interactions with landscape processes.Introduction to landuse planning.

EBL6129 LANDSCAPE ANALYSIS

Duration: 1 week (20 contact hours, 40 hours other forms)
Mode of examination: final assignment under examination conditions

Contents: Theoretical teaching of the topics through lectures in the Geography Laboratory, supplemented with practical sessions in the Laboratory for Spatial Analysis of the DGES (Department of Geography and Environmental Studies).Topological, chorological and chronological features and dynamics of ecology at the landscape level. Analysis of abiotical and biotical landscape features retrieved from aerial photos and satellite images. Analytical techniques of observation and ground truth verifications from on site visits. Principle concepts in zonation, classification and mapping of landscape features. Processing and integration of landscape information into spatial data bases. Applications and representation of landscape ecological data.

EBL6159 RESOURCE MANAGEMENT

Duration: 2 weeks (40 contact hours, 50 hours other forms)

Mode of examination : CA – assignments and field work; Written examination

Contents: What is resource management? Why is resources management important? What is biodiversity? The Convention on Biological Diversity; Objectives of Biodiversity; The Namibian National Biodiversity Programme; The Namibian National Biodiversity and Strategy and Action Plan; The history of conservation in Namibia; Conservation approaches in Namibia. The sustainable development concept. Global development and the environment; Trade and the environment; Defining sustainable development; Resource Economics; The human dimension in resource management; Indigenous Knowledge Systems/Traditional Knowledge; Community based natural resource management; Integrated management of natural resources; Management & implications of arid environments; Principles of environmental management; Planning for sustainable resource utilisation; Management of freshwater resources; Management of marine resources; Management of wildlife; Comprehension of the concept of resources management; Comprehension of the concept of resource development; Enhancing productivity without resource degradation; Critical analysis of environmental issues; Decision-making; Environmental legislation in Namibia; The ecosystem approach for resource management. Adaptive management.

EBL6179 AQUATIC RESOURCE MANAGEMENT

Duration: 2 weeks (40 contact hours, 50 hours other forms)
Mode of examination : CA: report on excursion; practical exercises 1x2 hour exam
Contents: Definitions; Objectives of resource management; The need for fisheries management. Key elements on which a manager needs information to achieve sustainable exploitation of resources; The fisheries management process; Biological and environmental concepts and constraints; Social and economic dimensions; The precautionary approach; Management strategies; Aquatic resource population modeling; Methods for collecting different type of data; Population dynamics of crop species; Estimation of recruitment and resource status; Migratory behaviour of aquatic organisms. The objectives, problems and historical management techniques; Conflicts that exist between different user groups; Impact of irrigation on aquatic biodiversity; Perspectives in aquaculture and marketing techniques.

EBL6199 INTERNATIONAL CONVENTIONS AND ENVIRONMENTAL LEGISLATION AND THEIR APPLICATIONS

Duration: 2 weeks (40 contact hours, 50 hours other forms)
Mode of examination: Written exam
Contents: Introduction to International Law: History, sources, relation to national law, relevance in international relations. International environmental law: History and concepts of international environmental law: Stockholm, Rio and Johannesburg Conferences, key principles, common goods, role of developing countries. Environmental treaties: drafting, negotiations, conclusion, regimes. Principles and problems of Biodiversity Protection through law. Conservation of land resources: Conservation treaties (land); species protection; The Convention on International Trade in Endangered Species (CITES), implementation, trade related problems; Biodiversity Convention (CBD); Desertification; Wetlands. Conservation of marine resources: fishing, oil pollution, UNCLOS, regional treaties, liability approach. Biodiversity and intellectual property: genetic resources and conflicts with TRIPS. Genetically Modified Organisms: biotechnical engineering; Cartagena Protocol on Biosafety; PICC Convention. Climate Change: Effects of climate

change on biodiversity; Climate Change Convention; Kyoto Protocol and process. Implementation: comparison of environmental legislation in Namibia, SADC countries and Germany.

