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FACULTY OF SCIENCE AND AGRICULTURE

HANDBOOK FOR 2010

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Professor R Slotow
BScHons (Rhodes) MSc (Natal) PhD (California)

Dean
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BScHons MSc (Nairobi) PhD (London) DIC

Deputy Dean (Westville)
To be appointed

Deputy Dean (Pietermaritzburg)
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BScAgric MScAgric PhD (Natal)

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We, the staff and students
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agree to treat each other with respect,
to abide by the rules and regulations of the institution
and to commit ourselves to excellence in research-led
teaching and learning

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Thina, singabasebenzi nabafundi
baseNyuvesi yakwaZulu-Natali
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Rules for Specific Masters Degrees

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S S e

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Dr M. Ciacciariello

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L Vorster MSc (UKZN)

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H Watson MSc (Natal) PhD (UDW)

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RA Preston-Whyte MA PhD (Natal)

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D Kotze BScAgricHons PhD (Natal)

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BP Moon BScHons MSc PhD (Witwatersrand)

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A Singles BScAgricHons, MScAgric, PhD (Free State)

School of Geological Sciences
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J Reinhardt Dipl Geol (Goettingen) PhD (James Cook)
R Uken BScHons PhD (Natal)

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S Misra BSc MSc PhD (Calcutta)

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K Govinder MSc PhD (Natal)

V Gutev MSc PhD (Sofia)

JG Raftery PhD HDE (Natal)

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BG Rodrigues BScHons (Havana) PhD (Natal)

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K Arunakirinather BScHons (Peradenai) MSc (Edlinburgh/Heriot Watt) MSc PhD (Cape Town)
DJ Erwin BSc MSc (Natal) PhD (Western Michigan)

M Govender BScHons MSc PhD (Natal)

S Hansraj JSED (Springfield) BScHons (UNISA) MSc PhD (Natal)
S Mukwembi BAHons MPhil (Zimbabwe) PhD (UKZN)

N Parumasur BScHons (UDW) MSc PhD (Natal)

P Pillay BScHons MSc PhD (UDW)

R Quadir BScHons MSc (Dhaka) MS PhD (Western Ontario)

P Singh BScHons MSc (UDW) PhD (Natal)

R Willie MSc PhD DSc (Madfid)

PA Winter MSc PhD HDE (Post School) MEd (EdPsych) (Natal)

Lecturers

G Amery BScHons MSc (Natal) PhD (Cantab)

PP Ghosh BSc (Calcutta) MSc (Indian Stat Institute, Calcutta) PhD (Burdwan)
AEM Henning BScHons MSc (Pretoria)

A Maharaj BPaed (UDW) BAHons MA PhD (UNISA)

M Moodley LSED (Springfield) BSc (UNISA) BEd BScHons MSc (Natal) MEd (Harvard) PhD (Aalborg
)
S Moopanar MSc PhD (Natal)

MJ Morgan BMath MMath (Waterioo)

OK Narain BScHons MSc (UDW) PhD (Witwatersrand)
SK Shindin MSc PhD (Ulyanovsk)

VS Singh BScHons MSc (UDW) PhD (Natal)

J Wortmann BScHons MSc PhD (Natal)

Senior Tutors
H Tarr BSc MSc (Natal) PGCE (UNISA)

Tutors

YP Latchmanan BSc(UDW)

M Matadi BScHons (Kinshasa) MSc (UKZN)
S Pillay JSED (Springfield) BA BEd (UNISA)

Emeritus Professors
EAK Briining Dip/ Phys Dr rer nat (GÃ©ttingen) Priv Diz (Bielefield)

PG Leach BSc DipEd BA (Melbourne) MSc PhD (La Trobe) DSc (Natal) MANS FRSSAF

RG Ori BScHons (UNISA) MSc PhD (Colorado)

P Pillay BScHons (UDW) MSc (Chicago) PhD (| Witwatersrand)
JH Swart MSc (Stellenbosch) PhD (UNISA)

HR Swart DSc (Stellenbosch) FTICA FRSSAf

Honorary Professors

NK Dadhich MSc (Sardar Patel) PhD (Poona)
M Lachowicz MSc PhD DSc (Warsaw)

R Maartens BScHons PhD (Cape Town)

G Sabidussi DPhil (Vienna)

Honorary Senior Lecturers
JD Krige BSc (Natal) MA (Cantab) MSc (Newcastle)

Senior Research Associate
JF McKenzie PhD (Cantab) DSc (Strathclyde)

Honorary Research Associates
HC Swart MSc DSc (Stellenbosch) FTICA FRSSAF

PIETERMARITZBURG CENTRE

Senior Professors
J Moori BSc (Iran) MSc PhD (Birmingham)

Professors
MA Henning BScHons MSc PhD (Natal)

Associate Professors

S-A Ng BAHons MA PhD (Wisconsin)

P Sibanda BScHons (Zimbabwe) MSc PhD (Manchester)
JE van den Berg BScHons MSc PhD (Natal)

Senior Lecturers
A Udomene BScHons (Nigeria) MSc (Ibadan) DICTP (Trieste) PhD (Nigeria)

Lecturers

MF Mahlaba BSc (Fort Hare) BScHons (UDW) MSc (Claremont Graduate, USA)

Senior Tutors
AL Campbell BScHons HDE (Natal)

Tutors
Y Aungamuthu BSc (Natal)

Honorary Professors
JD Key BSc (Rand) MPhil PhD (London)
J Swart BScHons MSc (Witwatersrand) PhD (UNISA)

Honorary Senior Lecturers
C Zaverdinos BScHons (Witwatersrand) PhD (Natal)

School of Physics
Head of School
To be appointed

DURBAN CENTRE

Professors
F Petruccione Dipl. Phys. Dr rer nat Dr rer nat habil (Freiburg)

Associate Professors

M J Alport MSc (Natal) PhD (lowa)

T Konrad MSc (UK) PhD (Konstaz)

RL Mace BScHons PhD (Natal)

SR Pillay BPaed(Science) BScHons MSc PhD (UDW)
JPS Rash MSc (Cape Town) PhD (Rhodes)

Senior Lecturers
AP Matthews BScHons (Natal) PhD (Cantab)
T Moyo BSc (UNZA) PHD (Leeds)

Lecturers

J Govender BScHons STD MSc (UDW) BScHons (UNISA) PhD (Natal)
K Govender BEng (UDW) MSc(Eng) PhD (Natal)

M Moodley MSc (Nata) MS PhD (Rhode Island)

S Moolla BScHons MSc (UDW) PhD (UKZN)

R Mukaro MSc (Zimbaywe)

LEAP Lecturer
MR Semonyo BSc(Hons, MSc (UKZN)

Emeritus Professors

K Bharuth-Ram BScHons NSc (Natal) DPhil (Oxon) MASSAf

T B Doyle BScHons (Dunelm| PhD (Witwatersrand)

M A Hellberg BScHons (Cape Town) PhD (Cantab) FRSSAf MASSAF

JD Hey BSc (Stellenbosch) BStHons MSc (Cape Town) PhD (Maryland)
J F McKenzie PhD (Cantab) DSz (Strathclyde)

M M Michaelis MA DPhil (Oxon) Dipl Phys (Munich) Dip/ScPlasmas (Oxon)
MW J Scourfield BScHons (Keele) MSc PhD (Calgary)
A D M Walker MSc (Rhodes) PhD (Cantab) FRSSAf MASSAf

Honorary Professors

R Bharuthram BScHons (UDW) MSc PhD (Natal)

P K Shukla PhD (Umea) PhD (Banaras Hindu University)
P Sutcliffe PhD (Potchefstroom)

F Verheest MSc PhD DSc (Gent)

Honorary Associate Professors
A Forbes PhD (Natal)

Honorary Senior Lecturers
A B Collier BScHons (Natal) MSc (PUCHE) PhD (KTH)
| Machi BScHons MSc (UDW) PhD (Witwatersrand)

Honorary Lecturers
P Krumm Dipl Phys (Marburg) PhD (Natal)

Senior Research Associates
P J Barrett BScEng (Cape Town) MA (Oxon) PhD (London)
A R W Hughes BScHons PhD (Sheffield)

Research Fellows
E Mravlag PhD (Innsbruck)
J A E Stephenson BScHons (Rhodes) MSc PhD (Natal)

PIETERMARITZBURG CENTRE

Senior Lecturers

V W Couling BScHons MSc PhD (Natal)

R J Lindebaum BScHons MSc PhD (Cape Town)

J Pierrus BScHons (Natal) MSc (Witwatersrand) PhD (Natal)
A Sergi BSc PhD (Laurea, Messina)

Senior Tutors
N Chetty BScHons (Natal) PhD (UKZN)
RA Webber BScHons HDipEd (Witwatersrand)

Tutor
SE Halstead BSc (Natal) HED (UNISA)

Emeritus Professors
O L de Lange BScHons MSc (Witwatersrand) PhD (Clarkson)
RE Raab BScHons (Natal) DPhil (Oxon)

School of Statistics & Actuarial Science

Head of School
Prof. D. E. North

DURBAN CENTRE

Associate Professors

GB Matthews MSc PhD (Pretoria)
M Murray MSc PhD (Natal)

DE North MSc PhD (Natal)

Lecturers

A Desai BScHons MSc (UDW)

J. Hammujuddy BScHons, MSC (Natal)

A Hazra MSc (Calcutta)

S Mataramvura BSc (Cuba) BScHons MSc PhD (Zimbabwe)
E. Rangani PhD (Stellenbosch)

Emeritus Professor
Al Dale MSc (Cape Town) PhD (VPI & SU) FSASA

Honorary Professor
ML Thompson BScHons (Natal) PhD (GÃ©ttingen)

PIETERMARITZBURG CENTRE

Associate Professors
T Zewotir BSc (Asmara) MSc (Addis Ababa) PhD (Witwatersrand)

Senior Lecturers
HG Mwambi BSc MSc PhD (Nairobi)

Lecturers
0 Bodhlyera BScHons (Zimbabwe) MSc (Essex)
S Ramroop BScHons (Natal) MSc (UNISA) PhD (UKZN)

Centre for Science Access
Head of Centre
Dr N.A. Koorbanally
Deputy Head of Centre (Durban Centre)
V Singh
Deputy Head of Centre (Pietermaritzburg Centre)
SA Barnsley

DURBAN CENTRE

Senior Lecturers
NA Koorbanally BScHons MSc PhD (Natal)

Senior Tutors

G Dawson BScHons MSc (UPE)

D Haricharan BAHons (UDW) MA (UKZN)

R Moodley BScHons (UDW) MSc (UKZN)

E Morillion BTech (Tech. Natal) MSc (Natal) PGCHE (UKZN)

V Padayachee JSED (SCE) BAHons (UNISA) HonsBA (TESOL) (UNISA) MA (UKZN)
P Seaman BScHons (Rhodes) MSc (UKZN)

S Shaik BPaed (Sc) BScHons MSc (UDW)

V Singh BSc (Natal) BScHons UPGCE (UDW) MSc (UKZN) MBA (UKZN)
H Tarr BScHons (Natal) PGCE(UNISA) MSc (Natal)

D Varghese BSc (KAU, India) MSc (UAS, India) PhD (UAS, India)

E Zhandire BScHons (NUST) MSc (Reading)

Tutors

B Adams BScHons (UCT) BAHons (UCT)

S Chellakootty BSc (UDW) BScHons (UKZN)

W Dlamini BScHons (UKZN)

S Ghebregziabher BA (UoA, Eritrea) BAHons (Natal) MA (UKZN)
B Keke BSc SSTD (UNITRA) MEd (UKZN)

S Pillay JSED (Springfield) BA BEdHons (UNISA)

R Robb BScHons (Natal)

Student Counsellors
C McCain BSocScHons (UP)
I Maharaj BA HDE HRD (Natal) BA Hons MA (UKZN) Registered Educational Psychologist

PIETERMARITZBURG CENTRE
Lecturers
NF Kirby BScHons MSc (Natal)
MF Mahlaba BSc (Fort Hare) BScHons (UDW) HED (UNISA) MSc (Claremont Graduate)

Senior Tutors

KL Barry BSc (Natal) BScHons (UKZN) MSc (UKZN)
N Chetty BScHons (Natal) PhD (UKZN)

A C Fick MA (UCT)

S McConnanchie BScHons PhD (Witwatersrand)

M Rasalanavho BScHons (Venda) HED (UNISA)
RA Webber BScHons HDipEd (Witwatersrand)

JY White BScHons (Natal) PGCE (UNISA)

Tutors

Y Aungamuthu BSc (Natal) PDHE Med (UKZN)

S Halstead BSc (Natal) HDE (UNISA)

J Gadzikwa BAHons (UKZN)

P Govender BA (Natal) BAHons (UKZN)

VN Tutshana STD (Clarkeburry College) BA BEdHons (Natal)

Student Counsellors
SA Barnsley BAHons MA (Natal) Registered Senior Counselling Psychologist
N Mtwentula BA (Vista) BAHons(UOFS) MA (NMMU) Registered Counselling Psychologist

INFORMATION FOR STUDENTS

Location

The Faculty of Science and Agriculture comprises the ten Schools of:

Agricultural Sciences and Agribusiness; Biochemistry, Genetics and Microbiology; Biological and Conservation Sciences; Chemistry; Computer Science; Environmental Sciences; Geological Sciences; Mathematical Sciences; Physics; and Statistics and Actuarial Science.

The Faculty is on the Pietermaritzburg and Westville campuses.

Note that the School of Agricultural Sciences and Agribusiness is based only on the Pietermaritzburg campus and the School of Geological Sciences is on the Westville campus only.

The Facultyâ\200\231s Access programmes which consist of the two BSc4 streams, the BSc4(Augmented) and the BSc4(Foundation), as well as the Science Foundation Programme operate in both Pietermaritzburg and Westville.

Various service courses for other Faculties are offered at the campuses where those faculties are located.

Degrees and Diplomas

The Faculty offers a wide range of undergraduate and postgraduate degrees in programmes ranging from Agribusiness to Information Technology, from Ecology to Computational Physics, from Chemical Technology to Marine Biology, as well as Geology, Botany, Crop Science, Horticultural Science, Mathematics, Physics and Zoology, among others. The undergraduate and postgraduate degrees offered in these disciplines and other areas of specialisation are described in the Rules for Qualifications section of this Handbook. The Rules and Syllabi sections contain the details of each programme and qualification offered in the Faculty of Science and Agriculture.

The following Qualifications are offered:

Undergraduate Qualifications

(@) A three-year course leading to the degree of Bachelor of Science (BSc). This may be achieved through a general formative programme of study or through a focussed programme of study around an area of specialisation. In the latter case the field of specialisation is indicated after the words Bachelor of Science or contraction BSc, e.g. BSc in Biomedical Sciences.

(b)

A three-year course leading to one of the following degrees: Bachelor of Science irH Dietetics (BScDiet), Bachelor of Science in Human Nutrition (BScHumNut), Bachelor o Agriculture in Agricultural Extension (BAgric) or Bachelor of Agricultural Management (BAgricMgt).

A four-year course leading to a Bachelor of Science in Agriculture (BScAgric)
A four-year course known as the BSc4, also leading to the degree of Bachelor of Science.

Postgraduate Diplomas

A one-year full time or two-year part time Postgraduate Diploma in Rural Resource Management (PGDipRRM)
A one-year full time or a two-year part time Postgraduate Diploma in Community Nutrition that consists of academic and experiential training (PGDipCommunNut)
A one-year full time or a two-year part time Postgraduate Diploma in Dietetics that consists of academic and experiential training (PGDipDiet)
A one-year full time or two-year part time Postgraduate Diploma in Food Security (PGDipFoodSecur) with coursework and a practical internship or research dissertation.

Honours Qualifications

A one-year postgraduate specialist Honours course following the Bachelor of Science, Bachelor of Agriculture in Agricultural Extension and Bachelor of Agricultural Management is offered to eligible students.

Note: Under special circumstances, a student who has completed post-matriculation

courses may be admitted to the second year of study and may complete an Honours degree in three years. As the subjects offered must meet the requirements of the Honours curriculum to be followed, the prior approval of the Dean must be obtained.

Masters and Doctoral Qualifications

Following on the BScHons, a research programme towards the Master of Science (MSc), lasting a minimum of one year. Examination is normally by thesis only.

In certain disciplines, the MSc or MScAgric degree may also be obtained through the following programmes: one of advanced study and research, with coursework contributing up to 50% of the total required credit and a dissertation the remainder. Following on a BScHons (or an acceptable Honours degree from another faculty) in an aspect of environmental studies, a one-year programme of advanced study and research leading to the degree of Master of Environmental Management; or to the degree of Master in Marine and Coastal Management. The coursework and dissertation each contribute to the credit.

Following on a BAgricMgtHons, a research programme towards the Master of Agricultural Management (MAgricMgt).

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Following on the BScAgricHons, a research programme towards the Master of Science in Agriculture (MScAgric).

A research programme towards the Master of Agriculture specializing in either Agricultural Extension & Resource Management or Food Security.

A research programme towards the Master of Science in Dietetics or Human Nutrition (MScDiet or MScHumNut).

A research programme towards the Doctor of Philosophy (PhD), lasting a minimum of two years, and showing that the candidate has carried out a programme of original research.

A Doctor of Science (DSc) and a Doctor of Science in Agriculture (DScAgric) awarded on the basis of original published work carried out over a number of years.

Designing a Curriculum

Each programme has a specified combination of modules and there is a limitation on the distribution of modules in any semester.

Some modules have pre- or co-requisite requirements. The details of these are contained under Syllabi below (the meanings of these terms are given under Definitions in the Rules).

By careful consideration of the combination of modules offered in each programme, candidates may bias their training towards a single area (this applies mainly to students studying for the Bachelor of Science degree, as other qualifications have specified curricula).

All combinations of modules are subject to the constraints of the time-table.

Because of the requirements of certain rules, a first-year curriculum must be designed to lead on to Level-2 and Level-3 modules that are suitable for the completion of a degree. It should be noted that the restrictions of the timetable and the modular structure make it impossible or very difficult to construct a curriculum which allows the student to transfer to certain other faculties or degree courses (such as Pharmacy, Optometry or Medicine) in this University, other universities, or other tertiary institutions.

Semester System

The Faculty follows the semester system of teaching. Modules are given in either the first semester, with a final examination in June, or in the second semester, with a final examina tion in November. The modules of the Science Foundation Programme and the Foundation Stream of the BSc4 are given as year courses with assessment throughout the year and examinations in November. A limited number of specialist modules are offered during the winter vacation period.

Credit System

Every module for a qualification has a credit rating. Credit ratings are given under Syllab i.

Unless specially exempted, candidates obtain the credit points indicated for a module by passing the assessments for that module with an average mark of not less than 50%. Such credits are also known as Degree Credits to distinguish them from Foundation Credits which in addition to Degree credits, are awarded in the BSc4 Programme. Students in the Science Foundation Programme earn only Foundation Credits.

Entrance Requirements for Degrees

Entry requirements for candidates with matric qualifications prior to the NSC are dealt with in the Rules Section.

1. Standard requirements

All candidates must produce evidence to the satisfaction of the Senate that they have a ful l

National Senior Certificate for Degrees (NSC Deg) or a certificate of exemption from the matriculation examination. Foreign applicants who do not have a pass in a prescribed second language may qualify through a certificate of foreign conditional exemption. Specific requirements for programmes are detailed under each curriculum.

2. Alternative entry route

Candidates who have had a disadvantaged school background and who do not meet the normal entry requirements may be admitted to the Faculty through one of three routes:

(a) Candidates with a full NSC Deg, with a score of at least 22 points (excluding Life Orientation), including a minimum of 4 points in English and Life Orientation, and a minimum of 3 points in Mathematics and at least one of Physical Science, Life Science or Agricultural Science may be admitted to the Augmented stream of the BSc4. Such candidates must not qualify for direct entry into an undergraduate programme in the Faculty.

(b) Candidates with a full NSC Deg, with a score of at least 16 points (excluding Life Orientation), including a minimum of 4 points in English and Life Orientation, and a minimum of 2 points in Mathematics and at least one of Physical Science, Life Science or Agricultural Science may be admitted to the Foundation stream of the BSc4. Such candidates must not qualify for direct entry into an undergraduate programme in the Faculty

(c) Candidates who do not have a NSC Deg or matriculation exemption may, under special circumstances, be admitted to the Science Foundation Programme, a fully foundational year in the Centre for Science Access before proceeding to a qualification in the Faculty.

Further details may be found in the Rules section.

Calculation of Points for the National Senior Certificate

Points for the NSC are calculated according to the table below:

NSC Rating Percentage	NSC Rating	NSC Points for UKZN
90% to 100%		
80% to 89%		
70% to 79%		
60% to 69%		
50% to 59%		
40% to 49%		
30% to 39%		
0% to 29%		

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Note that the points will be calculated from six Subjects excluding Life Orientation.

In all Faculty entrance requirements Mathematics Literacy at any level will not act as a substitute for Mathematics.

Further details may be found in the Rules section.

Bachelor of Science Degrees

The Faculty of Science and Agriculture offers two types of programmes: a general and flexible BSc that equips graduates with the necessary skills to pursue a career in several professional areas, and a specific focussed BSc that has a more structured selection of modules with a strong vocational outcomes-based orientation.