SECOND YEAR

EBL6219 ASSESSING BIODIVERSITY II

Duration: 5 weeks (100 contact hours, 300 hours other forms)
Mode of examination: Assignment and oral examination
Contents: The course will be individually designed to meet the requirements of the topic chosen by the students (e.g. forestry, fishery, economics, tourism, management, biosystematics)

EBL6209 INTERNSHIP

EBL6299 DISSERTATION/THESIS

E.3 MSC CHEMISTRY (11MSCC)

E.3.1 DEPARTMENTAL REGULATIONS

E.3.2 ADMISSION REQUIREMENTS

The MSc programme in the Department of Chemistry is open to all BSc graduates with Chemistry as one of their majors. The admission to the MSc programme of the holders of the B.Sc. (Chemistry) degree is not automatic. The applicants will be accepted on the basis of their undergraduate record. An average mark of 70% is required. The course normally extends over a minimum period of two years for full-time students.

E. 3.3 DURATION OF STUDY

The duration of the MSc in Chemistry is two (2) years for full-time students and three (3) years for part-time students. Relevant committees may grant an extension of registration up to six (6) months beyond the stipulated period if valid reasons are advanced.

E. 3.4 CURRICULUM COMPILATION

The curriculum for the MSc Chemistry consists of coursework and the writing of a research thesis. Refer to the Regulations for Postgraduate Courses of study in the General Prospectus: Information, Regulations & Fees.

FIRST YEAR
Compulsory course:
CHM6121 Professional Communication

The following courses are offered in the first semester with a three hours examination paper written in June. Student may choose any 4 of the courses below. The courses are not necessarily offered every academic year.
CHM6111 Advanced Analytical and Instrumental Methods
CHM6131 Advanced Organic Chemistry
CHM6151 Advanced Inorganic Chemistry
CHM6171 Advanced Physical Chemistry
CHM6191 Advanced Biochemistry and Biotechnology

SECOND YEAR
Compulsory course:
CHM6142 Research Methodology and Project Proposal

The following courses are offered in the second semester. Student may choose any 3 of the courses below. The courses are not necessarily offered every academic year.
CHM6112 Current Topics in Analytical Chemistry
CHM6132 Current Topics in Organic Chemistry
CHM6152 Current Topics in Inorganic Chemistry
CHM6172 Current Topics in Physical Chemistry
CHM6192 Current Topics in Biotechnology
CHI6112 Current Topics in Industrial Chemistry

E. 3.5 EXAMINATION REGULATIONS

If a student fails the first semester module he/she may proceed to the next semester. However he/she must repeat the module in the following year. A minimum of 50% is required to pass each module.

E.3. 6 PRACTICALS

Four compulsory practical classes (mini Projects) in the chosen field of study are offered in the first semester. Each practical runs over three weeks. A well-written practical report in the form of a journal article should be submitted. All calculations must be submitted separately

E.3. 7 COURSES: CODES, RESTRICTIONS, EQUIVALENTS AND CONTENTS

FIRST YEAR MODULES

FIRST SEMESTER

CHM6111 Advanced Analytical and Instrumental Methods 16 Credits

Contact time: 42 hours
Practical Sessions: 36 hours
Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment and 50% Examination
Content: Electroanalytical chemistry: Ion selective electrodes, potentiometry, polarography, coulometry, conductometry and electrogravimetry. Advanced techniques in electroanalytical chemistry –fundametals in; solution electrode interface, Buttler-Volmer relationships, Cottrel equation, Tafel relationships, Levich equation and aspects of rotating disk electrodes, rotating ring disk electrodes.Chromatography. Chromatography - Theory of Chromatography, High Performance Liquid Chromatography (HPLC), Ion Chromatography, Supercritical Fluid Chromatography. Mass Spectrometry (GC-MS), and Liquid Chromatography – Mass Spectrometry (LC-MS). T Advanced mass spectrometry, -Basic instrumentation, ionization techniques, analyzers and detectors, vacuum technology, detailed ion fragmentation patterns and the practical application of electron impact, chemical ionization and other auxiliary mass spectrometry techniques, *e.g.* FABMS and electro spray MS, to the structure elucidation of both small and large organic molecules. *X-ray analysis methods:* Theory of X-ray Spectra. Conventional X-ray fluorescence analysis. Methods and instrumentation for excitation, dispersion detection and interpretation. Matrix effects and their avoidance. Energy dispersive X-ray analysis. Alternative X-ray analysers. Electron microprobe analyser. Single crystal X-ray analysis. *Crystallography* (theoretical principles, theory of crystals, X-rays, crystallographic techniques, structure determinations, powder diffraction and crystallographic data bases), NMR-Practical application of 1D and 2D Fourier transform NMR techniques. ^{1}H NMR and ^{13}C NMR. Non-first order spectra, basic experiments in DEPT, J-Mod. NOE diff. 2D homonuclear NMR- COSY, NOESY, TOCSY; heteronuclear direct (1J)- HECTOR, HMQC,HSQC; heteronuclear long range HMBC, LR HECTOR and COLOC.; selective 1D experiments: SEL TOCSY and SEL NOESY. Application of Analytical techniques to food science**,** pesticide analysis, forensic analysis, bioanalytical chemistry as well as other topics that are of interest. Other instrumentations tools

CHM6131 Advanced Organic Chemistry 16 Credits

Contact time: 42 hours
Practical Sessions: 36 hours
Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment and 50% Examination
Content:*Stereochemistry:* chirality, prochiral relationships, enzyme mediated reactions, dynamic stereochemistry; *asymmetric synthesis;* A survey of current methodologies for the synthesis of chiral compounds. *Pericyclic reactions:* A survey of the mechanistic principles and applications of cycloadditions, electrocyclic reactions and sigmatropic shifts in organic synthesis.*Retrosynthetic Analysis* (principles, functional groups transformations, synthetic equivalent groups, umpolung; protective groups);*Organometallic Compounds in Synthesis* (organolithium compounds, direct ortho-metallation, synthetic applications); *Stereoselective Synthesis* (strategies, chiral pool, substrate controlled methods, sigmatropic rearrangements, chiral auxiliary methods, asymmetric reagents and catalysts, synthesis planning).*Nanotechnology (*Fullerenes, nanotubes, self-assembled monolayer, Langmuir-Blodgett films)
*Polymers (*types of polymerization, reactions of polymers selected application, recycling)*Selected natural products:* Elucidation of biosynthetic pathways.

CHM6151 Advanced Inorganic Chemistry 16 Credits

Contact time: 42 hours
Practical Sessions: 36 hours
Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment and 50% Examination
Content: The material includes the chemistry of both, the main group, and the transition metal elements, and can be divided into the following topics:*Classification Systems in Inorganic Chemistry*
Chemistry of selected Main Group Elements, Synthesis, structure and reactions of: hydrogen, elements of Groups 1(alkali metals), 2(alkaline earth metals), 12, 13, 14, 15(pnictides), 16(chalcogens), 17(halogens) and 18(rare gases). Lanthanides and Actinides. Solution Chemistry. Steric Effects in Inorganic Chemistry.
Coordination Chemistry (requirements, stereochemistry and structures)Solid State Chemistry: Lattice energy; bonding in solids – bond model. Electrical properties of semiconductors; doped semiconductors. Defects and non-stoichiometry. Low-dimensional solids: one-dimensional solids; two-dimensional solids. Optical properties of solids; optical fibres. Magnetic properties of solids; Superconductors: theory, magnetic properties, Josephson effects. *Vibrational Spectra of Inorganic MoleculesOrganometallic Chemistry*: synthesis, characterization and application. Homogeneous catalysis: Reactions of unsaturated compounds, oxidation of olefins to carbonyl compounds. *Reaction Kinetics and Mechanisms:* Ligand substitution reactions: classification of mechanism, substitution in square planar complexes, substitution in octahedral complexes. Rate laws and their interpretation. Mechanisms of redox reactions; oxidative-addition and migration (insertion) reactions*Catalysis* Recent developments in homogeneous catalysis*Electron-deficient compounds Isolobal analogies and relationshipsMetal-metal bondsCluster compoundsBioinorganic Chemistry.*

CHM6171 Advanced Physical Chemistry 16 Credits

Contact time: 42 hours
Practical Sessions: 36 hours
Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment and 50% Examination
Content: *Advanced kinetics* (rates of chemical reactions, reactions in the gas and solution phases, complex reactions, and solid state reactions), *Statistical Mechanics* (partition functions, thermodynamic functions, equilibria), *Symmetry* (symmetry elements and operations, point groups, applications to orbital theory and spectroscopy), and *Chemical Bonding* (sigma bonding, hybrid orbitals, pi-bonding and multi-centre bonding).*Quantum Chemistry*, Computational Chemistry: Electronic structure methods (DFT, Ab-initio etc), Molecular dynamics Biophysical Chemistry

CHM6121 Professional Communication 8 Credits

Contact time: 24 hours
Assessment: 100% Continuous Assessment
Content: The main component of this course involves training in various *general skills* such as writing of research proposals, scientific research papers, spread-sheets, graphics presentation packages and oral communication.