General Bachelor of Science (BSc)

The BSc degree allows students to design a curriculum to suit their particular interests an

d
requirements, subject to certain constraints. In fact, it is the only manner in which certain disciplines or combinations of disciplines can be studied, such as Cellular Biology and Chemistry, or Physics and Mathematics, or Statistics and Economics, or Computer Science and Economics.

All degrees require a minimum of 384 credits for a degree, and a student normally takes 128 ˜ credits each year. Each subject (such as Physics or Genetics) is made up of a number of modules, and each module is given a credit rating based on the number of lectures, tutorials and practicals in the module. A typical semester-long module is worth 16 credits, and students normally study four of these 16-credit modules per semester. In their first year students usually take modules from four different disciplines, but at higher years would select more modules from two or three subjects (called major subjects). Students may choose to take 2 majors, e.g. Cellular Biology and Chemistry, or they may prefer to have one full major (between 64 and 80 Level-3 credits) with the remaining credits taken from other disciplines, e.g. Applied ˜ Mathematics as major (64 credits), together with 32 credits each from Computer Science and Physics.

Focussed BSc

Some of these programmes represent existing popular choices amongst the possible degree structures available within the BSc options. Others have been formulated in an attempt to provide exciting new academic offerings leading to specific careers. In general they all have focussed structured curricula, although some offer almost as much flexibility of choice, within some constraints, as does the general BSc.

Agricultural Engineering Degrees

The Faculty of Engineeringâ\200\231s School of Bioresources Engineering and Environmental Hydrology, in association with the disciplines of Agriculture, offers a degree in Agricultural Engineering. The curriculum extends over four years of study of which the first is spent in either Durban or Pietermaritzburg, the next in the Faculty of Engineering in Durban, and the final two years in Pietermaritzburg. Interested candidates are referred to the Faculty of Engineering Handbook where full particulars are given, or to the School of Bioresources Engineering and Environmental Hydrology which is located in Pietermaritzburg.

Postgraduate Study

A candidate may be admitted to postgraduate study in any of the areas of specialisation in the Faculty of Science and Agriculture, provided that the candidate holds an acceptable primary degree, and provided also that the standard of proficiency previously attained in the intended area is sufficiently high.

Extra Curricula Activities

Although the Faculty encourages participation of students in all university activities, the holding of office in certain student organisations and committees can be extremely time consuming and may be incompatible with full-time study in certain disciplines. Students should only accept such positions or responsibilities after consultation with the Head(s) of the School(s) concerned.

Careers

Among careers open to graduates of the Faculty are positions in commercial and industrial organisations, government departments, research institutes, higher education and the teaching profession. Students wishing to obtain professional registration with the SA Council for Natural Science Professions are required to complete at least a BScHons degree. Students wishing to follow research careers should complete at least an Honours degree, and preferably a Masters degree.

Intending Teachers

The Dean of the Faculty of Education in the College of Humanities, Development and Social Sciences should be contacted for information regarding subject choices in the BSc degree for careers in the teaching profession.

UNIVERSITY OF KWAZULU-NATAL
HOWARD COLLEGE, PIETERMARITZBURG AND WESTVILLE CAMPUSES

SESSIONAL DATES - 2010

FIRST SEMESTER Monday, 01 February â\200\224 Saturday, 05 June
WINTER VACATION Sunday, 06 June â\200\224 Sunday, 25 July
SECOND SEMESTER Monday, 26 July â\200\224 Tuesday, 07 December
PRE-SEMESTER:
Fri, 01 â\200\224 Fri, 08 Jan Fri, 01 Jan New Year’s Day (Public Holiday)
Mon, 04 Jan University Offices open
Mon, 11 - Fri, 15 Jan Mon, 11 Jan Applications for Re-marks to Faculty Offices
Deadline for submission of Exclusion Appeals
Mon, 18 - Fri, 22 Jan Mon, 18 â\200\224 FEACOM meetings
Wed, 20 Jan
Mon, 25 - Sat, 30 Jan AEACOM meetings to be held this week
Mon, 25 - Registrationâ\200\231 of Returning students (HC, PMB, WV)
Sat, 30 Jan
Sat, 30 Jan Parentsâ\200\231 Day
SEMESTER 1:
1 | Mon, 01â\200\224 Fri, 05 Feb Mon, 01 - Orientation and Registration of new students
Fri, 05 Feb
Wed, 03 Feb Lectures commence (except 15t year modules)
2 | Mon, 08 - Fri, 12 Feb Mon, 08 Feb Lectures commence (15t year modules)
Fri, 12 Feb Final date for submitting curriculum changes

Final date for requests for extended DPs

Final date for registration â\200\224 1st Semester

3 | Mon, 15â\200\224 Fri, 19 Feb
4 | Mon, 22 – Fri, 26 Feb
5 | Mon, 01 – Fri, 05 Mar
6 | Mon, 08â\200\224 Fri, 12 Mar
7 | Mon, 15 – Fri, 19 Mar Mon, 15 Mar Final day for submission for capturing of graduation decisions onto the computer system
(Bachelors, Honours, Diplomas and Certificates)
Fri, 19 Mar Follow Mondayâ\200\231s timetable
8 | Mon, 22 â\200\224 Fri, 26 Mar Mon, 22 Mar Human Rights Day (Public Holiday)
Fri, 26 Mar Lectures end
Sat, 27 Mar â\200\224 Mon, 05 Apr STUDENT EASTER VACATION
Tues, 30 Mar Final day for submission for capturing of graduation

decisions onto the computer system
(Masters and Doctoral Studies)

1 Registration dates may vary for specific programmes

26 Sessional Dates
Fri, 02 Apr Good Friday (Public Holiday)
Mon, 05 Apr Family Day (Public Holiday)
9 | Mon, 05˜ Fri, 09 Apr Tues, 06 Apr Lectures continue
Thurs, 08 Apr Follow Mondayâ\200\231s timetable
Fri, 09 Apr Final date for withdrawal from a module
Final date for withdrawing from the University
(Semester 1)
Final time table for main and supplementary examinations
released
10 | Mon 12 - Sat, 17 Apr Fri, 16 â\200\224 Graduation Ceremonies (PMB)
Sat, 17 Apr
11 | Mon, 19- Sat, 24 Apr Mon, 19 - Graduation Ceremonies (WV)
Fri, 23 Apr
12 | Mon, 26 - Fri, 30 Apr Tues, 27 Apr Freedom Day (Public Holiday)
Wed, 28 Apr Follow Tuesdayâ\200\231s timetable
Sat, 01 May Workersâ\200\231 Day (Public Holiday)
13 | Mon, 03 - Fri, 07 May
14 | Mon, 10 - Fri, 14 May Thurs 13 May DP Refusals published and sent to Faculty Offices

Fri, 14 May Lectures end
Sat, 15 - Study period
Wed, 19 May
Mon, 17 Fri, 21 May Tues, 18 May Final date for submission of DP Appeals to Faculty Offices
Thurs, 20 May Exams commence (incl. Saturdays)
Mon, 24 - Sat, 29 May Exam Week
Mon, 31 May â\200\224 Sat, 05 Jun Sat, 05 Jun Exams end
Semester 1:

Except level 1 modules
Teaching days: Monday 13, Tuesday 13, Wednesday 13, Thursday 13, Friday 13: 65 days
Level 1 modules
Monday 13, Tuesday 13, Wednesday 12, Thursday 12, Friday 12 62 days

Study leave: 5 days;

Examinations: 15 days

MID-YEAR BREAK:

Sun, 06 â\200\224 Sun, 25 Jul

Mon, 07 â\200\224 Fri, 11 Jun

Mon, 14 - Fri, 18 Jun Wed, 16 Jun Youth Day

Mon, 14 â\200\224 Fri, 18 Jun Tues, 15 Jun Release of examination results by Schools
Mon, 21 - Fri, 25 Jun

Mon, 28 Jun - Fri, 02 Jul

Mon, 05 - Fri, 09 Jul

Mon, 12 â\200\224 Fri, 16 Jul Tues, 13 Jul 1st Semester Supplementary Exams commence
Mon, 19 - Fri, 23 Jul Wed, 21 Jul Supplementary Exams end

SEMESTER 2:
1 Mon, 26 â\200\224 Fri, 30 Jul Mon, 26 Jul Lectures commence
Thurs, 29 Jul Supplementary marks to be captured

2 Mon, 02 Aug â\200\224 Fri, 06 Aug | Thurs, 05 Aug Release of Exam results
Fri, 06 Aug Final date for submitting curriculum changes
Final date for requests for extended DPs
Final date for registration â\200\224 274 Semester
3 Mon, 09 - Fri, 13 Aug Mon, 09 Aug National Womenâ\200\231s Day
4 Mon, 16 â\200\224 Fri, 20 Aug Thurs, 19 Aug Deadline for submission of Exclusion Appeals? Applications for Re-marks to Faculty Offices
5 Mon, 23 - Fri, 27 Aug
6 Mon, 30 Aug - Fri, 03 Sep
7 Mon, 06 - Fri, 10 Sep Thurs, 09 Sep Rosh Hashanah (Day of condoned absence)
Fri, 10 Sep Eid-ul-Fitr (Day of condoned absence)
8 Mon, 13 - Fri, 17 Sep Fri, 17 Sep Final date for withdrawal from University (2Â¢ Semester)
Final date for withdrawal from a module
Lectures end
Sat, 18 â\200\224 Sun, 26 Sep STUDENT MID â\200\224 TERM BREAK
Sat, 18 Sep Yom Kippur
Thurs, 24 Sep Heritage Day (Public Holiday)
9 Mon, 27 Sep - Fri, 01 Oct | Mon, 27 Sep Lectures commence
Final time table for main and supplementary examinations released
10 | Mon, 04 -Fri, 08 Oct
11 | Mon, 11 â\200\224Fri, 15 Oct
12 | Mon, 18 - Fri, 22 Oct
13 | Mon, 25 - Fri, 29 Oct Thurs, 28 Oct DP Refusals published and sent to Faculty Office
Fri, 29 Oct Final date for submission of Faculty handbooks for 2011
Lectures end
Sat, 30 Oct - Study period
Wed, 03 Nov
Mon, 01 - Fri, 05 Nov Tues, 02 Nov Final date for submission of DP Appeals to Faculty

Offices

Thurs, 04 Nov

Exams commence (Incl. Saturdays)

Fri, 05 Nov Diwali/Deepavali (Day of condoned of absence)
Mon, 08 - Fri, 12 Nov Exam Week
Mon, 15 â\200\224 Fri, 19 Nov Exam week

Tues, 16 Nov Eid-ul-Adha (Day of condoned absence)

2 FEACOM and AEACOM meetings in respect of semester 2 â\200\224 to be advised.

28 Sessional Dates

Mon, 22 - Fri, 26 Nov Tuesday, 23 Nov | Exams end
Wed, 24 - Break between Exams
Sun, 28 Nov
Mon, 29 Nov - Fri, 03 Dec | Mon, 29 Nov 2nd Semester Supplementary Exams commence
Wed, 01 Dec Last day for submission of theses/dissertations to the
Faculty Offices for April 2011 Graduation
Mon, 06 - Fri, 10 Dec Tuesday, 07 Dec | Supplementary Exams end
YEAR-END BREAK:
Mon, 13 - Fri, 17 Dec Wed, 15 Dec Supplementary marks to be captured
Thurs, 16 Dec Day of Reconciliation
Mon, 20 - Fri, 24 Dec Wed, 22 Dec Release of Exam results
Sat, 25 Dec Sat, 25 Dec Christmas Day (Public Holiday)
Mon, 27 - Fri, 31 Dec Sun, 26 Dec Day of Goodwill (Public Holiday)
Mon, 27 Dec In lieu of Sunday
Semester 2:

Teaching days: Monday 12 Tuesday 13, Wednesday 13, Thursday 13, Friday 13: 64 days
Study leave: 5days; Examinations: 15 days

SCHEDULE OF PUBLIC HOLIDAYS, RELIGIOUS HOLIDAY
AND DAYS OF CONDONED ABSENCE

PUBLIC HOLIDAYS
DATE DAY HOLIDAY
01 January Friday New Year’s Day
22 March Monday Human Rights Day
02 April Friday Good Friday
05 April Monday Family Day
27 April Tuesday Freedom Day
01 May Saturday Workers’ Day
16 June Wednesday Youth Day
09 August Monday National Women’â\200\231s Day
24 September Friday Heritage Day
16 December Thursday Day of Reconciliation
25 December Saturday Christmas Day
26 December Sunday Day of Goodwill
27 December Monday In lieu of Sunday
RELIGIOUS HOLIDAYS and DAYS OF CONDONED ABSENCE
DATE DAY HOLY DAY
09 September Thursday Rosh Hashanah (commences at nightfall the previous day)
10 September Friday Eid-ul-Fitr (fasting commences on 11 August)
18 September Saturday Yom Kippur (commences at nightfall the previous day)
05 November Friday Diwali/Deepavali
16 November Tuesday Eid-ul-Adha

SUMMARY OF SESSIONAL DATES – 2010

Board meetings

0.01am

START END

BNt DAY DATE DAY DATE
University opens Monday 04 January
Registration of returning students Monday 25 January Friday 29 January
Parents Day Saturday 30 January
el ENloncay 01 February Friday 05 February
1st Semester Monday 01 February Saturday 05 June
;eocsï¬\202lf; commenge. (Bxoept, 12 YOaL b Wetinesdaye: 7 1b08 Eabrialy
Lectures commence (1t year modules) | Monday 08 February
Term 1 Wednesday 03 February Friday 26 March
Easter Vacation Saturday 27 March Monday 05 April
Term2 Tuesday 06 April Friday 14 May
Graduation Dates Thursday 15 April Saturday 24 April
Study period Saturday 15 May Wednesday | 19 May
1st Semester Exams Thursday 20 May Saturday 05 June
Winter Vacation Sunday 06 June Sunday 25 July
Release of Exam results by Schools Tuesday 15 June

. Supplementary Exams Tuesday 13 July Wednesday | 21 July
Release of Exam results after Exam 05 August
Board meetings e 0.01ar?1
2nd Semester Monday 26 July Tuesday 07 December
Term 3 Monday 26 July Friday 17 September
Mid Term Break Saturday 18 September Sunday 26 September
Term 4 Monday 27 September Friday 29 October
Study period Saturday 30 October Wednesday | 03 November
2n Semester Exams Thursday 04 November Tuesday 23 November
Break between Exams Wednesday 24 November Sunday 28 November
Supplementary Exams Monday 29 November Tuesday 07 December
Release of Exam results after Exam W 22 December

ednesday

GENERAL ACADEMIC RULES FOR DEGREES, DIPLOMAS AND CERTIFICATES

(These Rules have been made by the Senate and approved by the Council in terms of the Higher Education Act (Act No. 101 of 1997), as amended.)

PREAMBLE:
(@) The Council and/or the Senate may from time to time amend, alter or delete any rule, whether a General Rule or a rule relating to a specific module or qualification.

(b) Where applicable, the interpretation of these Rules is informed by the Definitions of Terms preceding them.

(c) The provisions of these Rules, as applied in particular faculties, may be restricted in circumstances provided for in the rules of those faculties as approved under Rule GR4.

(d) Exceptas otherwise stated or prescribed by the Senate and the Council, Rules GR1 to GR33 shall be applicable to every student of the University of KwaZulu-Natal (hereinafter referred to as â\200\234the Universityâ\200\235).

DEFINITIONS OF TERMS

â\200\234academic exclusionâ\200\235 means termination of a studentâ\200\231s registration on academic grounds, resulting in exclusion from the university.

â\200\234admissionâ\200\235 means the act by which the university admits person to study, after acceptance by an applicant of an offer of a place at the University.

â\200\234ancillary moduleâ\200\235 means a module required as a corequisite or prerequisite to a proposed module. All such modules must have been passed before the relevant qualification may be awarded. Note: if module A is an ancillary for module B and B is an ancillary for C, then A is necessarily an ancillary for C.

â\200\234assessmentâ\200\235 means the evaluation and grading of work, supervised or unsupervised, carried out by a student in satisfying the requirements of a module.

â\200\234corequisite moduleâ\200\235 means a module for which a student must register in the same semester as the proposed module, unless the ancillary module has already been passed or attempted with satisfaction of the DP requirements.

â\200\234Councilâ\200\235 means the Council of the University of KwaZulu-Natal.

â\200\234coursework modulesâ\200\235 refers to the taught components of all coursework masters degrees specified in the curriculum, other than the dissertation.

â\200\234curriculumâ\200\235 means the combination of modules which together comprise the programme of study leading to a qualification. An individual student’s curriculum refers to the specific selection of modules within the broad framework of the curriculum prescribed for a qualification, which enables the student to meet the requirements for the qualification.

â\200\230dissertationâ\200\235 means a work involving personal research, that is (a) capable of being recorded in any form or medium, and (b) capable of being evaluated, that is submitted for a degree and satisfies degree specific requirements (for doctoral degrees, see â\200\234thesisâ\200\235).

â\200\234duly performed (DP) requirementsâ\200\235 means those faculty-determined requirements for a module which must be met to permit a student to be eligible for final assessment in that module.

â\200\234examinationâ\200\235 means a formal assessment, conducted within an officially designated examination session, usually invigilated, and bound by time constraints.

â\200\234exit-level moduleâ\200\235 means a module at the highest level required by the National Qualifications Framework (NQF) for a qualification.

â\200\234external examinationâ\200\235 means examination by a person, external to the university, who has not been involved with teaching including supervision at the University during the previous three (3) years.

"independent moderation" means examination by a person, internal or external to the university, who has not been involved with the teaching of the relevant module in that semester.

â\200\234internal examinationâ\200\235 means examination by a person or persons involved with the teaching of the relevant module in that semester or, in the case of postgraduate qualifications, is a member of the University academic staff including persons who hold honorary appointments in the University other than the supervisor(s).

â\200\234moduleâ\200\235 means any separate course of study for which credits may be obtained.
â\200\234qualificationâ\200\235 means a degree, diploma or certificate.
â\200\234prerequisite moduleâ\200\235 means a module which must have been passed, with at least the

minimum mark required by the relevant faculty, before registration for the proposed module is permitted.

â\200\234prerequisite requirementâ\200\235 means that requirement, whether a prerequisite module, a specified mark in a module or any other condition, which must have been met before registration for the proposed module is permitted.

â\200\234projectâ\200\235 means a substantial assignment, whether comprising a single module or part of a module, and which requires research or equivalent independent work by a student.

â\200\234registered studentâ\200\235 means a student who is registered to study in one or more modules offered by the University. Such registration will lapse on the date of the following registration session or earlier should the student cease to be an admitted student.

â\200\234registrationâ\200\235 means completion by a student, and acceptance by the University, of a registration form, and compliance with such other conditions as are required for entitiement to a current student card.

â\200\234Senateâ\200\235 means the Senate of the University of KwaZulu-Natal.

â\200\234special examinationâ\200\235 means an examination awarded by the Senate to a student who has not been able to attempt or complete the original examination by reason of illness or any other reason deemed sufficient by the Senate.

â\200\234studentâ\200\235 means a person who has been admitted to the University for the purpose of studying or who has registered for a qualification. A student remains a student until such time as that person graduates or otherwise completes studies, or withdraws from the University, or fails to attend or register in any semester, or is excluded and all appeal processes for readmission have been exhausted.â\200\235

â\200\234supplementary examinationâ\200\235 means an examination awarded by the Senate to a student, based on the studentâ\200\231s performance in the original module assessment.

â\200\234suspended registrationâ\200\235 means an agreement by which the University holds a student’s registration in abeyance for a specified period of time.

â\200\234tertiary institutionâ\200\235 means any institution that provides post-school education on a full-time, part-time or distance basis.

â\200\230thesisâ\200\235 means a work involving personal research, that is (a) capable of being recorded in any form or medium, and (b) capable of being evaluated, that is submitted for a doctoral degree and satisfies the requirements specified in the relevant rules

â\200\234the Universityâ\200\235 means the University of KwaZulu-Natal.

GENERAL RULES

GR1 Changes in rules

The University may revise or add to its rules from time to time, and any such alteration or addition shall become binding upon the date of publication or upon such date as may be specified by the Council and the Senate, provided that no change in rules shall be interpreted so as to operate retrospectively to the prejudice of any currently registered student.

GR2 Degrees, diplomas and certificates

The University may confer or award such degrees, diplomas and certificates as approved by the Senate and the Council.
Note: (a) The list of degrees, diplomas and certificates is available from the Registrar’s Office on request.
(b) Rules for specific qualifications will be found in the relevant Faculty handbooks.

GR3 Approval of curricula

The Council, upon the approval of the Senate after consultation with the relevant Boards of the Faculties, shall approve the curricula for all qualifications of the University.

GR4 Faculty rules

Subject to the provisions of the Higher Education Act, the Statute of the University, and the following Rules, the Council may, upon the approval of the Senate, make or amend rules for each faculty relating to:

a) the eligibility of a student as a candidate for any qualification and/or module, which may include recognition of prior learning (RPL);

b) the selection process;

c) the period of attendance;

d) the curriculum, work and other requirements for each qualification;
e) progression and academic exclusion; and

f) any other matter relating to the academic functions of the University.