CHM6191 Advanced Biochemistry and Biotechnology 16 Credits

Contact time: 42 hours
Practical Sessions: 36 hours
Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment and 50% Examination
Content: Biochemistry- Cell dynamics; Heredity of gene action; kinetics and coordination chemistry; Chemistry of biological molecules; genes and bioinformatics, statistical methods in biochemistry, techniques for biochemists; metabolic pathways; transmission genetics; cell biology and developmental genetics; biochemistry of disease; forensic materials; DNA evidence in forensic Science, Microbes to multicells; membrane biochemistry; basic immunology; microbial physiology and growth; medical microbiology; membrane proteins; enzyme catalysis.Biotechnology, Advance topics in biotechnology (principles and roles of various disciplines in biotechnology; Molecular plant and environmental biotechnology; Biochemical engineering; Bioanalytical chemistry (the use of biomolecules for analytics); Biological waste treatment (principles of biological treatment processes)

SECOND SEMESTER

CHM6142 Research Methodology and Project Proposal 8 Credits

Contact time: 24 hours
Assessment: 50% Continuous Assessment (Supervisors Evaluation) and 50% Departmental Evaluation
Content: The lecturers will present some Chemostatistics topics i.e. Handling experimental data, processing and reporting, e.g significance tests. Analysis of Variance (ANOVA), regression analysis methods, validation experimental data (quality control) and experimental design and optimisation of parameters. Student will write a comprehensive research proposal for his/her MSc research work in a particular field of his/her choice, under the supervision of an academic research. The proposal is submitted to the departmental postgraduate committee and to senate through the Faculty as well as the University postgraduate committee for approval. The evaluation will be done at the departmental level.

CHM6112 Current Topics in Analytical Chemistry 16 Credits

Contact time: 42 hours
Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment (2500 words literature Review) and 50% Examination
Content: The lecturers will present current topics in Analytical chemistry which will be assessed in the final examination. Topics to be covered will be provided towards the end of the first semester. Students will be requested to carry out literature survey exercise on a current topic in Analytical chemistry. The topic shall not be related to a candidate's research project but shall support the candidate's broad knowledge in the general area of study. Some contact hours may be consultations with the lecturer and not necessarily lectures.

CHM6132 Current Topics in Organic Chemistry 16 Credits

Contact time: 42 hours
Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment (2500 words literature Review) and 50% Examination
Content: The lecturers will present current topics in Organic Chemistry, which will be assessed in the final examination. Topics to be covered will be provided towards the end of the first semester. Students will be requested to carry literature survey exercise on a current topic in Organic Chemistry. The topic shall not be related to a candidate's research project but shall support the candidate's broad knowledge in the general area of study. Some contact hours may be consultations with the lecturer and not necessarily lectures.

CHM6152 Current Topics in Inorganic Chemistry 16 Credits

Contact time: 42 hours

Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment (2500 words literature Review) and 50% Examination
Content::
The lecturers will present current topics in Inorganic Chemistry which will be assessed in the final examination. Topics to be covered will be provided towards the end of the first semester. Students will be requested to carry out literature survey exercise on a current topic in Inorganic Chemistry. The topic shall not be related to a candidate's research project but shall support the candidate's broad knowledge in the general area of study. Some contact hours may be consultations with the lecturer and not necessarily lectures.

CHM6172 Current Topics in Physical Chemistry 16 Credits

Contact time: 42 hours
Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment (2500 words literature Review) and 50% Examination
Content: The lecturers will present current topics in Physical Chemistry, which will be assessed in the final examination. Topics to be covered will be provided towards the end of the first semester. Students will be requested to carry out literature survey exercise on a current topic in analytical chemistry. The topic shall not be related to a candidate's research project but shall support the candidate's broad knowledge in the general area of study. Some contact hours may be consultations with the lecturer and not necessarily lectures.