GR5 Application to study

a) Applications to study must be made in such manner as prescribed, and must include presentation of the Matriculation Certificate where this is required.

b) An applicant who has studied at any other tertiary education institution must, in addition, present an academic record and a certificate of conduct from that institution.

GR6 Selection requirements

All applicants shall produce evidence satisfactory to the Senate of their competence to work for the qualification sought. The Senate may decline to admit as a candidate for the qualification any person whose previous academic attainments are, in its opinion, not sufficiently high to warrant such admission.

GRY Selection for postgraduate studies

a) Graduates of any other recognised university (whether in the Republic of South Africa or elsewhere) may, for the purpose of proceeding to a postgraduate qualification in any faculty of the University, be admitted by the Senate to a status in the University equivalent to that which they possess in their own university by virtue of any degree held by them.

b) An applicant who has graduated from another tertiary institution or who has in any othe r manner attained a level of competence which, in the opinion of the Senate, is adequate for the purpose of postgraduate studies or research, may be admitted as a student in any faculty of the University.

GR8 Exemption from a module

Exemption from a module may be granted and credit may be awarded for a relevant module where an applicant has already obtained credit for an equivalent module or can demonstrate an equivalent level of competence through prior learning.

GR9 Registration

a) In order to pursue their studies in any semester, all students of the University shall complete the applicable registration procedure, thereby affirming their acceptance of the rules of the University.

b) The Council, on the recommendation of the Senate, may impose conditions for the registration of any student.

Â¢) On application to the relevant Faculty Office, and with the approval of the Senate, a student’s registration may be suspended for a specified period of time. Such student remains subject to the rules of the University, and may return to register before or at expiry of the period of suspension. The period during which registration is suspended shall not be included in any calculation towards the minimum and maximum periods prescribed for any qualification in terms of Rule GR12, nor for the evaluation of eligibili ty for the award of degrees cum laude or summa cum laude in terms of Rules BR6, HR8, CR17 and MR13.

GR10 Payment of fees

a) Save by special permission of the Senate and the Council:
(i) Anapplicant shall not be registered until all relevant prescribed fees are paid;
(if) A student shall not be entitled to admission to an examination, nor to receipt of examination results, until all relevant prescribed fees are paid.
b) A student shall not be entitled to the conferral or award of a qualification until all m onies due to the University have been paid.

GR11 Concurrent registration

Save by special permission of the Senate:
a) no student shall be registered for more than one qualification at the same time: nor

b) shall any student, while registered at any other tertiary institution, be registered concurrently at the University.

GR12 Period of attendance

Every candidate for a qualification shall meet the relevant attendance and performance requirements for each module and qualification as prescribed by the relevant Faculty and approved by the Senate, in order to obtain the requisite credit.

GR13 Module registration

a) Subject to Rule GR14, no student shall be registered for any module unless his or her curriculum has been approved by the Senate. An approved curriculum may be modified only with the consent of the Senate.

b) Save by special permission of the Senate, no student may attend a module for which he or she is not registered.

GR14 Ancillary, prerequisite and corequisite requirements

a) A faculty may prescribe ancillary modules in any curriculum.

b) A faculty may specify the attainment of a minimum mark of more than 50% in a prerequisite module, a specified mark in a module or any other requirement before registration for the proposed module is permitted.

c) Registration for a module will be conditional on meeting all corequisite and prerequisit e requirements for that module.

GR15 Obsolete modules

In readmitting a student, the Senate may withhold recognition, for the purposes of a qualification, of credits previously obtained in modules which have subsequently become obsolete.

GR16 Duly performed (DP) certification

a) Students shall not present themselves for examination in any module unless the Head of the School in which they have studied that module has certified that they have met the DP requirements for the specified module.

b) Such DP certification shall be valid only for the examinations, including supplementary examinations, of the semester in which it is issued.

c) With the consent of the Board of the Faculty concerned, in exceptional circumstances, the DP certification may be extended to the relevant subsequent semester, in which case the Board may allow the student to retain the relevant class mark.

d) The DP requirements for each module shall be published in the Faculty Handbook and in any other manner deemed appropriate by the Faculty.

e) Save as may otherwise be provided by the Faculty, for each module a list of those students refused DP certification shall be published, in a manner deemed appropriate by the Faculty, on or before the last day of teaching in each semester.

GR17 DP certification – right of appeal

a) Students have the right to appeal against the refusal of a DP certification in terms of Rule
GR16.

b) An appeal must be lodged in the relevant Faculty Office, in the prescribed manner, withi
n
three (3) University working days of the last day of notification of DP refusals.

Â¢) Such appeal shall be considered by an appropriate committee, the composition of which shall be approved by the Senate.

d) The decision of the committee shall be final.

GR18 Examinations

a) An examination may be written and/or oral, and may include practical work.

b) On application and/or on the recommendation of the Head of School, with the approval of the Senate, a written examination may, for a particular student, be replaced or supplemented by an oral examination.

GR19 External examination and moderation

a) Except with the permission of the Senate, all modules, other than exit-level modules, shall be subject to internal examination and independent moderation.

b) Except with the permission of the Senate, all exit-level modules shall be subject to internal and external examination.

c) The portion of the total assessment subject to independent moderation or external examination, in terms of (a) or (b) above, shall be at least 50%.

GR20 Examination scripts

a) To aid academic development, students may view their examination scripts under

supervision.

b) (i) Astudent may, on formal application and after payment of the applicable fee, have all his/her examination scripts for a module re-marked, normally by the original examiners, in accordance with the policies approved by the Senate and the
Council.

(i) Such application shall be lodged in the relevant Faculty Office, in the prescribed manner, within ten (10) University working days of the release of supplementary results.

(i) The student’s final mark for the module shall be that determined by the re-mark.

(iv) The fee shall be refunded only if the re-mark causes an improvement in the class of result as reflected in Rule GR29(a).

Â¢) Re-marking as contemplated in (b) above shall not be permitted for Honours and

equivalent projects, Masters dissertations and Doctoral theses.

d) Examination scripts shall be stored by the University for a maximum period of one (1)

year or such longer period required by contractual or professional obligations.

GR21 Examination sessions
All examinations shall be held in the prescribed sessions approved by the Senate.
GR22 Supplementary examinations

Supplementary examinations may be awarded in terms of these Rules and the relevant Faculty Rules, as approved by the Senate. Supplementary examinations shall not be awarded for any continuously assessed components of modules.

GR23 Special examinations

a) A student who has not been able to attempt or complete the original final examination by reason of illness or any other reason deemed sufficient by the Senate, may, on application, be granted permission to sit a special examination, during the next applicable supplementary examination session.

b) An application for a special examination shall be made on the prescribed form, accompanied by all relevant documentation, and lodged in the relevant Faculty Office within five (5) working days of the date of the examination concerned. It is the responsibility of the student to ascertain whether or not the special examination has been granted.

Â¢) Ifanapplication fora special examination is approved, the examination result, if any, f rom

the original examination shall be regarded as null and void. If such an application is not

approved the original examination result shall stand.

GR24 Standard of supplementary and special examinations

To pass supplementary and special examinations, students must demonstrate a level of academic competence equivalent to that required in the original examination.

GR25 Limitation on awarding supplementary and special examinations

a) A supplementary or special examination shall not be granted in respect of any supplementary examination awarded in terms of Rule GR22.

b) A supplementary or special examination shall not be granted in respect of any special examination awarded in terms of Rule GR23.

GR26 Completion of modules

Every module shall be completed by passing the Senate-approved assessment in that module.

GR27 Pass mark

The pass mark for all modules in the University shall be 50%, provided that any sub-minima required in certain components of the Senate-approved assessment have been met.

GR28 Completion requirements

Save by special permission of the Council, upon the approval of the Senate, a qualification shall not be conferred or awarded until:

a)

b)
0)

credit has been obtained for all prescribed modules, including prerequisite and corequisite modules;

all other faculty requirements have been met; and

all monies due to the University have been paid.

GR29 Classification of results

a) The result of any assessment shall be classified as follows:

75% upward = 1Â¢t Class; 70 â\200\224 74%. = 2"d Class, Upper Djvision;
60 â\200\224 69% = Second Class, Lower Division; 50 â\200\224 59% = 31 Class;
less than 50% = Fail.

b) A module may be passed with such distinctions as may be prescribed by the Senate on the recommendeation of the Board of the Faculty concerned.

Â¢) A qualification may be conferred or awarded with such distinctions as may be prescribed by the Senate on the recommendation of the Board of the Faculty concerned.

GR30 Academic exclusion

a) The Council may, with the approval of the Senate, after each examination session exclude or refuse to renew or continue the registration of a student who has failed to meet the academic requirements for continued registration.

b) The Senate may cancel the registration of a student in all or one or more of the modules for which the student is registered in a semester if, in the opinion of the Senate, the academic achievement of the student is such that the student may not at the end of the semester obtain credit in such module or modules.

Â¢) The Council may, with the approval of the Senate, refuse readmission to a student who fails to satisfy the minimum requirements for readmission.

d) Subject to Rule GR31, students excluded or refused re-registration may not be

readmitted to the University until they are able to demonstrate that they have achieved a level of competence satisfactory to the relevant Faculty and the Senate.

GR31 Academic exclusion - right of appeal

a)
3)

b)

Students have the right to a single appeal against academic exclusion in terms of Rule GR30.

Such appeal shall be lodged in the Faculty of registration, in the prescribed manner, within ten (10) University working days of the release of final results.

The process for consideration of such an appeal shall be approved by the Senate.

GR32 Ethics

All academic activities and research in particular, shall comply with the relevant University policies on ethics and any related requirements as determined by the Senate and the Council.

GR33 Reproduction of work

Subject to the provisions of the Universityâ\200\231s policy on intellectual property rights and any limitations imposed by official contractual obligations:

a) In presenting an assignment, prescribed project, dissertation, thesis or any such work for assessment, a student shall be deemed by so doing to have granted the University the right to reproduce it in whole or in part for any person or institution who states that it is for study and research but not for commercial gain; provided that the University may waive this right if the work in question has been or is being published in a manner satisfactory to the University.

b) The work of students shall not be included in publications by academic staff without their express permission and acknowledgement; provided that such work may be included and acknowledged if all reasonable attempts to trace such students have been unsuccessful.

RULES FOR BACHELORS DEGREES

Note: The following Rules are additional to the preceding General Rules GR1 – GR33.

BR1 Applicability

The following Rules, BR2 to BR6 inclusive, shall be applicable to every candidate for a Bachelors Degree.

BR2 Criteria for admission to study

a) Applicants for a first or primary degree for which the Matriculation Certificate is a prerequisite, shall produce evidence to the satisfaction of the Senate that they have obtained the National Senior Certificate (NSC) endorsed for Bachelors degrees, or Matriculation Certificate of the Matriculation Board, or satisfied the conditions prescribed by the Board for exemption from the Matriculation Examination and obtained the Board’s certificate to that effect, or obtained a certificate of conditional exemption issued by the Board to applicants from countries outside the Republic of South Africa, or satisfied the conditions of any alternative admission process approved by the Senate.

b) In addition to the requirements of a) above, the minimum requirements for admission to study in any faculty may include the requirement to have attained such minimum standard in a specified subject or subjects or such aggregate of points scored according to subjects passed in the Matriculation Examination, or in an examination recognised for the purpose by the Matriculation Board, or such other qualifications as may be prescribed. The selection process will be based on these requirements and may include academic ranking and other criteria as approved by the Senate and the Council.

BR3 Periods of attendance

Every candidate for a first or primary degree, shall be registered as a matriculated student, except as provided in Rule BR2, and have completed subsequent to the date of validity of the Matriculation Certificate or of the certificate of full exemption from the matriculation examination issued by the Matriculation Board, the minimum period of attendance prescribed by the rules of the relevant Faculty.

BR4 Recognition of attendance

For the purpose of Rules GR12 and BR3, the Senate may accept as part of the attendance of

a student for a degree of Bachelor, periods of attendance as a registered matriculated stud ent

at any other university or tertiary institution or in any other faculty in the University: provided

that students shall not have the degree of Bachelor conferred unless:

a) their periods of attendance are together not less than the complete period prescribed fo r
such degree; and

b) they attended at the University:

(i) for a degree of Bachelor, the term of which is six or eight semesters; at least four semesters which shall include the completion of at least half of the total number of credits prescribed for the degree and which, except with the approval of the Senate, shall include all those at the exit level; or

(i) for a degree of Bachelor, the term of which is ten or twelve semesters, at least six semesters which, except with the approval of the Senate, shall include the completion of all modules prescribed for the final six semesters of the curriculum.

BRS Progression under conditional exemption

Applicants who are accepted with an ordinary conditional exemption that requires completion of additional credits to qualify for exemption, shall not be permitted to register for any module
at level 3 or above before the requirements for exemption have been satisfied.

BR6 Supplementary examinations

Provided that the rules of any faculty, as approved by the Senate, do not prohibit this for a}
particular module:
a) a student who fails a module with a mark of at least 40%, or who obtains a passing mark less than that prescribed for registration for another module, shall be awarded . supplementary examination; |
b) under exceptional circumstances, and with the permission of the Senate, a student whol has failed a module with a mark of less than 40% may be awarded a supplementary examination.

BR7 Award of degree cum laude and summa cum laude

a) A degree of Bachelor may be conferred cum laude in accordance with the rules of the relevant Faculty, as approved by the Senate, provided that, subject to exceptions as approved by the Council, the student has:

(i) obtained a credit-weighted average of at least 75% in those modules specified by the Faculty; and

(i) successfully completed all modules in the curriculum at the first attempt and without recourse to supplementary examinations; and

(iify ˜ completed the degree in the prescribed minimum time.

b) A degree of Bachelor may be conferred summa cum laude in accordance with the rules of the relevant Faculty, as approved by the Senate, provided that, subject to exceptions as approved by the Council, the student has:

(i) obtained a credit-weighted average of at least 80% in those modules specified by the Faculty; and

(if) successfully completed all modules in the curriculum at the first attempt and without recourse to supplementary examinations; and

(i) completed the degree in the prescribed minimum time.

RULES FOR HONOURS DEGREES

Note: The following Rules are additional to the preceding General Rules GR1 - GR33.
HR1 Applicability

The following Rules, HR2 to HR8 inclusive, shall be applicable to every candidate for a deg ree of Honours.

HR2 Criteria for admission to study

a) Applicants may be registered for the degree of Honours in any faculty provided that they have:
(i) satisfied the requirements for a relevant prerequisite degree as specified in the Faculty concerned; or
(i) been admitted to the status of that degree in terms of Rule GR7(a); or
(iii) attained a level of competence as defined in Rule GR7(b).
b) A faculty may prescribe further minimum criteria for admission to study.

HR3 Attendance

a) Every student for a degree of Honours shall attend an approved course of study as a registered student of the University for a period of at least two semesters after admission in terms of Rule HR2.

b) Save by permission of the Senate, all modules shall be completed at the University.

HR4 Curriculum

Save by permission of the Senate, the curriculum for a degree of Honours shall include a prescribed project as one of the modules.

HRS Supplementary examinations

Provided that the rules of a faculty, as approved by the Senate, do not prohibit this for a particular module:

a) astudent who fails a module other than the prescribed project with a mark of at least 40 % shall be awarded a supplementary examination; and

b) under exceptional circumstances, and with the permission of the Senate, a student who has failed a module other than the prescribed project with a mark of less than 40% may be awarded a supplementary examination.

HR6 Re-examination of prescribed project

Provided that the rules of a faculty, as approved by the Senate, permit this, a prescribed project that is failed may be referred back once for revision and resubmission before the close of the applicable supplementary examination session.

HRY7 Progression

a) A student may repeat a failed module not more than once, provided that this does not apply to the prescribed project described in Rule HR4 and HR6 above.

b) A student who, after four semesters as a fulltime student or six semesters as a part-time student, has not completed the requirements for the degree, shall be excluded.

HR8 Award of degree cum laude and summa cum laude

a) A degree of Honours may be conferred cum laude in accordance with the rules of the relevant Faculty, as approved by the Senate, provided that, subject to exceptions as approved by the Council, the student has:

(i) obtained a credit-weighted average of at least 75% in those modules required for the qualification; and

(i) amark of at least 75% for the prescribed project; and

(i) successfully completed all modules in the curriculum without recourse to supplementary examinations; and

(iv) completed the degree in the prescribed minimum time.

b) A degree of Honours may be conferred summa cum laude in accordance with the rules of the relevant Faculty, as approved by the Senate, provided that, subject to exceptions as approved by the Council, the student has:

() obtained a credit-weighted average of at least 80% in those modules required for the qualification; and

(i) amark of at least 80% for the prescribed project; and

(iii) successfully completed all modules in the curriculum - without recourse to supplementary examinations; and

(iv) completed the degree in the prescribed minimum time.

RULES FOR MASTERS DEGREES BY COURSEWORK

Note: The following Rules are additional to the preceding General Rules GR1 – GR33.

CR1 Applicability

The following Rules, CR2 to CR17 inclusive, shall be applicable to every candidate for a degree of Master by coursework.

CR2 Criteria for admission to study

a) An applicant shall not be registered for the degree of Master by coursework in any faculty unless the applicant has:
() satisfied the requirements for a relevant prerequisite degree as specified in the Faculty concerned; or
(if) been admitted to the status of that degree in terms of Rule GR7(a); or
(i)˜ attained a level of competence as defined in Rule GR7(b).
b) A faculty may prescribe further minimum criteria for admission to study.

CR3 Recognition of examinations

The Senate may accept examinations passed or certificates of proficiency completed in any module by a student in any faculty of the University or of any other university or institution recognised by the Senate for this purpose, or accept demonstration of an equivalent level of competence through prior learning, in terms of Rule GR7(b), as exempting the student from examination in module(s) prescribed for a degree of Master by coursework, provided that:

a) no more than 50% of the required credits for the degree may be so exempted, provided that such credits shall be awarded for coursework modules only; and

b) at least 75% of the total number of credits required for the degree are at Masters level and the remainder at Honours level or above; and

c) students shall not have the degree of Master conferred unless the conditions laid down in Rules CR4 and CR5 are satisfied.

CR4 Periods of registration

A student registered for the degree of Master by coursework in any faculty shall be so registered for a minimum period of two semesters for full-time students or four semesters for part-time students before the degree may be conferred.

CR5 Recognition of attendance

The Senate may accept as part of the attendance of a student for a degree of Master by coursework, periods of attendance as a registered or graduated student at any other university or institution or in any other faculty, provided that students shall not have the degree of Master conferred unless:

a) their periods of attendance are together not less than the complete period prescribed for conferral of the degree; and

b) the research component is completed at the University.

CR6 Curriculum

a) A student shall complete all prescribed modules, at least one of which shall be a dissertation module comprising research on a particular topic approved by the Senate, and comply with such other conditions as may be prescribed by the Senate and the rules of the Faculty concerned.

b) Except with the permission of Senate, the dissertation module shall comprise 33% to 50% of the total credits for the degree.

CRY7 Proposed research topic

a) The Senate may, at its discretion, decline to approve a research topic if in its opinion :

(i) itis unsuitable in itself; or
(if) it cannot effectively be undertaken under the supervision of the University; or
(i) the conditions under which the student proposes to work are unsatisfactory.

b) Ethical approval in terms of Rule GR32 is required where applicable.

CR8 Supervision

The Board of the Faculty shall, in terms of the policies of the Senate, appoint one or more appropriate supervisors, at least one of whom shall be a member of the University staff, to advise a student whose research topic is approved, and the student shall be required to work in such association with the supervisor or supervisors as the Senate may direct.

CR9 Supplementary examinations

Provided that the rules of a faculty, as approved by the Senate, do not prohibit this for a particular module:

a) a student who fails a module other than the dissertation with a mark of at least 40% shall be awarded a supplementary examination;

b) under exceptional circumstances, and with the permission of the Senate, a student who has failed a module other than the dissertation with a mark of less than 40% may be awarded a supplementary examination.

CR10 Failed coursework modules

Failed coursework modules may not be repeated, except with the permission of the Senate and then not more than once.

CR11 Progression

A student who, after six semesters as a full-time student or ten semesters as a part-time student, has not completed the requirements for the degree shall be required to apply for re-registration, which will only be permitted on receipt of a satisfactory motivation.

CR12 Submission of dissertation

At least three months before the dissertation is to be submitted for examination, a student shall give notice, in writing, to the Postgraduate Office of the Faculty concerned of the intention to submit such dissertation and the title thereof, provided that, in the event of a student failing to submit the dissertation for examination within six months thereafter, the notice will lapse and a further notice of intention shall be submitted.

CR13 Format of dissertation

a) Every dissertation submitted shall include a declaration to the satisfaction of the Senate stating that it has not previously been submitted for a degree in this or any other university, and that it is the student's own original work.

b) Every dissertation submitted shall be in such format as prescribed by the Senate and the rules of the relevant Faculty; provided that each dissertation shall include an abstract in English not exceeding 350 words.

c) A dissertation may comprise one or more papers of which the student is the prime author, published or in press or in manuscripts written in a paper format, accompanied by introductory and concluding integrative material.

d) A dissertation submitted under (c) above shall include a detailed description of the studentâ\200\231s own distinct contribution to the papers.

e) All dissertations are subject to full examination in terms of these rules, the rules of a faculty and the normal policies and procedures applicable to dissertations.

CR14 Supervisorâ\200\231s report

Upon submission of the dissertation, the supervisor or supervisors shall furnish a report on the conduct of the student's work; the report shall not include an evaluation of the quality of the dissertation.

CR15 Examination of dissertation

a) The Senate shall appoint for each dissertation two examiners, at least one of whom shall be responsible for external examination.

b) A supervisor or co-supervisor shall not be appointed as an examiner.

Â¢) The names of the examiners shall not be known to either the candidate or to one another.

CR16 Re-examination of dissertation

a) Afailed dissertation may not be re-examined.

CR17 Award of degree cum laude and summa cum laude

On the recommendation of the examiners of the dissertation, and in accordance with rules of the relevant faculty, the degree of Master by coursework may be awarded cum laude or summa cum laude.

a) For cum laude the student should obtain a weighted average of 75% or more in the coursework component of the degree at the first attempt and without recourse to supplementary examinations.

b) For summa cum laude the student should obtain a weighted average of 80% or more in the coursework component of the degree at the first attempt and without recourse to supplementary examinations.

RULES FOR MASTERS DEGREES BY RESEARCH

Note: The following Rules are additional to the preceding General Rules GR1 - GR33.

MR1 Applicability

The following Rules, MR2 to MR13 inclusive, shall be applicable to every candidate for a degree of Master by research.

MR2 Criteria for admission to study

a) An applicant shall not be registered for the degree of Master by research in any faculty unless the applicant has:
(i) satisfied the requirements for a relevant prerequisite degree as specified in the Faculty concerned; or
(i) been admitted to the status of that degree in terms of Rule GR7(a); or
(iii) attained a level of competence as defined in Rule GR7(b).
b) Afaculty may prescribe further minimum criteria for admission to study.

MRS3 Periods of registration

A student registered for the degree of Master by research in any faculty shall be so regist ered
for a minimum period of two semesters for full-time students or four semesters for part-tim e
students before the degree may be conferred.

MR4 Curriculum

a) A student for the degree of Master by research shall be required to pursue an approved programme of research on some subject falling within the scope of the studies represented in the University.

b) A student shall also comply with such other conditions as may be prescribed by the Senate and the rules of the Faculty concerned.

MRS Proposed subject of study

a) Before registration, an applicant for the degree of Master by research in any faculty sh all
submit for the approval of the Senate a statement of the proposed subject of study.
b) The Senate may, at its discretion, decline to approve such subject f, in its opinion:
(i) it is unsuitable in itself, or
(i) it cannot profitably be studied or pursued under the supervision of the University, or
(i) the conditions under which the applicant proposes to work are unsatisfactory.
Â¢) Ethical approval in terms of Rule GR32 is required where applicable.

MR6 Supervision

The Board of the Faculty shall, in terms of the policies of the Senate, appoint one or more appropriate supervisors, at least one of whom shall be a member of the University staff, to advise a student whose research topic is approved, and the student shall be required to work in such association with the supervisor or supervisors as the Senate may direct.

MR?7 Progression

A student who, after six semesters as a full-time student or ten semesters as a part-time student, has not completed the requirements for the degree shall be required to apply for re-registration, which will only be permitted on receipt of a satisfactory motivation.

MR8 Submission of dissertation

a) Every student for the degree of Master by research shall be required to submit a dissertation embodying the results of their research.

b) At least three months before the dissertation is to be submitted for examination, a student shall give notice, in writing, to the Postgraduate Office of the Faculty concerned of the intention to submit such dissertation and the title thereof, provided that, in the event of a

. student failing to submit the dissertation for examination within six months thereafter, the notice will lapse and a further notice of intention shall be submitted.

MR9 Format of dissertation

a) Every dissertation submitted shall include a declaration to the satisfaction of the Senate stating that it has not previously been submitted for a degree in this or any other university, and that it is the student’s own original work.

b) Every dissertation submitted shall be in such format as prescribed by the Senate and the rules of the relevant Faculty; provided that each dissertation shall include an abstract in English not exceeding 350 words.

c) A dissertation may comprise one or more papers of which the student is the prime author, published or in press or in manuscripts written in a paper format, accompanied by introductory and concluding integrative material.

d) A dissertation submitted under (c) above shall include a detailed description of the studentâ\200\231s own distinct contribution to the papers.

e) All dissertations are subject to full examination in terms of these rules, the rules of a faculty and the normal policies and procedures applicable to dissertations.

MR10 Supervisorâ\200\231s report

Upon submission of the dissertation, the supervisor or supervisors shall furnish a report on the conduct of the student’s work; the report shall not include an evaluation of the quality of the dissertation.

MR11 Examination

a) The Senate shall appoint for each dissertation two examiners, at least one of whom shall be responsible for external examination.

b) A supervisor or co-supervisor shall not be appointed as an examiner.

Â¢) he names of the examiners shall not be known to either the candidate or to one another.

MR12 Re-examination of dissertation

a) Afailed dissertation may not be re-examined.

MR13 Award of degree cum laude

On the recommendation of the examiners, and in accordance with rules of the relevant faculty, the degree of Master by research may be awarded cum laude or summa cum laude.

RULES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
and
SUPERVISED DOCTORAL DEGREES BY RESEARCH

Note: The following Rules are additional to the preceding General Rules GR1 - GR33.

DR1 Applicability

Except as may be prescribed by the Senate in the rules of any particular faculty, the following rules, DR2 to DR13 inclusive, shall be applicable to every candidate for the degree of Doctor of Philosophy / a supervised Doctoral degree by research.

DR2 Criteria for admission to study

a) An applicant shall not be registered for the degree of Doctor of Philosophy / a supervised Doctoral degree by research in any faculty unless the applicant has:

(i) satisfied the requirements for a relevant prerequisite degree as specified in the Faculty concerned; or

(if) been admitted to the status of that degree in terms of Rule GR7(a); or

(iif) attained a level of competence as defined in Rule GR7(b).

b) Afaculty may prescribe further minimum criteria for admission to study.

c) Candidates, registered for a research Masters degree, who have completed the requirements for the Masters degree, may apply to have their registration converted to a Doctor of Philosophy (PhD) registration before the Masters degree is awarded. The time allowed for the PhD would be reduced by two semesters. The material from the Masters dissertation may then be used towards the PhD. If the PhD is not completed, the Masters degree will be awarded.

DR3 Periods of registration

* Astudent registered for the degree of Doctor of Philosophy / a supervised Doctoral degree by research in any faculty shall be so registered for a minimum period of four semesters for full-time students or eight semesters for part-time students before the degree may be conferred.

DR4 Curriculum

a) A student for the degree of Doctor of Philosophy / a supervised Doctoral degree by research shall be required to pursue an approved programme of research on some subject falling within the scope of the studies represented in the University.

b) Such programme shall make a distinct contribution to the knowledge or understanding of the subject and afford evidence of originality shown either by the discovery of new facts and/or by the exercise of independent critical power.

Â¢) A student shall also comply with such other conditions as may be prescribed by the Senate and the rules of the Faculty concerned.

DR5 Proposed subject of study

a) Before registration, an applicant for the degree of Doctor of Philosophy / a supervised - Doctoral degree by research shall submit for the approval of the Senate a statement of the proposed subject of study.
b) The Senate may, at its discretion, decline to approve such subject if, in its opinion:
(i) itis unsuitable in itself, or
(if) it cannot profitably be studied or pursued under the supervision of the University, or
(iii) the conditions under which the applicant proposes to work are unsatisfactory.
c) Ethical approval in terms of Rule GR32 is required where applicable.

DR6 Supervision

The Board of the Faculty shall appoint one or more appropriately qualified supervisors, at least one of whom shall be a member of the University staff, to advise a student whose research topic is approved, and the student shall be required to work in such association with the supervisor or supervisors as the Senate may direct.

- DR7 Progression

A student who, after eight semesters as a full-time student or twelve semesters as a part-time student, has not submitted a thesis for examination shall be required to apply for re-registration, which will only be permitted on receipt of a satisfactory motivation.

DR8 Submission of thesis

a) Every student for the degree of Doctor of Philosophy / a supervised Doctoral degree by research shall be required to submit a thesis embodying the results of their research.

b) At least three months before the thesis is to be submitted for examination, a student shall give notice, in writing, to the Postgraduate Office of the Faculty concerned of the intention to submit such thesis and the title thereof, provided that, in the event of a student failing to submit the thesis for examination within six months thereafter, the notice will lapse and a further notice of intention shall be submitted.

DR9 Format of thesis

a) Every thesis submitted shall include a declaration to the satisfaction of the Senate stating that it has not previously been submitted for a degree in this or any other university, and that it is the student’s own original work.

b) Every thesis submitted shall be in such format as prescribed by the Senate and the rules of the relevant Faculty; provided that each thesis shall include an abstract in English not exceeding 350 words.

c) A thesis may comprise one or more original papers of which the student is the prime author, published or in press in peer-reviewed journals approved by the Board of the relevant Faculty, accompanied by introductory and concluding integrative material.

d) A thesis submitted under c) above shall include a detailed description of the studentâ\200\231s own distinct contribution to the papers.

DR10 Supervisorâ\200\231s report

Upon submission of the thesis, the supervisor or supervisors shall furnish a report on the conduct of the student’s work; the report shall not include an evaluation of the quality of the thesis.

DR11 Examination

a) The Senate shall appoint for each thesis three examiners, at least two of whom shall be responsible for external examination.

b) Except with the permission of the Senate, at least one of the external examiners shall be based external to the country.

c) Asupervisor or co-supervisor shall not be appointed as an examiner.

d) The names of the examiners shall not be known to either the candidate or to one another.

DR12 Defence of thesis
As part of the examination process, a student may be required to defend a thesis.
DR13 Re-examination of thesis

A failed thesis may not be re-examined.

RULES FOR SENIOR (UNSUPERVISED) DOCTORAL
DEGREES

Note: The following Rule is additional to the preceding General Rules GR1 - GR33.
DS1 Applicability

a) Except as may be prescribed by the Senate in the rules of any particular faculty, the following rules, DS2 to DS7 and DR 12 and DR13 inclusive shall also be applicable to every candidate for a senior (unsupervised) Doctoral degree.

b) Additional rules governing the requirements for senior Doctoral degrees in particular faculties may be prescribed by the Senate and the Council.

DS2 Criteria for admission

a) An applicant shall not be registered for the Senior (unsupervised) Doctoral degree through research in any faculty unless the applicant:
(i) has adoctoral degree, and
(ii) isagraduate of this or another University of not less than 10 years standing.

b) With the permission of the Senate, a candidate who does not meet the requirements in a) above may be admitted in terms of Rule GR7(b).

Â¢) Afaculty may prescribe further minimum criteria for admission.

DS3 Period of registration

A candidate for the degree of Senior Doctoral must register for at least two semesters.
DS4 Subject of study

a) A candidate for the senior (unsupervised) Doctoral degree shall submit for the approval of
the Senate a summary in not more than 500 words, specifying the field of research covered by the published works and their appropriateness for the degree.

: b) The Senate may, at its discretion, decline to accept the published works if, in its opinion:

(i) they are unsuitable in themselves, or
(i) the published work does not fall within the faculties of the University.

DS5 Submission of thesis

a) Every candidate for the senior (unsupervised) Doctoral degree through research shall be required to submit a thesis or a portfolio embodying a collection of published work, representing a significant contribution of knowledge and showing evidence of originality and clarity of thought, and of application of research methods appropriate to the particular
field of study.

b) The published work submitted by a candidate may range over a number of different topics, but these should normally relate in a coherent way to a body of knowledge within a field recognised by the faculty. The amount of work submitted should be substantial, and concluded over a significant period of time having regard to the contribution to the discipline.

c) Candidates may not submit work previously submitted as a thesis for the degree of Doctor of Philosophy or a supervised Doctoral degree.

d) The Board of the faculty may appoint an appropriately qualified academic who is a member of the University staff, to advise the candidate on how to present the material for submission.

DS6 Format of thesis

a) Every thesis submitted shall include a declaration to the satisfaction of the Senate stating that it has not previously been submitted for a degree in this or any other university.

b) Every thesis submitted shall be in such format as prescribed by the Senate and the rules of the relevant faculty; provided that each thesis shall include an introduction in English linking the published work and explaining its significance and coherence.

cÂ¢) Every thesis submitted shall include a signed statement indicating the level of contribution to each publication and role of the candidate as sole author, senior/principal author or co-author.

d) A thesis may comprise of published books and monographs, chapters in books, edited works, refereed conference proceedings, papers in peer-reviewed journals, accompanied by a comprehensive concluding integrative chapter.

DS7 Assessment

a) The Senate shall appoint for each thesis five persons to act as examiners, at least three of whom shall be responsible for external assessment.

b) Except with the permission of the Senate, at least two of the external examiners shall be based external to the country.

RULES FOR CERTIFICATES AND DIPLOMAS

Note: The following Rule is additional to the preceding General Rules GR1 - GR33.
CD1 Applicability

The rules governing certificates and diplomas in any faculty shall be as prescribed by the Senate and the Council in the Handbook of the applicable faculty.

RULES FOR DEGREES AND DIPLOMAS IN THE FACULTY OF SCIENCE AND AGRICULTURE

Students are advised that as a result of directives from the Council for Higher Education (CHE) and the South African Qualifications Authority (SAQA), established in terms of Act 58 of 1995, not all qualifications or programmes may be on offer.

The inclusion of any programme, course of study or module in this Handbook does not imply that the Faculty of Science and Agriculture is compelled to offer it.

Definitions

Assessment: the evaluation and grading of work, supervised or unsupervised, carried out by a student in satisfying the requirements of a module. This includes examinations (see below).

Credit: the value assigned to ten (10) notional study hours (see below) of learning and assessment (see also Degree Credits and Foundation Credits).

Credit-weighted average: the average mark of a set of modules weighted in proportion to the credit value of the modules concerned.

Curriculum: consists of the set of modules that together comprise the programme of study leading to a qualification.

Degree Credits: these are credits used to satisfy the requirements for qualifications within the Faculty. Unless otherwise stated â\200\234creditsâ\200\235 means Degree credits and the term â\200\234Degree creditsâ\200\235 is used only when it is necessary to distinguish them from Foundation credits (see below).

Examination: a formal assessment, conducted within an officially designated examination session, usually invigilated, and bound by time constraints.

Faculty Board: the Board of the Faculty of Science and Agriculture of the University.

Foundation Credits: Foundation credits are calculated on the basis of notional study hours in the same way as Degree Credits, and are a measure of the amount of formal â\200\230Foundationâ\200\231 material in the curriculum. Students in the BSc4 Programme earn Foundation credits in addition to Degree credits, while students in the Science Foundation Programme earn only Foundation credits. Foundation credits may not be used in lieu of Degree credits for the purpose of qualification for a degree in the Faculty.

Major: a major in a discipline consists of at least 64 credits at the exit level and at least 32 credits in the preceding year in that discipline or in other closely related specified disciplines.

Module: any separate course of study for which credits may be obtained. Modules are designated as being at Level 0, usually taken in an access programme at the University, Level 1 (first year), Level 2 (second year), Level 3 (third year), Level 7 (Honours or fourth year), Level 8 (Masters) and Level 9 (Doctoral). The Level of a module may be read from its module code (see the section â\200\234Introduction to Syllabusesâ\200\235). It is given by the first numeric character in that code. Modules may be further subdivided as follows:

Corequisite module: a module for which a student must register in the same semester as the proposed module, unless the ancillary module has already been passed or attempted with satisfaction of the DP requirements.

Prerequisite module: a module which must have been passed, with at least the minimum mark required by the Faculty, before registration of the proposed module is permitted.

Core module: these are modules that are common to all campuses and core (compulsory) to a major or a programme.

Campus core module: these are modules that are not necessarily offered on all campuses but which are compulsory for a particular programme stream or campus focus of a major.

Elective module: modules from which a student selects according to preference, which - may be from a restricted list.

Notional study hours: the learning time that it is conceived it would take to meet the defined outcomes for the module by an average student.

Programme: a structured curriculum in an area of specialisation leading to a qualification such that at least 50 per cent of the credits are prescribed by the programme, including at least 96 credits at exit level.

Prerequisite requirement: that requirement, whether a prerequisite module, a specified mark in a module or any other condition, which must have been met before registration for the proposed module is permitted

Senate: the Senate of the University of KwaZulu-Natal.
University: the University shall mean the University of KwaZulu-Natal.

Year of Study: the level at which undergraduate students are registered academically.
(a) Foundation year: applies to students who are registered for the Science Foundation Programme or the first year of the BSc4 Foundation stream.
(b) F/â\200\231rs; year of study: applies to students who have not yet obtained at least 96 (degree) credits.
(c) Second year of study:
(i) in three-year programmes this applies to students who have obtained at least 96

(degree) credits, but have not yet registered for such modules as will, if passed, lead to the completion of the degree

(i) in four-year programmes this applies to students who have obtained at least 96 (degree) credits, but have not yet obtained 50% of the credits needed for the qualification.

(d) Third year of study:

(i) in three-year programmes this applies to students who have registered for such modules as will, if passed, lead to the completion of the degree.

(i) in four-year programmes this applies to students who have obtained at least 50% of the credits needed for the qualification, but who have not yet registered for such modules as will, if passed, lead to the completion of the degree.

(e) Fourth year of study: this applies to students in four-year programmes who have registered for such modules as will, if passed, lead to the completion of the degree.

General Rules

SA1 Degrees and Diplomas awarded

Bachelor of Science

Bachelor of Science in Agriculture

Bachelor of Agricultural Management
Bachelor of Agriculture in Agricultural Extension
Bachelor of Science in Dietetics

Bachelor of Science in Human Nutrition
Bachelor of Science Honours

Bachelor of Agriculture Honours

Bachelor of Agricultural Management Honours
Postgraduate Diploma in Rural Resource Management
Postgraduate Diploma in Community Nutrition
Postgraduate Diploma in Dietetics
Postgraduate Diploma in Food Security
Master of Science

Master of Science in Agriculture

Master of Agricultural Management

Master of Agriculture

Master of Science in Dietetics

Master of Science in Human Nutrition

Master of Environmental Development

Master of Environmental Management

Master of Marine and Coastal Management
Doctor of Philosophy

Doctor of Science

Doctor of Science in Agriculture

SA2 Applicability of General Academic Rules

(@) The general academic rules of the University shall be of effect where applicable.

(b) All candidates for degrees and diplomas offered in this Faculty are subject to the Rules contained in this Handbook. Any exceptions, except where specified below, require the approval of the Senate.

Note: Where there is a confiict in application or interpretation between these rules and the general academic rules of the University, the general academic rules of the University shall apply.

SA3 Entry Requirements (Candidates with National Senior Certificate)

(@) Candidates shall be eligible to apply to register for undergraduate qualifications (other than those mentioned in (b), (c) and (d) below) provided they satisfy the University-wide entrance requirements and have a full National Senior Certificate for Degrees (NSC Deg) with at least 28 points (excluding Life Orientation) and have obtained

(i) atleasta Level 4 (50%) in Mathematics; and
(i) at least a Level 4 (50%) in Physical Science or Life Science or Agricultural Science

For candidates intending to register for the Bachelor of Science in Agriculture (Agricultural Economics) or the Bachelor of Agricultural Management, a pass with at least a Level 4 (50%) in Economics can replace the Physical Science or Life Science or Agricultural Science requirement in (ii) above. If these candidates subsequently wish to change from these specific programmes to any other programmes within the Faculty, they may enter those programmes only if they satisfy the Physical Science, Life Science or Agricultural Science entry requirements in (ii) above.

Candidates intending to register for the Mathematics modules MATH130 or MATH140 or any programme of study that requires these modules shall have at least 30 points (excluding Life Orientation) in the NSC and

(i) atleasta Level 5 (60%) in Mathematics in addition to the Physical Science, Life Science or Agricultural Science requirement above.

(b) Candidates who have had a disadvantaged school background (as defined by Senate) who satisfy the University-wide entrance requirements and who
(i) have a full NSC Deg with at least 22 points (excluding Life Orientation), and
(if) have obtained a Level 3 (40%) in Mathematics and a Level 3 (40%) in Physical Science or Life Science or Agricultural Science, and

(i) have not otherwise met the requirements set out in (a) above,
may be registered for the BSc4 Augmented stream. This leads to the completion of a degree, usually in not less than four years.

(c)

()

Candidates who have had a disadvantaged school background (as defined by Senate)

who satisfy the University wide entrance requirements and who

(i) have a full NSC Deg with at least 16 points (excluding Life Orientation), and

(i) have obtained a Level 2 (30%) in Mathematics and a Level 2 (30%) in Physical Science or Life Science or Agricultural Science, and

(iii) have not otherwise met the requirements set out in (a) and (b) above,

may be registered for the BSc4 Foundation stream. This leads to the completion of a

degree in not less than four years.