CHM6192 Current Topics in Biotechnology 16 Credits

Contact time: 42 hours
Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment (2500 words literature Review) and 50% Examination
Content: The lecturers will present current topics in Biotechnology, which will be assessed in the final examination. Topics to be covered will be provided towards the end of the first semester. Students will be requested to carry out literature survey exercise on a selected current topic in Biotechnology. The topic shall not be related to a candidate's research project but shall support the candidate's broad knowledge in the general area of study. Some contact hours may be consultations with the lecturer and not necessarily lectures.

CHI6112 Current Topics in Industrial Chemistry 16 Credits

Contact time: 42 hours
Examination: 1 x 3 hours Exam paper
Assessment: 50% Continuous Assessment (2500 words Literature Review) and 50% Examination
Content: The lecturers will present current topics in Industrial Chemistry which will be assessed in the final examination. Topics to be covered will be provided towards the end of the first semester. Students will be requested to carry out literature survey exercise on a current topic in Industrial Chemistry. The topic shall not be related to a candidate's research project but shall support the candidate's broad knowledge in the general area of study. Some contact hours may be consultations with the lecturer and not necessarily lectures.

SECOND YEAR MODULES

FIRST SEMESTER

CHM 6210 MSc Thesis **120 Credits**

This is carried out for a minimum period of 1 year for full time students or 2 years for part time students. Depending on the research topic the Department will confer the following degrees.

F. DOCTOR OF PHILOSOPHY (PHD)

The degree of Doctor of Philosophy (PhD) in approved disciplines will be offered in compliance with the general regulations and guidelines for postgraduate studies at the University. Refer to the Regulations for Postgraduate Courses of Study in the General Prospectus: Information, Regulations & Fees.

F.1. ADMISSION REQUIREMENTS

Possession of a good M.Sc. degree. Working experience is highly recommended. Admission will depend on availability of suitably qualified supervisors in the respective field of research.

NB: PLEASE REFER TO THE GENERAL INFORMATION AND REGULATIONS PROSPECTUS FOR GENERAL REGULATIONS AS FAR AS POSTGRADUATE COURSES OF STUDY ARE CONCERNED.

G. ADVICE, INFORMATION AND GENERAL REGULATIONS

G.1. ATTENDANCE OF LECTURES

See the General Information and Regulations Prospectus

G.2. PART-TIME COURSE/DISTANCE EDUCATION

The Faculty of Science does not offer a part-time curriculum. Some courses may be offered in the evening due to the time - table division. Prospective students should contact the Faculty Officer/Head of Department for further information. Part-time studies see Faculty Prospectus: Centre for External studies.

G.3. GENERAL INFORMATION

All general information as well as the general examination dates and the dates for registration appear in the General Information and Regulations Prospectus.

G.4. RATIO OF CONTINUOUS ASSESSMENT AND EXAMINATION MARKS

G.4.1 BIOLOGY

40% Continuous Assessment 60% Examination Mark

EBL3222 50% Continuous Assessment 50% Examination Mark

MBL3222 50% Continuous Assessment 50% Examination Mark

BLG3410 100% Continuous Assessment

G.4.2 CHEMISTRY

60% Continuous Assessment 40% Examination Mark

CHM3442 100% Continuous Assessment 100% Examination Mark

G.4.3 COMPUTING

60% Continuous Assessment 40% Examination Mark

CMP3400 100% Continuous Assessment

G.4.4 ENGINEERING

50% Continuous Assessment 50% Examination Mark

EGT3202 100%

CMP3220 50% Continuous Assessment 50% Examination Mark (For Engineering Students)

G.4.5 GEOLOGY

SECOND YEAR MODULES 60% Continuous Assessment 40 % Examination Mark

THIRD YEAR MODULES 40% Continuous Assessment 60% Examination Mark

FOURTH YEAR MODULES 50% Continuous Assessment 50% Examination Mark

All Field Geology courses have no final examination. These are examined by Field projects.

G.4.6 MATHEMATICS

50% Continuous Assessment 50% Examination Mark

G.4.7 PHYSICS

50% Continuous Assessment 50% Examination Mark

PHC3192 100%

PHC3492 100%

G.4.8 STATISTICS

The weighting in the assessment of all courses offered in the Department (Except STS3400: Project) 40% Continuous Assessment 60% Examination. The only exception to this rule is" Project " for which 70% goes to the Project Report itself and 30% for oral Presentation of the report.