Candidates who have had a disadvantaged school background (as defined by Senate)

who satisfy the University wide entrance requirements and who

(i) have a National Senior Certificate with at least 16 points (excluding Life Orientation), and

(i) have obtained a Level 2 (30%) in Mathematics and a Level 2 (30%) in at least one of Physical Science, Life Science or Agricultural Science, and

(iii) have not otherwise met the requirements set out in (a), (b) or (c) above,

may be registered for the Science Foundation Programme (see Rule SFP1).

All of the above is subject to the availability of places. Moreover, some programmes may require higher entrance requirements as specified in the rules for that programme (see especially notes for Biomedical Sciences).

In all of the above Mathematical Literacy will not count as a substitute for Mathematics.

SA4 Entry Requirements (Candidates with Matriculation)

(a)

Candidates shall be eligible to apply to register for undergraduate qualifications (other

than those mentioned in (b), (c) and (d) below) provided they have a full matriculation

endorsement (or its equivalent) with at least 34 points and have obtained passes in the

Senior Certificate examination or equivalent of:

(i) at least E (40%) at the higher grade or B (70%) at the standard grade in Mathematics; and

(i) atleast E (40%) at the higher grade or B (70%) at the standard grade in Physical Science or Biology or Agricultural Science.

For candidates intending to register for the Bachelor of Science in Agriculture (Agricultural Economics) or the Bachelor of Agricultural Management, passes of at least E (40%) at the higher grade or B (70%) at the standard grade in Economics or Business Economics can replace the Physical Science or Biology or Agricultural Science requirement in (i) above. If these candidates subsequently wish to change from these specific programmes to any other programmes within the Faculty, they may enter those programmes only if they satisfy the Physical Science, Biology or

Agricultural Science entry requirements in (ii) above.

Candidates intending to register for the Mathematics modules MATH130 or MATH140

or any programme of study that requires these modules shall have:

(i) at least D (50%) at the higher grade or A (80%) at the standard grade in Mathematics in addition to the Physical Science, Biology or Agricultural Science requirement above.

In order to be eligible to register for the Bachelor of Agriculture in Agricultural

Extension degree, candidates must have a full matriculation endorsement (or its

equivalent) and have obtained passes of in the Senior Certificate examination or

equivalent of:

() at least E (40%) at the higher grade or C (60%) at the standard grade in Mathematics; and

(if) atleast E (40%) at the higher or standard grade in Physical Science or Biology or Agricultural Science.

Candidates who have had a disadvantaged school background (as defined by Senate)

and who

(i) have a full matriculation endorsement (or its equivalent) with at least 28 points, and

(ii) have obtained passes in Mathematics and in at least one of Physical Science, Biology or Agricultural Science in the Senior Certificate or equivalent examination each with a minimum of a higher grade E (40%) or a standard grade B (70%), but

(iii) have not otherwise met the requirements set out in (a) and (b) above, may be registered for the BSc4 Augmented stream. This leads to the completion of a degree, usually in not less than four years.

Candidates who have had a disadvantaged school background (as defined by Senate)

and who have

(i) afull matriculation endorsement (or its equivalent) with at least 20 points, and

(if) - who have obtained a minimum of a standard grade F in both Mathematics and in at least one of Physical Science, Biology or Agricultural Science in the Senior Certificate or equivalent examination, but

(iif) have not otherwise met the requirements set out in (a) and (b) above, may be registered for the BSc4 Foundation stream. This leads to the completion of a degree in not less than four years.

Candidates who have had a disadvantaged school background (as defined by Senate)

and who do not have a full matriculation endorsement (or its equivalent), but have at

least 20 points, and who have obtained a minimum of a standard grade F in both

Mathematics and in at least one of Physical Science, Biology or Agricultural Science in

the Senior Certificate or equivalent examination, may be registered for the Science

Foundation Programme (see Rule SFP1).

All of the above is subject to the availability of places. Moreover, some programmes may require higher entrance requirements as specified in the rules for that programme (see especially the notes for Biomedical Sciences).

SA5 Maximum Credits per Semester

The normal load per semester is 64 credits. Unless otherwise specified or with the permission of the Dean, a candidate shall not register for modules totalling more than:

(@) 64 credits per semester in the first two semesters of registration;

(b) 80 credits per semester subsequent to the first two semesters of registration.

SAG6 Prerequisite and Corequisite Requirements

Candidates shall not:

(@) be permitted to register for any module unless all prerequisite requirements for the module have been satisfied; or

(b) be awarded the degree before the corequisite requirements for the component modules are satisfied.

SA7 Pass Mark

The pass mark for all modules in the Faculty is 50%, the assessment being based on a weighted mean of marks obtained for one or more of the following: written, oral and/or practical examinations, practical work, tests, essays, seminars, reports and other classwork. A sub-minimum mark may be required in one or more parts of the assessment as specified in the syllabus entry for the module.

SA8 Duly Performed (DP) Requirements

Students shall not be allowed to present themselves for the final examination in any module unless they have attained the faculty minimum requirements of 30% for the class mark and attendance at 80% of all practicals, tutorials and fieldwork required for the module; or as otherwise specified for the module. These should be taken to mean Minimum DP Requirements. In the syllabus section individual modules may specify higher or additional requirements.

Note: Students who do not satisfy the minimum attendance requirements will be liable to lose their duly performed certificate, no matter what the reason for their absence.

See also General Academic Rule GR16 Duly Performed (DP) certification.

SA9 Progression

(a) Students may not (i) proceed to any Level-2 module until they have been previously registered for at least two semesters and have obtained at least 64 credits at Level 1 including at least 32 credits which are compulsory for the programme or major for which they are registered; nor (i) proceed to any Level-3 module until they have been previously registered for four semesters and have obtained at least 144 credits including 32 credits at Level 2 and have passed all Level-1 modules which are compulsory for the programme or majors for which they are registered.

(b) Students will not normally be allowed to register for two or more modules that have clashes in the time-table and will normally be required to register for the lower level of such clashing modules.

(c) Students who fail to maintain the following minimum rate of progress in their studies or who, at the end of any semester, are not able to propose a future curriculum acceptable to the Senate which will allow them to achieve this minimum rate of progress, may be excluded from the Faculty, or be given probationary conditions which must be met, or be required to suspend their registration.

(d) Foundation credits will not be included in these calculations.

No of Standard curriculum BSc4 (degree credits only)
semesters and post-SFP.
completed Augmented Stream Foundation Stream
1 16 16 -
2 64 48 32
3 96 80 64
4 144 112
5 176 (at least 16 at Level 2) 144
6 224 192
(atleast 64 at Level 2) (at least 32 at Level 2)

7 256 224
(at least 96 at Level 2 or 3) (at least 64 at Level 2)
8 304 256
(at least 96 at Level 2 and 48 at (at least 96 at Level 2 or 3)
Level 3)
9 336 288
(at least 80 at Level 3) (at least 96 at Level 2 and 32 at Level 3)
10 384 320
(3-year qualification complete) (at least 64 at Level 3)
(4-year qualification: at least 96 at
Level 3)
11 448 352
(at least 64 at Level 7) (at least 96 at Level 3)
12 512 384
(4-year qualification complete) (3-year qualification complete)
(4-year qualification: at least 96 at Level 3)
13 448
(4-year qualification: at least 64 at Level 7)
14 512
(4-year qualification complete)

Notes:

(i) Ifexcluded, candidates may apply to the Dean, on the prescribed form, to be readmitted. Readmission will be granted only in special circumstances and candidates who are readmitted may be required to achieve additional targets (see also General Academic Rules GR30 and GR31).

(if) Periods of study in other faculties or at other universities may be taken into accoun t when calculating the number of semesters of study completed.

(iii) For candidates from the Science Foundation Programme, the two semesters spent in

that programme will not count when calculating the number of semesters completed.

SA10 Excluded Candidates

(a) Candidates excluded from the Faculty shall not be permitted to register for any module in the Faculty, including modules taken for "non-degree" purposes, unless required by the programme for which they are now registered;

(b) Candidates excluded from any other faculty or university will only be admitted to the Faculty of Science and Agriculture with the permission of the Dean.

See also General Academic Rule GR31 Academic exclusion - right of appeal.

SA11 Supplementary Examinations

(a) Any candidate who fails a module with a mark of not less than 40% shall be permitted to write a supplementary examination in the module provided that the module assessment includes a formal written examination.

(b) Any candidate who passes a module overall, shall be permitted to write a supplementary examination in that module in order to fulfil a sub-minimum pre-requisite requirement for another module.

(c) Students who have failed any modules with marks between 30% and 40%, and who, if they had passed all modules would have been able to graduate in that semester, shall be permitted to apply to write supplementary examinations in those modules. Such supplementary examinations will be granted on application to the Faculty Office, provided the application is made to the Faculty Office at least 2 working days before the supplementary exam is due to be written and the conditions above are met.

SA12 Practical, Project or Field Work

Candidates may be required, for specific modules, to spend periods during the vacations in carrying out practical work.

SA13 Awards of Degrees cum laude and summa cum laude.

The general rules BR6, HR8, CR17 and MR13 for cum laude and summa cum laude shall apply.

SA14 External Examining and Independent Moderation

(a) At least 50% of the assessed work for any exit-level module must be externally examined.

(b) At least 50% of the assessed work for any other module must be independently moderated.

SCIENCE FOUNDATION PROGRAMME

The Science Foundation Programme (SFP) is designed to provide a solid grounding in knowledge, skills and competencies in science for students from disadvantaged schools who do not have full matric endorsement nor an NSC (Deg) and hence do not meet the formal entrance requirements of the Faculties of Science and Agriculture, Engineering and Health Sciences, but who are judged to have the potential to succeed in these faculties.

Students with matric endorsement or NSC (Deg) but who do not otherwise meet the formal Faculty entry requirements may be admitted to the BSc4 access programme.

SFP1 Admission into the Science Foundation Programme

In order to enter the programme, candidates must satisfy the requirements of Rule SA3(d) or

SA4(e) and must have either

(a) a matriculation score of at least 20 points, with at least standard grade F for matric Mathematics and standard grade F in either Physical Science, Biology or Agricultural Science.

OR

(b) ’NSC with at least 16 points, with Level 4 (50%) in English and Life Orientation and Level 2 (30%) in Mathematics and in at least one of Agricultural Science, Life Science or Physical Science.

This programme is reserved for candidates who have neither a full matriculation endorsement, nor an NSC (Deg). Candidates will be selected according to the results of entrance tests.

Students who have attended the University or any other university, whether in a degree or access programme of any kind, for a complete semester will not be admitted to the Science Foundation Programme.

SFP2 Requirements for Progression after First Semester

In order to proceed to the second semester of the foundation year, students must achieve, by the end of the first semester, all of the following:
(a) afinal June mark of at least 40% in at least two of BIOL099, CHEM099, PHYS099:
(b) afinal June mark of at least 40% in MATH099: and
(c) an average final June mark of at least 40% in all of BIOL099, CHEMO099, MATH099 and PHYS099.

SFP3 DP Requirements

Candidates shall not be allowed to present themselves for the final examination in any module unless they have attained the minimum requirements of 40% for the class mark and attendance at 80% of all lectures, practicals, tutorials and fieldwork required for the module, or as otherwise specified for the module.

See also General Academic Rule GR16 Duly Performed (DP) certification.

SFP4 Supplementary Examinations

Any candidate who fails a module at the end of the second semester with a mark of not less than 40% shall be permitted to write a supplementary examination in that module. No supplementary examinations will be permitted at the end of the first semester.

SFP5 Exclusion

(a) Students who do not satisfy the requirements listed in Rule SFP10 or who do not satisfy the progression requirements in Rule SFP2 will be excluded from the Faculty.

(b) Students who, after supplementary examinations, have not passed all modules in the programme as set out in Rule SFP9 will be excluded from the Faculty.

(c) Students who fail to attend at least 80% of the timetabled lifeskills workshops will b
e
excluded from the Faculty.

(d) Students who have been excluded under either Rule SFP2 or SFP5(a), (b) or (c) above, may not be admitted to any other faculty.

SFP6 Duration and Repeating

The Science Foundation Programme must be completed in two semesters. Candidates are not permitted to repeat the Science Foundation Programme, and therefore may not appeal their exclusion in terms of Rule SFP5. None of the modules listed in Rule SFP9 may be repeated.

SFP7 Language Requirements

Based on their performance in a language test at the beginning of the year, students in the Science Foundation Programme will be prescribed a language module that is most appropriate for their needs. The available modules are SCOM003(16) and SCOM013(16).

SFP8 Credits

All of the credits in the Science Foundation Programme are foundation credits and cannot be carried forward into a degree programme.

SFP9 Curriculum

The modules prescribed for the programme are listed below. Numbers in parentheses refer to foundation credits.

BIOL099(24), CHEM099(24), MATH099(40), PHYS099(24), and either SCOMO03(16) or SCOMO013(16).

SFP10 Requirements for Progression into the Faculty of Science and Agriculture

(@) In order to be eligible for admission into undergraduate programmes of the Faculty of Science and Agriculture, a student must pass every module of the curriculum as specified in SFP9.

(b) Inorder to be eligible for admission into any programme in the M stream (see Rule SB3) of the Faculty of Science and Agriculture, a student must pass every module of the curriculum as specified in SFP9, obtain at least 60% in MATHO099 and obtain an average over all modules of at least 60%.

Note: Other faculties may admit students from the Science Foundation Programme according

to their own criteria. Candidates should consult the relevant faculty handbook or Dean.

UNDERGRADUATE DEGREES

Degree of Bachelor of Science

SB1 Structure of the Degree

The following applies to degrees based on majors (see also Rule SB4) and on Focussed Programmes (see Rule SB5):
(a) the minimum duration for the qualification is 6 semesters;
(b) the qualification requires that a set of modules with a total credit value of at least 384 be passed, subject to the following conditions:
(i) atleast 128 credits shall be at Level 3;
(i) atleast 96 credits shall be at Level 2;
(iii) atleast 96 credits shall be at Level 1; and
(iv) the unspecified credits may, subject to the approval of the Dean, contain elective modules with a combined credit value not exceeding 32, offered in any other faculty. These external credits shall be counted at Level 1.

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Notes:

(i) Credit cannot be obtained for more than one module, the contents of which are substantially the same or broadlly overlapping, including situations where one module is or was given on one campus, and the other on another. The decision whether such an overlap occurs will be made by the Dean.

(i) Exemption without credit is given if the material for one required module is broadly contained in another, which has been passed. The decision whether such an exemption will be granted is made by the Dean.

SB2 Transferability of exit-level Credits

Except with the permission of the Senate, candidates may not include among the 128 credits at exit level prescribed in terms of Rule SB1(b)(i) credits for modules passed at another university, or for modules in a subject passed at equivalent level towards the requirements of a qualification in another faculty, unless they are specified in the programme or major in which the candidate is registered.

SB3 Common Curriculum

All students enrolled in any Bachelor of Science programme must follow a common curriculum in the first semester of their first year. This is further divided into two broad groupings:
e Life and Earth Sciences (LES) stream, which encompasses programmes and majors within the Life Sciences, Geology, Geography and Environmental Sciences: and
* Mathematical Sciences (M) stream, which encompasses programmes and majors within the disciplines of Computer Science, Mathematics, Physics and Statistics.
Chemistry can fit into either grouping depending on the choice of a second major.

The modules for the first semester are as follows:

LES stream
CHEM110 16 credits
MATH130 or MATH133 16 credits
and two further modules selected from
BIOL101 16 credits
PHYS131 or PHYS110 16 credits
GEOL101 16 credits (not offered in Pietermaritzburg)
GEOG110 16 credits
M stream
MATH130 16 credits
and three further modules selected from
CHEM110 16 credits
COMP100 16 credits
ECON101 16 credits
PHYS110 16 credits
STAT130 16 credits

Notes:

(i) In majors and programmes in the LES stream MATH133 may be replaced by MATH130.

- Moreover PHYS131 may be replaced by PHYS110. Some programmes may require one or both of these replacements.

(if) - Other combinations of electives may be permitted at the discretion of the Dean.

SB4 Structure of the Degree based on Majors
In addition to Rules SB1 to SB3, the following applies to degrees based on majors:

(a)

no more than 64 credits may be specified at Level 2, of which at least 32 and no more than 48 shall be in modules specified for a primary major subject (from List A below) the balance of the Level-2 modules may be from subjects given in Lists A, B or C.

at least 64 and no more than 80 credits at Level 3 shall be in modules specified for primary major subject from List A below, with the balance from modules in other subjects given in Lists A B or C;

except as provided for in (d) below, all Level-1 and Level-2 modules shall come from disciplines in Lists A or B, or modules mentioned in List C;

the unspecified credits points may, subject to the approval of the Dean, contain elective modules with a combined credit value not exceeding 32, offered in any facuity. (These external credits shall be counted at Level 1.); and

students may major in more than one subject. In that case, no more than 16 credits at exit level may be counted towards both majors.

List A (primary major subjects):

Applied Mathematics Grassland Science**
Biochemistry Hydrology
Botany* Marine Biology**

Cellular Biology* Mathematics

Chemistry Microbiology
Computer Science Physics
Entomology* Plant Pathology
Environmental Biology* Soil Science
Genetics Statistics
Geography Zoology*
Geoscienceâ\204¢*

*Botany, Cellular Biology, Entomology and Zoology will continue to be available as a major for continuing second and third year students only.

**Environmental Biology, Geoscience, Grassland Science and Marine Biology will continue to be available as a major for continuing third year students only.

List B (other major subjects):
e Economics, Information Systems and Technology (but see Note (iii) after Rule SB5, number 16), Psychology.

List C (other recognised modules):
Â® any module specified for a particular programme in which the student is registered;
* Any module in a subject offered in the Faculty of Science and Agriculture, for which the pre-requisites have been met.

SB5 Rules of Combination for Majors

The tables below give the modules needed to major in a particular discipline. Numbers in parentheses denote the number of credits for a module. The remaining credits (to ensure tha t
Rule SB1 is satisfied) must be drawn from other modules in accord with Rules SB3 and SB4.

Please note that this Handbook contains only modules to be taught in 2010. The modules listed in first year are for first-year students, those for second year are for second-year students and so on. Students in first year should not assume that the modules listed below will be the same by the time they reach second and higher years.

Please note also that electives in the first Semester of first year must accord with Rule SB3.

Students may be required to register for focussed programmes if their combinations of major subjects are available within a focussed programme.

1. Applied Mathematics (Pietermaritzburg, Westville)

MATH130(16), 140(16)

MATH212(16), 241(16)

Pietermaritzburg: MATH324(16), 331(16), 334(16), 16C from (MATH3O01(16), 322(16), 323(16), STAT350(16))

Westvile: MATH334(16), 356(16), 32C from (MATH301(16), 310(16), 327(16), 338(16), 340(16), 342(16), 343(16), 344(16), 346(16), 347(16))

2. Biochemistry (Pietermaritzburg, Westville)

Year 1 BIOL101(16), BIMI120(16), CHEM110(16), 120(16), MATH133(16), PHYS131(16)

Year 2 Pietermaritzburg: BIOC201(16), 212(16), CHEM220(16), RONA202(16)

Westville: BIOC201(16), 202(16), CHEM220(16), RDNA202(16)

Year 3 Pietermaritzburg: BIOC304(8), 310(8), 311(16), 315(16), 316(16).

Westville: BIOC307(16), 308(16), 315(16), 316(16)

3. Botany (Pietermaritzburg)

Year 1 No longer offered

Year 2 BIOL200(16), 204(16), 211(16)

Year 3 BIOL303(16), 321(16), 390(16), (BIOL304(16) or 315(16))

4, Cellular Biology (Westville)

Year 1 No longer offered

Year 2 (BIOC201(16) or 203(16)), BIOL200(16), 205(16), BIOL234(16)

Year 3 BIOL316(16), 345(16), 350(16), 390(16)

5. Chemistry (Pietermaritzburg, Westville)

Year 1 Pietermaritzburg: CHEM110(16), 120(16), MATH130(16) or 133(16), MATH140(16) or 143(8
),
: PHYS110(16) or 131(16), PHYS120(16) or 133(8)

Westville: CHEM110(16), 120(16), MATH130(16) or 133(16), MATH140(16) or 145(16), PHYS110(16) or 131(16), PHYS120(16) or 132(16).

Year 2 CHEM210(16), CHEM220(16), CHEM230(16)

Year 3 CHEM310(16), CHEM320(16), CHEM330(16), CHEM340(16)

6. Computer Science (Pietermaritzburg, Westville)

Year 1 COMP100(16), COMP102(16), MATH130(16), MATH140(16)

Year 2 COMP200(16), COMP201(16) , 16C from MATH at Level 2

Year 3 Pietermaritzburg: COMP301(16), 302(16), 308(16), 309(16)

Westville: COMP301(16), 302(16), two of (COMP300(16), 303(16), 304(16), 305(16), 306(16), 307(16), 308(16))

7. Economics (Pietermaritzburg, Westville)

Year 1 ECON101(16), 102(16), MATH130(16), 140(16)

Year 2 ECON201(16), 202(16)

Year 3 ECON314(16), 48C from ECON as specified by Academic Coordinator

Notes:

(i) Economics can only be taken in conjunction with another primary major.
(i) Students majoring in Statistics cannot take ECON314, and must replace that module with ECON309.

:8. Entomology (Pietermaritzburg)

Year1 No longer offered

Year 2 BIOL200(16), 213(16), (BIOL211(16) or 222(16))

Year3 AGPS308(16), BIOL304(16), 322(16), 390(16)

9. Environmental Biology (Westville)

Year 1 No longer offered

Year 2 No longer offered

Year 3 BIOL303(16), 304(16), 390(16), 16C from (BIOL342(16), 344(16), 348(16))

10. Genetics (Pietermaritzburg)

Year 1 BIOL101(16), BIMI120(16), CHEM110(16), 120(16), MATH133(16), MATH143(8)

Year 2 (BMET210(16) or BIOL200(16)), GENE240(16), RONA202(16)

Year 3 GENE310(16), 330(16), GENE320(16), 16C from (AGPS306(16), BIOL304 (16), GENE 340(16) J
350(16))

11. Geography (Pietermaritzburg, Westville)

Year 1 CHEM110(16), ENVS120(16), GEOG110(16), MATH133(16), STAT143(8)

Year 2 ENVS210(16), 211(16), GEOG220(16)

Year 3 ENVS322(16); at least 32C from (ENVS314(16), 315(16), 316(16), GEOG330(16)) and at m
ost
16C from (ENVS318(16); GEOG325(16))

12. Geology (Westville)

Year 1 No longer offered

Year 2 No longer offered

Year 3 GEOL301(16), 304(16), 306(8), 308(16), 310(8)
Note:

The major in Geology is available only to 39 year pipe-line students.

13. Geoscience (Westville)

Year 1 No longer offered

Year 2 No longer offered

Year 3 GEOL306(8), GEOL310(8), GEOL322 plus 32 credits from GEOL313 (16), GEOL314 (16) and â\200\230
GEOL321(16) : |

14. Grassland Science (Pietermaritzburg)

Year 1 No longer offered

Year 2 No longer offered

Year 3 BIOL303(16), 312(16), 323(16), 390(16)

15. Hydrology (Pietermaritzburg)

Year 1 CHEM110(16), COMP105(8), MATH133(16), PHYS110(16) or 131(16) i

Year 2 HYDR210(16), HYDR220(16)

Year 3 HYDR310(16), 313(8), 321(8), 322(8), 324(16), 330(8)

Notes:

(i) COMP105 may be taken in year 2.
(i) Students who so wish may take AGPS301 in place of HYDR313.

16. Information Systems and Technology (Pietermaritzburg, Westville)

Year 1 COMP100(16), (COMP 102(16) or ISTN102(16)), MATH130(16), MATH140(16)
Year 2 ISTN211(16), ISTN212(16)
Year 3 ISTN31A(8), 31B(8), 31D(8), 31E(8), 32A(8), 32B(8), 32D(8), 32F(8)

Notes:

" (i) Credit cannot be obtained for more than one of ISTN100, ISTN101, COMP100, COMP104 or COMP106.

(i) Information Systems and Technology can only be taken in conjunction with another primary major other than Computer Science.

] (iii) Level-3 modules in ISTN not listed above may not be taken as exit level modules counting towards a B.Sc. majoring in Information Systems and Technology.

- 17. Marine Biology (Westville)

Year 1

No longer offered
- Year2 No longer offered
Year 3 (BIOL304(16) or 342(16)), 341(16), 343(16), 390(16)

˜ 18. Mathematics (Pietermaritzburg, Westville)

"Year 1 MATH130(16), 140(16)
â\200\234Year?2 MATH212(16), 220(16)
Year 3 Pietermaritzburg: MATH310(16), 323(16), 340(16), (MATH322(16) or 334(16))

Westvile: MATH310(16), 340(16), 32C from (MATH301(16), 327(16), 334(16), 338(16), 342(16), 344(16), 346(16), 347(16)) or 32C from (MATH301(16), 327(16), 338(16), 342(16), 344(16), 346(16), 347(16), 356(16))

˜19. Microbiology (Pietermaritzburg, Westville)

Year 1 BIOL101(16), BIMIT20(16), CHEM110(16), 120(16), MATH133(16), PHYS131(16)
â\200\234Year 2 Pietermaritzburg: (BIOC201(16) or CHEM220(16)), MICR213(16), 214(8), 220(8), RONA202(16)
Westville: MICR213(16), 216(16), 218(16), RONA202(16)
Year 3 Pietermaritzburg: MICR304(16), 305(16), 320(16), 360(16)

Westville: MICR303(16), 304(16), 305(16), 311(16)

20. Physics (Pietermaritzburg, Westville)

Year 1 MATH130(16), 140(16), PHYS110(16), 120(16)
- Year 2 Pietermaritzburg: PHYS211(16), 212(16), 231(16)
d Westville: PHYS201(16), 204(16), 231(16)
- Year 3 Pietermaritzburg: PHYS305(16), 306(16), 351(16), 352(16)

Westville: PHYS305(16), 306(16), 331(16), 332(16) i %

21, Plant Pathology (Pietermaritzburg)

Year 1 BIOL101(16), BIMI120(16), CHEM110(16), 120(16), MATH133(16), PHYS131(16)
Year 2 MICR213(16), PPTH214(16), RONA202(16)
Year 3 AGPS308(16), MICR305(16), 316(8), PPTH310(8), 330(16),

22. Psychology (Pietermaritzburg)

Year 1 CHEM110(16), MATH133(16), PSYC101(16), 102(16)

Year 2 PSYC201(16), 202(8), 203(8), 16C from PSYC

Year 3 PSYC301(16), 302(8), 305(8), 32C from Level 3 PSYC

Notes:

(i) Psychology can only be taken in conjunction with another primary major.

(i) The above rules of combination refer only to Psychology taken as a major within the Faculty of Science and Agriculture.

23. Soil Science (Pietermaritzburg)

Year 1 BIOL101(16), CHEM110(16), 120(16), ENVS120(16), (MATH133(16) or 130(16) and PHYS131(16) or (MATH130 and PHYS110(16))

Year 2 SSCI217(16), 230(16)

Year 3 AGPS301(16), SSCI320(16), 351(8), 352(8), 371(8), 372(8)

24, Statistics (Pietermaritzburg, Westville)

Year 1 MATH130(16), 140(16), STAT130(16), 140(16)

Year 2 MATH212(16), 241(16), STAT230(16), 240(16)

Year 3 Pietermaritzburg: STAT301(16), 305(16), 350(16), 360(16)

Westville: STAT301(16), 330(16) , 350(16), 360(16)

25. Zoology (Pietermaritzburg)

Year 1 No longer offered

Year 2 BIOL200(16), BIOL213(16), 222(16)

Year 3 BIOL304(16), 324(16), 325(16), 390(16)

SB6 Focussed Programmes

The tables below give the programmes of study for focussed programmes within the degree of Bachelor of Science. All modules must be chosen in accordance with Rule SB1 to SB3 and require approval by the Academic Coordinator. Numbers in brackets denote the number of credits for a module.

Please note that this Handbook contains only modules to be taught in 2010. The modules listed in first year are for first-year students, those for second year are for second-year students and so on. Students in first year should not assume that the modules listed below will be the same by the time they reach second and higher years.

1. Actuarial Science (Westville)

Year 1	No longer offered
Year 2	
Semester 1	ACSC200(32), MATH212(16), STAT230(16)
Semester2	ACSC210(16), MATH241(16), STAT240(16)
Year 3	
Semester 1	ACSC300(32), STAT301(16), 360(16)
Semester2	ACSC310(32), STAT330(16), 350(16)

2. Applied Chemistry (Westville)

[Year1
Semester 1 │ CHEM110(16), MATH130 or 133(16), PHYS110(16) or 131(16), Electives(16)
│ Semester2 │ CHEM120(16), MATH140(16) or 145(16), PHYS120(16) or 132(16), Electives(16)
Year 2
Semester 1 │ APCH211(16), CHEM210(16), 220(16), Electives(16)
Semester 2 │ APCH221(16), 231(16), CHEM230(16), Electives(16)
Year 3
Semester 1 │ APCH312(16), 322(16), CHEM330(16), 340(16)
Semester2 │ APCH332(16), 342(16), CHEM310(16), 320(16)

3. Applied and Environmental Microbiology (Pietermaritzburg)

Year 1

Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

Semester2 │ BIMI120(16), BIOR118(8), 130(8), CHEM120(16), Electives(16)

Year 2

Semester 1 (BIOC201(16) or CHEM220(16)), MICR213(16), 32C from (BMET210(16), GENE240(16),

HYDR210(16), SSCI217(16))

Semester 2 | MICR214(8), 220(8), PPTH214(16), RDNA202(16), 16C from (BMET222(16), BIOC212(16), CTEC233(16))

Year 3

Semester 1 BIOC311(16), MICR310(16), 320(16), 16C from (BIOC315(16), MICR305(16))

Semester 2 | MICR304(16), 360(16), 32C from (ENVS322(16), GENE320(16), SSCI320(16), 371(8), 372(8))

4. Applied Environmental Science (Pietermaritzburg)

Year 1 | No longer offered

Year 2

Semester 1| AMET210(16), ENVS210(16), HYDR210(16), SSCI217(16)

Semester2 | AMET212(16), ENVS211(16), SSCI230(16), 16C from (HYDR220(16), MICR220(8), Elective)

Year 3

Semester 1| (HYDR310(16) or MICR310(16)), SSCI351(8), 40C from (ENVS314(16), 315(16), HYDR313(8), 321(8), SSCI371(8))

Semester 2 | ENVS322(16), HYDR322(8), SSCI352(8), 372(8), 24C from (ENVS316(16), HYDR324(8),

330(16), SSCI320(16))

5. Applied Physics (Westville)

Year 1

Semester 1 | MATH130(16), PHYS110(16), Electives(32)
Semester2 | MATH140(16), PHYS120(16), Electives(32)
Year 2

Semester 1 | PHYS201(16), 231(16), Electives(32)
Semester2 | PHYS204(16), 242(16), Electives(32)

Year 3

Semester 1 | PHYS306(16), 331(16), 343(16), Electives (16)
Semester2 | PHYS305(16), 332(16), 344(16), Electives (16)

6.a. Biological Sciences (General Stream) (Pietermaritzburg, Westuville)

Year 1

Semester 1 | BIOL101(16), CHEM110(16), MATH133(16), Electives(16)

Semester2 | BIOL102(16), STAT143(8), Electives(48)

Year 2

BIOL200(16), 204(16), 205(16), 32C from Level-2 BIOL modules as directed by the Academic Coordinator and approved by the Dean, Electives(48)

Year3

BIOL300(16), 304(16), 390(16), 32C from (BIOL315(16), 316(16), 324(16), 349(16)), 48C from Level-3 BIOL modules or alternatives selected in consultation with the Academic Coordinator and approved by the Dean.

6.b. Biological Sciences (Cellular Biology Stream) (Westville)

Year 1 No longer offered
Year 2 No longer offered
Year3

BIOL300(16), 304(16), 345(16), 350(16), 390(16), 16C from (BIOL316(16), 347(16), 349(16)), Electives (32)

7. Biomedical Sciences (Westville)

Year 1

Semester 1 | BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

Semester2 | BIOL102(16), CHEM120(16), COMP105(8), STAT143(8), 16C from (BIMI120, HPHS1H2(16),

PHYS132(16))

Year2

Semester 1 | BIOC203(16), BIOL200(16), HPHS2C1(16), HPHS2N1(16)

Semester2 | BIOL205(16), (BIOL233(16) or 234(16)), HPHS2E2(16), HPHS2G2(16)

Year 3
BIOL300(16), (HPHS3R1(16) or HPHS3P2(16) or HMBC3RP(16)), 64C from (HMBC3ET(8), LAWS4BE(8), MHA3HA1(8), HMBC3MD(16), MV13MV1(16), HMBC3EB(8), MM13MM2(16), HPHS3N2(8), MBMC3WH(8)), 32C from (BIOL316(16), 344(16), 345(16), 350(16))

Notes:

(i)

(i)

(i)

(v)

To qualify for entry to the Programme in Biomedical Sciences at Level 1, a candidate must obtain either an NSC Deg with at least 34 points (excluding Life Orientation) including at least Level 5 in Life Science and Physical Science and Level 4 in mathematics or 40 matric points with a D at higher grade or an A at standard grade in Mathematics and a higher grade C in Physical Science and Biology.

Places in Levels 2 and 3 in the Programme will be restricted. A preliminary selection of students to be allowed into Level 2 of the Programme will be made at the end of the 1st semester of first year, but a final decision on whether a student may continue will only be taken once he or she has completed the first-year curriculum. Selection will be on academic merit.

All students entering Level 2 are required to be vaccinated against Hepatitis B and may be required to register with the Health Professions Council of South Africa. Students will have to bear any necessary costs.

In the syllabus section of this handbook, the entries for modules given by the Faculty of Health

Sciences are grouped together under â\200\234Biomedical Sciencesâ\200\231.

8. Chemistry & Chemical Technology (Pietermaritzburg)

ear
or or
or

make up to â\200\231creditsâ\200\230

9. Computational Physics (Pietermaritzburg)

Year 1

Semester 1 │ COMP100(16), MATH130(16), PHYS110(16), Electives(16)
Semester2 │ COMP102(16), MATH140(16), PHYS120(16), Electives(16)
Year 2
Semester 1 │ PHYS211(16), PHYS231(16), Electives (32)
Semester2 │ CPHY212(16), PHYS212(16), Electives (32)

Year 3

Semester 1 │ CPHY311(8), CPHY321(8), PHYS306(16), PHYS351(16), 16C at Level-3 from COMP, MATH or STAT

Semester2 │ CPHY312(8), CPHY322(8), PHYS305(16), PHYS352(16), 16C at Level-3 from COMP, MAT
H
or STAT

10.a. Computer Science & Information Technology (Computer Science Stream)
(Westville)

Year 1

Semester 1 │ COMP100(16), MATH130(16), STAT130(16), Electives(16)

Semester2 │ COMP102(16), MATH140(16), (MATH144(16) or STAT140(16)), Electives(16)
Year 2
Semester 1│ COMP200(16), MATH236(16), 16C from (MATH212(16), 235(16), STAT230(16)), Electiv

es(16)
Semester2 | COMP201(16), 203(16), 16C from (MATH220(16), 241(16), 243(16), 246(16), STAT240 (16)),

Electives(16)

Year 3

Semester 1 | COMP300(16), 302(16), (COMP303(16) or 306(16)), 16C at Level 3 from COMP, MATH or
STAT

Semester2 | COMP301(16), 308(16) 16C from (COMP304(16), 305(16), 307(16)), 16C at Level 3 from
COMP, MATH or STAT

10.b. Computer Science & Information Technology (Information Technology Stream) (Pietermaritzburg, Westville)

Year 1

Semester 1│ COMP100(16), MATH130(16), STAT130(16), Electives(16)

Semester2 │ COMP102(16), MATH140(16), (ISTN102(16) or MATH144(16) or STAT140(16)), Electives(16)

Year 2

Semester 1 │ COMP200(16), ISTN211(16), MATH236(16), Electives(16)

Semester2 │ COMP201(16), 203(16), ISTN212(16), Electives(16)

Year 3

Semester 1 │ COMP302(16) , (COMP300(16) or 309(16)), ISTN31A(8), 31B(8), 31D(8), 31E(8)
Semester 2 │ COMP301(16), 308(16), ISTN32A(8), 32B(8), 32D(8), 32F(8)

11. Crop & Horticultural Science (Pietermaritzburg)

Year 1

Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

Semester2 | BIOL102(16), BIOR118(8), 130(8), CHEM120(16), MATH143(8), PHYS133(8)
Year 2

Semester 1 AMET210(16), BIOL204(16), BMET210(16), GENE240(16), SSCI212(8)
Semester2 | AGPS200(16), 220(8), BIOC212(16), BMET222(16)

Year 3

Semester 1 [AGPS301(16), AGPS305(16), AGPS307(16), Electives(8)

Semester 2 | AGPS304(8), AGPS306(16), AGPS308(16), AGPS320(16), SSCI320(16)

12. Ecological Sciences (General Stream) (Pietermaritzburg)

Year 1 | No longer offered

Year2
BIOL200(16), 204(16), 48C from (BIOL211(16), 212(16), 213(16), 214(16), 222(16), 231(16)), Electives(48)

Year 3

BIOL300(16C), 303(16C), 312(16), 325(16), 390(16C), (32C from BIOL30A(16), 322(16), 324(16), ENVS316(16)), Electives(16)

13.a. Environmental Science (Earth Science Stream) (Westville)

Year 1

Semester 1 | CHEM110(16), MATH133(16), GEOG110(16), GEOL101(16)

Semester2 | BIOL102(16), CHEM120, ENVS120(16), GEOL102(16)

Year 2

Semester 1 | ENVS210(16), GEOL201(8), 211(8), 220(8), Electives(24)

Semester2 | ENVS211(16), GEOL205(8), Electives(40)

Year 3

Semester 1 | ENVS315(16), GEOL313(16), 16C at Level 3 from ENVS, Level-3 Electives(16)

Semester2 | ENVS316 (16), 322(16), GEOL310(16), Level 3 Electives (16). A total of at least 32C of GEOL

must be taken at Level 3.

L)

Science & Agriculture i)

13.b. Environmental Science (Life Science Stream) (Pietermaritzburg, Westville)

Year 1

[Semester 1 | BIOL101(16), CHEM110(16), MATH133(16), GEOG110(16)

Semester2 | Pietermaritzburg: BIOL102(16), ENVS120(16), Electives (32)

Westville: BIOL102(16), ENVS120(16), STAT143 (8), Electives (24)

| Year?2

| Semester 1 | BIOL200(16), ENVS210(16), 32C from (BIOL212(16), 213(16), 214(16), 223(16), SSCI217(16))

Semester2 | (BIOL222(16) or 231(16)), ENVS211(16), GEOG220(16)), Elective(16)

Year 3

Semester 1 | (ENVS314(16), 315(16)), BIOL300(16), 303(16)

Semester2 | ENVS316(16), ENVS322(16), BIOL390(16) , 16C from (BIOL304(16), 312(16), 325(16))

14. Geography & Environmental Management (Pietermaritzburg, Westville)

Year 1 | No longer offered

Year 2

Semester 1 | Pietermaritzburg: ENVS210(16), 16Â¢ from (ECON201(16), MGNT21M(16), RRMG212(16)),
32C from (AMET210(16), BIOL213(16), HYDR210(16), SSCI217(16))

Westville: ENVS210(16), 16Â¢ from (ECON201(16), MGNT21M(16)), 32C from (BIOL212(16), GEOL211(8), 220(8), Elective(16))

Semester2 | Pietermaritzburg: AMET211(8), ENVS211(16), ECON202(16), GEOG220(16), Elective(8
)

Westville: ENVS211(16), ECON202(16), GEOG220(16), Elective (16)

Year 3

Semester 1| ENVS314(16), 315(16), 32C from (GEOG325(16), Level 3 ECON MGNT or RRMG)

Semester2 | ENVS316(16), 322(16), Electives(32)

15.a. Geological Sciences (Environmental and Engineering Geology Stream) (Westville)

Year 1 No longer offered
Year 2 No longer offered
Year 3

Semester 1 | GEOL313(16), 314(16), Electives(32)

Semester2 | GEOL306(8), 308(16), 321(16), Elective(24)

15.b. Geological Sciences (Geology and Ore Deposits Stream) (Westville)

Year 1

Semester 1 | CHEM110(16), GEOL101(16), MATH133(16), Electives(16)

Semester2 | CHEM120(16), COMP105(8), GEOL102(16), STAT143(8), Electives(16)

Year 2

Semester 1 | GEOL201(8), 202(8), 211(8), 220(8) Electives(32)

Vacation GEOL200(16)

Semester2 | GEOL205(8), 206(16), ENVS211(16), Elective(8)

Year 3

Semester 1 | GEOL301(16), 303(8), 310(8), Electives(32)

Vacation GEOL304(16)

Semester2 | GEOL306(8), 308(16), Electives(24)

Notes:

(i) Entry into GEOL200, GEOL202, GEOL205 and GEOL206 will be restricted to students in the Geological Sciences programme and limited to a maximum of 56 students. Selection for these modules will be on academic merit and the decision on whether a student will be admitted will only be taken after s/he has passed all of GEOL101, GEOL102, CHEM110, CHEM120, MATH133 or MATH130, and STAT143.

(i) Students will only be allowed to register for GEOL200, GEOL202, GEOL205 and GEOL206 a maximum of 3 times, after which they will be required to de-register from the Geological Sciences programme.

16. Industrial and Applied Biotechnology (Pietermaritzburg)

Year 1

Semester 1 | BIOL101(16), CHEM110(16), (MATH130(16) or 133(16)), PHYS110(16) or 131(16)

Semester 2 | BIMI120(16), CHEM120(16), MATH140(16) or (COMP105(8) and MATH143(8)), (PHYS120(16) or (PHYS133(8) and Elective(8))

Year 2

Semester 1| BIOC201(16), CHEM220(16), (CHEM210(16) or GENE240(16)), MICR213(16)

Semester2 | BIOC212(16) or (MICR214(8) and MICR220(8)), CHEM230(16), CTEC233(16), RONA202(16)

Year 3

Semester 1 | BIOC311(16), CHEM330(16), CTEC333(16), MICR320(16)

Semester2 | CTEC343(16), MICR304(16), 360(16), 16C from (BIOC304(8), 310(8), CHEM320(16), GENE320(16), 330(16))

17. Industrial Mathematics (Westville)

Year 1

Semester 1 | MATH130(16), STAT130(16), COMP100(16), Electives(16)

Semester2 | MATH140(16), 144(16), STAT140(16), Electives(16)

Year 2

Semester 1 | MATH212(16), STAT230(16), Electives(32)

Semester 2 | MATH241(16), 243(16), STAT240(16), Electives(16)

Year 3

Semester 1 | MATH334(16), STAT360(16), Electives(32)

Semester2 | MATH301(16), 327(16), 346(16), STAT350(16)

18. Marine Biology (Westville)

Year 1

Semester 1 | BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

Semester2 | BIOL102(16), STAT143(8), Electives(40)

Year2

Semester 1 | BIOL200(16), 204(16), 214(16) 16C from Level-2 BIOL modules as directed by the

Semester 2 | BIOL205(16), 231(16) Academic Coordinator and approved by the Dean, Electives(32).

Year 3

BIOL300(16), 304(16), 341(16), 342(16), 343(16), 391(16), 32C from Level-3 BIOL modules as directed by the Academic Coordinator and approved by the Dean

19. Microbial Biotechnology (Westville)

Year 1

Semester 1| BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

Semester 2 | BIMI120(16), CHEM120(16), Electives(32)

Year 2

Semester 1 | BIOC201(16), CHEM220(16), MICR213(16), 216(16)

Semester2 | BIOC202(16), MICR218(16), RONA202(16), Electives(16)

Year 3

Semester 1 | BIOC315(16), 307(16), MICR305(16), 311(16)

Semester 2 | BIOC316(16), MICR303(16), 304(16), 313(16)

20. Operations Research (Pietermaritzburg)

Year 1

Semester 1 | MATH130(16), STAT130(16), Electives(32)

Semester 2 | MATH140(16), STAT140(16), Electives(32)

Year 2

Semester 1 | MATH212(16), MATH236(16), STAT230(16), Electives(16)

Semester 2 | MATH241(16), STAT240(16), Electives(32)

Year 3

Semester 1| MATH331(16), 334(16), 32C from (BMET314(8), 316(8), STAT301(16), 360(16))

Semester 2 | MATH301(16), (MATH322(16) or 324(16)), STAT305(16), STAT350(16)

The BSc4 Programme

The BSc4 Programme allows students who would not normally qualify for entry into the Faculty to complete a degree in one more year than the normally allocated time. There are two streams within the BSc4 Programme.

In the Augmented stream, students are given extra tuition in the first one or two years. In these they attend the regular lectures and practicals with other first year students, but in addition the courses are â\200\230augmentedâ\200\231 by additional lectures, practical sessions and small group tutorials for which they earn foundation credits. However, instead of eight modules in first year, they will take only four, together with two modules of Scientific Communication.

In the Foundation stream, students attend the same classes as the students of the Science Foundation Programme. They will earn 32 degree credits which may be carried forward to their degree, provided they pass all modules. In addition they will earn 96 foundation credits.

The two streams are administered under separate sets of rules.

BSc4 Augmented Stream

S4A1 Admission into the BSc4 Augmented Stream

In order to enter the Augmented stream of the BSc4 programme, candidates must satisfy the

requirements of Rule SA3(c) or SA4(c) and must have either

(a) a full matriculation endorsement with a score of at least 28 points, with a minimum of standard grade B or higher grade E for Mathematics and at least one of Physical Science, Biology or Agricultural Science

OR

(b) NSC (Deg) with at least 22 points, with Level 4 (50%) in English and Life Orientation a nd
Level 3 (40%) in Mathematics and Level 3 (40%) in at least one of Agricultural Science, Life Science or Physical Science.

This programme s reserved for candidates who do not qualify for direct entry into an undergraduate programme in the Faculty.

Students who have attended the University or any other university, whether in a degree or access programme of any kind, for a complete semester will not be admitted to the BSc4 Augmented Stream.

S4A2 Structure of the Programme

In all years, the choice of modules must be made in consultation with the Academic

Coordinator and approved by the Dean.

(@) In their first year students will register for 80 (degree) credits and 64 foundation cr edits.
The latter 64 credits must be from the augmented modules BIOL195, BIOL196, CHEM195, CHEM196, MATH195, MATH196, MATH197, PHYS195 and PHYS196 (each 16 degree credits). Each of these modules will also carry 16 foundation credits so that the notional study hours for these modules will total 320.

(b) In addition students will register for either both SCOM101 and SCOM102 or for both SCOM111 and SCOM112. These modules each carry 8 degree credits. The particular choice of which pair of modules is taken will be determined by an entrance test at first registration. Students must pass 16 credits from: SCOM101, SCOM102, SCOM111 and SCOM112.

(Â¢) Intheir second year, students will normally register for between 80 and 96 degree cred its.
These will be selected from augmented and regular Level-1 modules and may also include up to 32 credits in Level-2 modules.

(d) Intheir third year, students will normally register for 96 credits selected from Levels 2 and
3.

(e) In their fourth year students will register for the credits required to complete their degree.

Note: Augmented modules have separate codes (because their credit values and notional study hours are different). The table below shows the codes of the augmented modules and their mainstream equivalents.

Augmented Module	Mainstream Module
BIOL195	BIOL101
BIOL196	BIOL102
CHEM195	CHEM110
CHEM196	CHEM120
MATH195	MATH130
MATH196	MATH140
MATH197	MATH133
PHYS195	PHYS110
PHYS196	PHYS120

S4A3 Completion of the Qualification

In order to satisfy the requirements for a three-year qualification within the Faculty, students in the Augmented stream must complete 384 degree credits and between 64 and 96 foundation credits. The 384 degree credits must satisfy the requirements of Rule SB1, AgMan2, AgBa2, BDiet3 or BHN3, whichever is appropriate.

S4A4 Transfers into Bachelor of Science in Agriculture

Students who transfer from the BSc4 into the BSc(Agric) must complete 512 degree credits and between 64 and 96 foundation credits. These 512 degree credits must satisfy the requirements of Rule SAg1.

S4A5 Supplementaries

In the first semester of their first year, students in the augmented curriculum will be awarded a supplementary examination for any examined module in which they achieve at least 30%.

S4A6 Progression Requirements

The progression requirements laid out in Rule SA9 will apply.

S4A7 Repeating of Modules

None of the augmented modules BIOL195, BIOL196, CHEM195, CHEM196, MATH195, MATH196, MATH197, PHYS195 and PHYS196 may be repeated. Students who fail any of these and wish to obtain credit for these modules must register only the corresponding non-augmented modules BIOL101, BIOL102, CHEM110, CHEM120, MATH130, MATH140, MATH133, PHYS110 and PHYS120, respectively.

BSc4 Foundation Stream

S4F1 Admission into the BSc4 Foundation Stream

In order to enter the Foundation stream of the BSc4 programme, candidates must satisfy the requirements of Rule SA3(c) or SA4(d) and must have either

(@) a full matriculation endorsement with a score of at least 20 points, with at least standard grade F for matric Mathematics and standard grade F in at least one of Physical Science, Biology or Agricultural Science.

OR

(b) NSC (Deg) with at least 16 points, with Level 4 (50%) in English and Life Orientation and Level 2 (30%) in Mathematics and Level 2 (30%) in at least one of Agricultural Science, Life Science or Physical Science.

Candidates will be selected according to the results of entrance tests.

Students who have attended the University or any other university, whether in a degree or access programme of any kind, for a complete semester will not be admitted to the BSc4 Foundation Stream.

S4F2 Requirements for Progression after First Semester

In order to proceed to the second semester of the programme, students must achieve, by the end of the first semester, all of the following:
(a) afinal June mark of at least 40% in at least two of BIOL199, CHEM199, PHYS199;
(b) afinal June mark of at least 40% in MATH199; and
(c) an average final June mark of at least 40% in all of BIOL199, CHEM199, MATH199 and PHYS199.

S4F3 DP Requirements

Candidates shall not be allowed to present themselves for the final examination in any module unless they have attained the minimum requirements of 40% for the class mark and attendance at 80% of all lectures, practicals, tutorials and fieldwork required for the module, or as otherwise specified for the module.

See also General Academic Rule GR16 Duly Performed (DP) certification.

S4F4 Supplementary Examinations

Any candidate who fails a module at the end of the second semester with a mark of not less than 40% shall be permitted to write a supplementary examination in that module. As provided for in General Rule BR5, no supplementary examinations will be permitted at the end of the first semester of the programme.

S4F5 Exclusion

(@) Students who do not satisfy the requirements in Rule S4F10 or who do not satisfy the progression requirements in Rule SA9 will be excluded from the Faculty.

(b) Students who, after supplementary examinations, have not passed all modules in the programme as set out in S4F8 will be excluded from the Faculty.

(c) Students who fail to attend at least 80% of the timetabled lifeskills workshops will be excluded from the Faculty.

(d) Students who have been excluded under either Rule S4F2 or S4F5 (a), (b) or (c) above may apply to be admitted only to another faculty, not including faculties in the Colleges of Agriculture, Engineering and Science or Health Sciences.

S4F6 Repeating

The modules laid down in Rule S4F8 must be completed in two semesters. Candidates are not permitted to repeat any of the modules listed in Rule S4F8.

S4F7 Language Requirements

Based on their performance in a language test at the beginning of the year, students in the Foundation stream will be prescribed a language module that is most appropriate for their needs. The available modules are SCOM103(16) and SCOM113(16).

S4F8 Curriculum

The modules prescribed for the programme are listed below. Numbers in parentheses refer to foundation credits (F) + degree credits (D).
BIOL199(20F + 4D), CHEM199(20F + 4D), MATH199(36F + 4D)), PHYS199(20F + 4D), and either SCOM103(16D) or SCOM113(16D).

S4F9 Credits

(a)
(b)

The modules SCOM103 and SCOM113 carry 16 degree credits each (see S4F7 above).
The modules BIOL199, CHEM199, and PHYS199 carry 4 degree credits and 20 foundation credits each, while MATH199 carries 4 degree credits and 36 foundation credits. However, candidates will be awarded the degree credits only if they pass all four of these modules.

S4F10 Requirements for Continuation in the Faculty of Science and Agriculture

(a)

(b)

In order to be eligible to continue studying in an undergraduate programme in the Faculty of Science and Agriculture, a student must pass every module of the curriculum as specified in S4F8.

In order to be eligible to follow any curriculum in the M stream (see Rule SB3) of the Faculty of Science and Agriculture, a student must pass every module of the curriculum as specified in S4F8, obtain at least 60% in MATH199 and obtain an average over all modules of at least 60%.

S4F11 Completion of the Qualification

In order to complete a three-year qualification within the Faculty, students in the Foundation
stream must complete 384 degree credits and the 96 foundation credits specified in Rule S4F8. The 384 degree credits must satisfy the requirements of Rule SB1, AgMan2, AgBa2, BDiet3 or BHN3, whichever is appropriate.

S4F12 Transfers into Bachelor of Science in Agriculture

Students who transfer from the BSc4 into the BSc(Agric) must complete 512 degree credits and 96 foundation credits. These 512 degree credits must satisfy the requirements of Rule

Degree of Bachelor of Science in Agriculture

SAg1 Structure of the Degree

(@ The minimum duration for the qualification is 8 semesters.

(b) The qualification requires that a set of modules with a total credit value of at least 512
be passed, subject to the following conditions:
(i) atleast 96 credits shall be at each of Levels 1,2, 3 and 7;
(i) @ maximum of 160 credits shall be at Level 1;
(iii) a total of at least 224 credits shall be at Levels 2 and 3;
(iv) atotal of at least 224 credits shall be at Levels 3 and 7;

(c) Students may not proceed to any Level-7 module until they have obtained a total of at least 128 credits from Levels 2 and 3 including at least 64 credits at Level 3.

(d) Candidates will elect to undertake one of the programmes listed in Rule SAg2, where the actual modules required for the programme of study are given. All elective modules must be chosen in accordance with Rule SAg1(b) and require approval by the Dean.

SAg2 Programmes of Studies
The following tables give the programmes of study within the degree.

1.a. Agribusiness (Animal Science Stream)

Year 1

Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

Semester 2 BIOL102(16), BIOR118(8), CHEM120(16), COMP105(8), MATH143(8), PHYS133(8)

Year 2

Semester 1 AGEC210(16), 220(16), BMET210(16), Electives(16)
Semester 2 AGEC270(16), ANSI201(16), 202(16), Electives(16)
Year 3

Semester 1 AGEC380(16), ANSI332(16), 344(16), Electives(16)
Semester 2 AGEC370(16), ANSI318(16), 322(8), Electives(24)
Year 4

Semester 1 AGECT730(8), ANSI741(16), Electives(16)

Semester 2 AGECT740(16), ANSI718(16), Electives(16)
Year Modules AGBU790(40)

culture

Science & Agri

1.b. Agribusiness (Crop Science Stream)

Year 1

Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)
â\200\230Semester 2 BIOL102(16), BIOR118(8), CHEM120(16), COMP105(8), MATH143(8), PHYS133(8
)
Year 2

Semester 1 AGEC210(16), 220(16), BMET210(16), Electives(16)

Semester 2 AGEC270(16), AGPS200(16), Electives(32)

Year 3)

Semester 1 AGEC380(16), AGPS301(16), 305(16), 307(16)

Semester 2 AGEC370(16), AGPS304(8), 308(16), Electives(24)

Year 4

Semester 1 AGEC730(8), AGPS701(8), 711(8), Electives(24)

Semester 2 AGEC740(16), (AGPS710(16) or 712(16)), AGPS791(8), Elective(8)
Year Modules AGBU791(32)

1.c. Agribusiness (Horticultural Science Stream)

Year 1

Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)
Semester 2 BIOL102(16), BIOR118(8), CHEM120(16), COMP105(8), MATH143(8), PHYS133(8)
Year 2

Semester 1 AGEC210(16), 220(16), BMET210(16), Electives(16)

Semester 2 AGEC270(16), AGPS200(16), Electives(32)

Year 3

Semester 1 AGEC380(16), AGPS301(16), 307(16), Electives(16)

Semester 2 AGEC370(16), AGPS304(8), 308(16), Electives(24)

Year 4

Semester 1 AGEC730(8), AGPS701(8), 721(8), 723(8), 725(8), Elective(8)
Semester 2 AGEC740(16), AGPS720(8), 724(8), 726(8), 791(8)

Year Modules AGBU791(32)

2. Agricultural Economics

Year 1

Semester 1 BIOL101(16), ECON101(16), ISTN101(16), MATH133(16)

Semester 2 BIOL102(16), BIOR118(8), ECON102(16), ISTN102(16) or 103(16), MATH143(8)
Year 2

Semester 1 ACCT101(16), AGEC220(16), BMET210(16), ECON201(16)

Semester 2 ACCT102(16) or 103(16), AGEC270(16), ANSI202(16), ECON202(16)

Year 3

Semester 1 AGEC380(16), AGPS305(16), ECON330(16), 340(16) ECON360(16) or
Semester 2 AGEC370(16), ECON314(16), Electives(16) ECON311(16)
Year 4

Semester 1 AGECT730(8), BMET314(8), 316(8), STAT214(16)

Semester 2 AGEC740(16), Level-7 Electives(32)

Year Modules AGEC790(40)

3.a. Agricultural Plant Sciences (Crop Science Stream)

Year 1
Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)
Semester 2 BIOL102(16), BIOR118(8), 130(8), CHEM120(16), MATH143(8), PHYS133(8)
Year 2
Semester 1 AGEC210(16), BMET210(16), GENE240(16), SSCI212(8), (AMET210(16) or BIOL204(16))
Semester 2 AGPS200(16), 220(8), BIOC212(16), BMET222(16), MICR220(8)
Year 3
Semester 1 AGPS301(16), 303(8), 305(16), 307(16)
Semester 2 AGPS304(8), 306(16), 308(16), 320(16), SSCI320(16)
Year 4
Semester 1 AGPS701(8), 711(8), 713(16), Electives at Levels 3 or 7 (16) in either semester
Semester 2 AGPS710(16), 712(16), 791(8)
2

Year Modules

AGPS790(32)

3.b. Agricultural Plant Sciences (Horticultural Science Stream)

Year 1

Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

Semester 2 BIOL102(16), BIOR118(8), 130(8), CHEM120(16), MATH143(8), PHYS133(8)

Year 2

Semester 1 AGEC210(16), BMET210(16), GENE240(16), SSCI212(8), (AMET210(16) or BIOL204(16))
Semester 2 AGPS200(16), 220(8), BIOC212(16), BMET222(16), MICR212(8)

Year 3

Semester 1 AGPS301(16), 303(8), 305(16), 307(16)

Semester 2 AGPS304(8), 306(16), 308(16), 320(16), SSCI320(16)

Year 4

Semester 1 AGPS701(8) 64C from AGPS712(16), 720(8), 721(8),
Semester 2 AGPST724(8), 791(8) 723(8), 725(8), 726(8), 727(8), 728(8)
Year Modules AGPS790(32)

3.c. Agricultural Plant Sciences (Plant Breeding Stream)

Year 1

Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

Semester 2 BIOL102(16), BIOR118(8), 130(8), CHEM120(16), MATH143(8), PHYS133(8)
Year 2

Semester 1 AGEC210(16), BMET210(16), GENE240(16), SSCI212(8), (AMET210(16) or BIOL204(16))
Semester 2 AGPS200(16), 220(8), BIOC212(16), BMET222(16), MICR220(8)

Year 3

Semester 1 AGPS301(16), 303(8), 305(16), 307(16), GENE310(16)

Semester 2 AGPS304(8), 306(16), 308(16), (AGPS320(16) or SSCI320(16))

Year 4

Semester 1 AGPS701 (8), 711(8), 721(8), BMET710(8), GENE715(16), PPTH330(16)
Semester 2 AGPS730(16), Level-7 Elective (8)

Year Modules AGPS790(32)

4. Animal and Poultry Science

Year 1	
Semester 1	BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)
Semester 2	BIOL102(16), BIOR118(8), 130(8), CHEM120(16), MATH143(8), PHYS133(3)
Year 2	
Semester 1	AGEC210(16), BIOC201(16), BMET210(16), MPHY200(16)
Semester 2	ANSI201(16), 202(16), BMET222(16), BIOC212(16),
Year 3	
Semester 1	ANSI332(16), 344(16), GENE240(16), Electives(16)
Semester 2	ANSI318(16), 322(8), 370(16), GENE350(16), Elective(8)
Year 4	
Semester 1	ANSI703(16), 741(16), 742(16)
_Semester 2	ANSI324(8), ANSI718(16), Electives(24)
Year Modules	ANSI790(32)

-5. Microbiology

Year 1

-Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

-Semester 2 BIMI120(16), BIOR118(8), 130(8), CHEM120(16), Electives(16)

Year 2

-Semester 1 BIOC201(16), BMET210(16), MICR213(16), Electives(16)

-Semester 2 (BIOC212(16) or CHEM230(16)), MICR214(8), 220(8), RDNA202(16), 16C from

] (BMET222(16), CTEC233(16), ENVS211(16), PPTH214(16))

Year 3

Semester 1 | MICR305(16), 310(16), 320(16), Electives(16)

Semester 2 | MICR304(16), 360(16), Electives(32, at least 16 at Level 3 in either semester)

Year 4

Semester 1 MICR721(16), 723(16), Level-7 Electives(16)

Semester 2 MICR722(16), 724(16)

Year Modules MICR710(48)

6. Plant Pathology

Year 1

–Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

–Semester 2 BIMI120(16), BIOR118(8), 130(8), CHEM120(16), Electives(16)

Year 2

â\200\230Semester 1 | AMET210(16), BMET210(16), GENE240(16), SSCI217(16)

â\200\230Semester 2 | AGPS200(16), MICR220(8), PPTH214(16), Electives(24)

Year 3

Semester 1 MICR316(8), PPTH330(16), 40C from (AGPS301(16), 305(16), 307(16), BIOL321(16),

y Level-3 Elective(8))

Semester 2 AGPS308(16), PPTH310(8), 16C from (AGPS304(8), 306(16), BMET222(16)), Electives(24)

Year 4

Semester 1 PPTH730(16), 723(16), 745(16), 785(8), Elective(8)

Semester 2 PPTH713(16)

Year Modules PPTH750(48)

7. Soil Science

Year 1

Semester 1 BIOL101(16), CHEM110(16), MATH133(16), PHYS131(16)

Semester 2 BIOR118(8), 130(8), CHEM120(16), EART122(8), MATH143(8), PHYS133(8), Elective(8)

Year 2

Semester 1 AMET210(16), BMET210(16), SSCI217(16), Electives(16)

Semester 2 AGPS200(16), SSCI230(16), Electives(32)

Year 3

Semester 1 AGPS301(16), SSCI351(8), 371(8), Electives(32, at least 16 at Level 3)
Semester 2 SSCI320(16), 352(8), 372(8), Electives(32, at least 16 at Level 3)

Year 4

Semester 1 SSCI710(8), 760(8), Electives(16)

Semester 2 SSCI770(8), 780(8), Electives(16)

Year Modules SSCI793(48), 792(16)

SAg3 Transferability of Credits

Except with the permission of the Senate, candidates may not include among the 224 credits at Levels 3 and 7 prescribed in terms of Rule SAg1(b)(iv) credits for modules passed at another university, or for modules in a subject passed at equivalent level towards the requirements of a qualification in another faculty, unless they are specified in the progra

mme
or major in which the candidate is registered.

SAg4 Transfers into Bachelor of Science in Agriculture

In order for third year students to be eligible to transfer into a BSc(Agric) programme the y must
have passed at least 96 credits of level 3 modules specified in the relevant curriculum wit h a
credit weighted average of at least 60%. Acceptance into the BSc(Agric) programme will be
based on availability of positions and on academic merit.

Degree of Bachelor of Agricultural Management

AgMan{1 Structure of the Degree

In order to complete the degree, a student shall obtain not less than 384 credits and shall
complete the modules specified in Rule AgMan2.

AgMan2 Curriculum
The curriculum shall consist of the modules laid out in the table below.

Bachelor of Agricultural Management

Year 1

Semester 1 ACCT101(16), BIOL101(16), ECON101(16), MATH134(16)

semesterZ ACCT102(16) or 103(16), ECON102(16), MGNT102(16), STAT171(16)

ear 2

Semester 1 AGEN216(8), HRMG2HR(8), MARK2MK(8), SSCI217(16), (AGEC220(16) or
FINA201(16)), Elective(8)) â\200\230

Semester 2 ANSI202(16), ENTR2EN(8), SCMA20P(8), (AGEC270(16) or FINA202(16)), |
Electives(16) b |

Year 3

Semester 1 AGPS301(16), 303(8), 305(16), 24C or 32C from (AGEC380(16), AGPS307(16), ANSI344(16), 332(16), FINA311(16), 312(16), (HRMG3ER(16) and 3IE(16)), MGNT307(16), 315(16), SCMA301(16), Level-3 Elective(8))

Semester 2 AGEC370(16), 40 or 48C from (AGPS304(8), ANSI318(16), 322(8), 370(16), FINA321(16), (HRMG3CE(16) and 30D(16)), MGNT310(16), SCMA306(16), 311(16)), (Level-3 Elective(8) or Level-3 Electives(16))

Note: FINA201 and 202 options in Year 2 are only for students wishing to continue to BAgricMgt(Hons)(Commerce Stream), specializing in Finance.

AgMan3 Transferability of Credits

Students may not include among the 128 credits at Level 3 prescribed in terms of Rule AgMan2, credits for modules passed at another university, or for modules in a subject passed at equivalent level towards the requirements of a qualification in another faculty, unless they are specified in the programme or major in which the candidate is registered.

Degree of Bachelor of Agriculture in Agricultural Extension

AgBa1 Structure of the Degree

In order to complete the degree a candidate shall obtain not less than 384 credits and shall complete the modules specified in Rule AgBa2.

AgBa2 Curriculum

The curriculum shall consist of the modules laid out in the tables below.

Bachelor of Agriculture in Agricultural Extension

Year 1

Semester 1 | BIOL101(16), GEOG110(16), RRMG111(16), 16C from (CHEM110(16), ECON101(16), MATH133(16))

Semester2 | RRMG112(16), 48C from (BIOL102(16), BIOR118(8), 130 (8), EART122(8), ECON102(16), MATH143(8), STAT101(8), Elective(8))

Year 2

Semester 1 │ AGPS210(8), RRMG212(16), 40C from (AGEC210(16), 220(16), AMET210(16), , BIOL223(16), BMET210(16), SSCI217(16), Elective(8))

Semester2 │ AGPS200(16), RRMG222(16), 32C from (AGEC240(8), AGEC270(16), AGEN225(16), AGPS220(8), ANSI201(16), 202(16), , ENVS211(16), Elective(8))

Year 3

Semester 1│ RRMG312(16), RRMG370(16), 32C from (AGPS301(16), 303(8), 305(16), 307(16), Elective(8))

Semester2 │ RRMG350(32), 32C from (AGPS304(8), 308(16), ANSI318(16), 322(8), FDSC350(8), 360(3),
DRAM311(16), SSCI320(16), Elective(8))

AgBa3 Transferability of Credits

Except with the permission of the Senate, candidates may not include among the 128 credits at Level 3 prescribed in terms of Rule AgBa2 credits for modules passed at another university, or for modules in a subject passed at equivalent level towards the requirements of a qualification in another faculty, unless they are specified in the programme or major in which the candidate is registered.

Degree of Bachelor of Science in Dietetics

BDiet1 Structure of the Degree

In order to complete the degree a student shall obtain not less than 384 credits and shall complete the modules described in Rule BDiet3.

BDiet2 Additional Requirements

(@) In order to be awarded the degree, students need to complete either ZULN101 or have Matric Zulu at Standard Grade E or NSC Zulu at Level 3 or be fluent in Zulu as determined by School of isiZulu at UKZN.

(b) In terms of Section 61(1)(1)(iv A) of the Medical, Dental and Supplementary Health Service Professions Act (Act 56 of 1974), students must register with the Health Professions Council of South Africa, in their first year of study,

Note: Studentsâ\200\231 attention is drawn to implementation of the Statutory Compulsory Community Service for a one-year period upon completion of the BSc (Dietetics) and Postgraduate Diploma in Dietetics in order to register with the Health Professions Council of South Africa (applicable to South African citizens only).

BDiet3 Curriculum
The curriculum shall consist of the modules laid out in the table below.

Bachelor of Science in Dietetics (Pietermaritzburg)

Year 1

Semester 1 BIOL101(16), CHEM110(16), NUTR114(16), ZULN101(16) or Elective (16)
Semester 2 CHEM120(16), FSCI120(16), MGNT102(16), NUTR124(16)

Year 2

Semester 1 BIOC201(16), FSCI210(16), MPHY200(16), NUTR224(16)

Semester 2 BIOC212(16), DIET237(16), HPHY200(16), MICR214(8), STAT101(8)
Year 3

Semester 1 DIET311(8), 350(24), FSMT332(16), NUTR343(16)

Semester 2 DIET351(8), 360(24), FSMT333(16), NUTR342(16)

BDiet4 Transferability of Credits

Except with the permission of the Senate, candidates may not include among the 128 credits at Level 3 prescribed in terms of Rule BDiet3, credits for modules passed at another university, or for modules in a subject passed at equivalent level towards the requirements of a qualification in another faculty, unless they are specified in the programme or major in which the candidate is registered.

Degree of Bachelor of Science in Human Nutrition

BHN1 Structure of the degree

In order to complete the degree a student shall obtain not less than 384 credits and shall complete the modules described in Rule BHN3.

BHN2 Additional Requirements

In order to be awarded the degree, students need to complete either ZULN101 or have Matric Zulu at Standard Grade E or NSC Zulu at Level 3 or be fluent in Zulu as determined by School of isiZulu at UKZN.

BHN3 Curriculum
The curriculum shall consist of the modules laid out in the table below.

Bachelor of Science in Human Nutrition (Pietermaritzburg)

Year 1

Semester 1 BIOL101(16), CHEM110(16), NUTR114(16), ZULN101(16) or Electives(16)

Semester 2 CHEM120(16), FSCI120(16), MGNT102(16), NUTR124(16)

Year 2

Semester 1 BIOC201(16), FSCI210(16), MPHY200(16), NUTR224(16)

Semester 2 BIOC212(16), DIET237(16), HPHY200(16), MICR214(8), STAT101(8)

Year 3

Semester 1 DIET311(8), FSMT332(16), NUTR343(16), 24C from (PSYC302(8), 303(16), 304(16), SOCY330(16), RRMG370(16)), Level-3 Elective(8))

Semester 2 DIET351(8), FDSC350(16), FSMT333(16), NUTR342(16)

BHN4 Transferability of Credits

Except with the permission of the Senate, candidates may not include among the 128 credits at Level 3 prescribed in terms of Rule BHN3, credits for modules passed at another university, or for modules in a subject passed at equivalent level towards the requirements of a qualification in another faculty, unless they are specified in the programme or major in which the candidate is registered.

HONOURS DEGREES

Degree of Bachelor of Science Honours

SH1 Eligibility

(@) No student may be admitted for the degree of Bachelor of Science Honours until he or she:

(i) has a Bachelor of Science of the University or is a graduate of another recognized university who has been admitted to the status thereof; or

(if) is a person who has been admitted by permission of the Senate in terms of General Academic Rule GR7(b) as a candidate for the degree.

(b) In order to be accepted for an Honours degree, candidates must have a credit weighted average of at least 60% in the relevant Level-3 modules. This rule may be relaxed only with permission of the Dean and under exceptional circumstances. Many disciplines require a higher average or may restrict the number of entries due to the limited availability of places.

(c) Applicants may be subject to further selection as approved by the Board.

SH2 Structure of the Degree

In order to complete the degree, a student shall obtain not less than 128 credits. Of these at least 96 must be at Level 7. The remaining 32 must be at Level 7 or at Masters level.

SH3 Subject of Study

(a) A candidate for the degree shall pursue a programme of advanced study in a subject approved by the Senate.

(b) Except with the permission of the Senate, the subject of an Honours programme shall be one in which the student has completed, during the BSc curriculum, all prerequisite modules for entry into that Honours programme.

SH4 Additional Requirements

The Senate may require a candidate for the degree to complete one or more modules in addition to the modules prescribed for the Honours programme concerned.

SH5 Duration of Study

Except with the permission of the Senate, candidates for the degree shall be required to complete all requirements for the degree within four semesters, except that part-time students shall be required to complete all requirements for the degree within six semesters. Students who cannot meet these requirements shall be excluded.

SH6 Repeating

A student may repeat a failed module not more than once, except for the project modules listed below:

ACSC706, AGPS790, ANSI790, BIOC702, BIOL790, CHEM791, CHEM793, COMP700, ENVS730, GENE701, GEOL707, HYDR790, MATH702, MATH717, MICR710, PHYS704, PHYS709, PHYS731, PHYS732, PHYS760, PHYS761, PPTH750, SSCI793, STAT791.

SH7 Combinations

The following lists give the programmes of study within the degree of Bachelor of Science Honours. All elective modules must be chosen in accordance with Rule SH2 and require approval by the Academic Coordinator.

1. Animal and Poultry Science (Pietermaritzburg)

Prerequisites: Completion of a 3-year BSc programme in Animal Science or an appropriate major or programme approved by the Head of School with a credit-weighted average of at least 60% in the Level-3 modules.

Core: ANSI718(16), 730(16), 741(16), 742(16), 790(32).

Electives: 32C from 703(16), 770(16) or other relevant module in consultation with the Academic Coordinator

2. Applied Mathematics

Prerequisites: Completion of a major or programme in Applied Mathematics or equivalent approved by the Head of School with a credit-weighted average of at least 65% in the Level-3
Applied Mathematics modules.

a. Pietermaritzburg

Core: MATH702(16).

Electives: 112C from MATH730(16), 731(16), 732(16), 733(16), 734(16), 740(16), 741(16), 755(16), 765(16), 785(16) or other modules selected in consultation with the Academic Coordinator and approved by the Dean.

b. Westville

Core: MATH702(16).

Electives: 112C from Level-7 MATH. (Up to 32 of these credits may be replaced by Level-7 credits outside the School, selected in consultation with the Academic Coordinator and approved by the Dean.)

3. Applied Physics (Westville)

Prerequisites: Completion of a major or programme in Physics with a credit-weighted average of at least 60% in the Level-3 Physics modules.

Core: PHYS707(16), 708(16), 709(32), 787(16).

Electives: 48C chosen from PHYS760(8), 761(8), 762(8), 763(8), 765(8), 766(8), 768(8), 769(8), 770(8), 771(8), 772(8), 773(8), 775(8), 782(8), 786(8), 788(8).

Note: Up to 32C of the above Electives may be replaced by modules from the core of Physics honours or modules from another school, subject to the approval of the Head of School and the Dean.

4. Biochemistry

Prerequisites: Completion of a major or programme in Biochemistry with a credit-weighted average of at least 60% in the Level-3 Biochemistry modules.

a. Pietermaritzburg

Core: BIOC701(16), 702(48), 703(16), 705(16), 707(16), 710(16).

b. Westville

Core: BIMI701(16), BIOC702(48), 708(16), 709(16), 711(16), 713(16).

5. Biological Sciences

Prerequisites: Completion of a major or programme in the Biological Sciences with a credit-weighted average of at least 60% in 64C of the Level-3 Biological Sciences modules. Note that acceptance into the programme may depend on availability of places.

a. Pietermaritzburg

Core: BIOL701(16), 790(48).

Electives: 48C from BIOL721(16), 722(16), 723(16), 724(16), 726(16), 732(16), 733(16), 762(16), 763(16), 764(16) and a further 16C chosen freely from Level-7 modules within the School or Faculty.

b. Westville

Core: BIOL701(16), 790(48).

Electives: 48C from BIOL711(16), 712(16), 713(16), 715(16), 716(16), 731(16), 734(16), 741(16), 744(16), 745(16), 747(16), 748(16), 749(16), 750(16), 781(16), 782(16), 884(16) and a further 16C chosen freely from Level-7 modules within the School or Faculty.

6. Biometry (Pietermaritzburg)

Prerequisites: BMET314(8), BMET316(8) and completion of a major in Statistics each with a credit-weighted average of at least 65%.

Core: STAT714(16), 730(16), 740(16), 791(16). The project (STAT791) must be in Biometry.
Electives: 64C from STAT710(16), 711(16), 715(16), 719(16), 723(16), 752(8), 753(16), 754(16), 760(16).

7. Botany (Pietermaritzburg)

Prerequisites: Completion of a major or programme in the Biological Sciences with a credit-weighted average of at least 60% in the Level-3 Plant Sciences modules. Note that acceptance into the programme may depend on availability of places.

Core: BIOL701(16), 790(48).

Electives: 32C from BIOL726(16), 733(16), 762(16), 763(16), 16C from Level-7 modules within the School and a further 16C chosen from relevant Level-7 modules within the School or Faculty, selected in consultation with the Academic Coordinator and approved by the Dean.

8. Cellular Biology (Westville)

Prerequisites: Completion of a major or programme in Cellular Biology with a credit-weighted average of at least 60% in 64C of the Level-3 Biological Sciences modules. Note that acceptance into the programme may depend on availability of places.

Core: BIOL701(16), 790(48).

Electives: 32C from BIOL715(16), 731(16), 741(16), 744(16), 745(16), 747(16), 748(16), 749(16), 750(16), 16C from Level-7 modules within the School and a further 16C chosen from relevant Level-7 modules within the School or Faculty, selected in consultation with the Academic Coordinator and approved by the Dean.

9. Chemistry

Prerequisites: Completion of a major or programme in Chemistry with a credit-weighted average of at least 60% in the Level-3 Chemistry modules.

- a. Pietermaritzburg

Core: CHEM733(16), 743(16), 763(32), 793(48).

Electives: 16 credits chosen from CHEM753(8), CTEC733(8), 743(8).

b. Westville

Core: CHEM711(16), 721(16), 731(16), 741(16), 781(32), 791(32).

10. Computer Science (Pietermaritzburg, Westville)

Prerequisites: Completion of a major or programme in Computer Science with a credit-weighted average of at least 65% in the Level-3 Computer Science modules. Note that acceptance into the programme may depend on the availability of places.

Care: COMP700(32).

Electives: 64C of Computer Science modules at Level 7 plus 32C from the Faculty selected in consultation with the Academic Coordinator and approved by the Dean.

11. Crop Science (Pietermaritzburg)

Prerequisites: Completion of the BSc programme in Crop and Horticultural Sciences or an appropriate major with a credit-weighted average of at least 60% in the Level-3 modules.

Core: AGPS701(8), 710(16), 711(8), 712(16), 713(16), 790(32), 791(8).

Electives: 24C at Level 7 or 8 selected in consultation with the Academic Coordinator and approved by the Dean.

12. Ecological Sciences (General Stream)

Prerequisites: Completion of a major or programme in the Biological Sciences with a credit-weighted average of at least 60% in the Level-3 Biological and/or Environmental Science modules. Note that acceptance into the programme may depend on availability of places.

a. Pietermaritzburg

Core: BIOL701(16), 790(48).

Electives: 48C from BIOL721(16), 722(16), 723(16), 724(16), 726(16), 764(16) and a further 16C chosen from relevant Level-7 modules within the School or Faculty selected in consultation with the Academic Coordinator and approved by the Dean.

b. Westville

Core: BIOL701(16), 790(48).

Electives: 48C from BIOL711(16), 712(16), 713(16), 715(16), 716(16), 734(16), 781(16), 782(16), 884(16) and a further 16C chosen from relevant Level-7 modules within the School o
r
Faculty.

13. Ecological Sciences (Rangeland & Wildlife Conservation Stream) (Pietermaritzburg)
Prerequisites: Completion of a major or programme in Ecological Sciences or Grassland Science with a credit-weighted average of at least 60% in the Level-3 Biological and/or Environmental Science modules. Note that acceptance into the programme may depend on availability of places.

Core: BIOL701(16), 790(48).

Electives: 32C from (BIOL722(16), 723(16), 724(16), 725(16)), 16C from (BIOL721(16), 722(16), 723(16), 724(16), 726(16)) and a further 16C chosen from relevant Level-7 modules within the School or Faculty selected in consultation with the Academic Coordinator and approved by the Dean.

14. Entomology (Pietermaritzburg)

Prerequisites: Completion of a major or programme in the Biological Sciences with a credit-weighted average of at least 60% in the Level-3 Biological Sciences modules. Note that acceptance into the programme may depend on availability of places.

Core: BIOL701(16), 721(16), 726(16), 790(48).

Electives: 32C chosen from relevant Level-7 modules within the School or Faculty selected in consultation with the Academic Coordinator and approved by the Dean.

15. Environmental Science

The BSc Environmental Science Honours degree is a multidisciplinary qualification. Students registering for 48 credits or more in a single discipline (excluding the research project) should register in the discipline from which the majority of the course credits are derived.

a. Pietermaritzburg

Prerequisites: Completion of a major or programme in Environmental Science, Biology, Geography, Geology, Hydrology, Microbiology or Soil Science including at least 16C of MATH and 16C of CHEM, with a credit-weighted average of at least 60% in the Level-3 modules within their completed undergraduate degree. Acceptance is dependent on the availability of places.

Core: ENVS700(16), 730(48).

Electives: 64C chosen from AMET, BIOL, ENVS, GEOG, HYDR, MICR, or SSCI selected in consultation with the Academic Coordinator and approved by the Dean.

b. Westville

Prerequisites: Completion of a major or programme in Biological Sciences, Environmental Science, Geography or Geology including at least 16C of MATH and 16C of CHEM, with a credit-weighted average of at least 60% in the Level-3 modules.

Core: ENVS700(16), 730(48).

Electives: 64C including at least 32C from BIOL781(16), 782(16), ENVS708(16), 711(16), 712(16), 720(16), 741(16), 751(16), GEOG701(16), 727(16), 733(16), 735(16), 744(16), (not to exceed 32C in GEOG), GEOL712(16), or other modules from related disciplines in consultation with the Academic Coordinator and approved by the Dean.

16. Financial Mathematics (Westville)

Prerequisites: Completion of a programme in Actuarial Science with a credit-weighted average of at least 65% in the Level-3 modules. Candidates with other qualifications may be considered.

Core: ACSC706(16).

Electives: 112C from ACSC701(16), 702(16), 703(16), 704(16), 705(16), 707(16), 708 (16), (STAT713(16) or 721(16)).

17. Genetics (Pietermaritzburg)

Prerequisites: Completion of a major or programme in Genetics with a credit-weighted average of at least 60% in the Level-3 Genetics modules.

Core: GENE701(48), 703(16), 714(16), 715(16), 716(16).

Electives: 16C from: BIOL724(16), 733(16), GENE706(16), 718(16).

18. Geology (Westville)

Prerequisites: Completion of a major or programme in Geology with a credit-weighted average of at least 60% in the Level-3 core Geology modules. Limitations on student numbers may be imposed by available resources.

Core: GEOL706(16), 707(32).

Electives: 80C from GEOL701(16), 702(16), 703(16), 705(16), 708(16), 710(16), 711(16), 712(16), 713(16), 714(16), 715(16), 716(16), 717(16) or up to 16C of electives at Level 7 from related disciplines as approved by the Head of School and Dean.

19. Horticultural Science (Pietermaritzburg)

Prerequisites: Completion of the BSc programme in Crop and Horticultural Sciences or an appropriate major with a credit-weighted average of at least 60% in the Level-3 modules.

Core: AGPS701(8), 724(8), 790(32), 791(8).

Electives: 72C from AGPS712(16), 720(8), 721(8), 723(8), 725(8), 726(8), 727(8), 728(8). Up to 16C of other Level-7 or -8 modules may be selected in consultation with the academic coordinator and approved by the Dean.

20. Hydrology (Pietermaritzburg)

Prerequisites: Completion of a major or programme in Hydrology with a credit-weighted average of at least 60% in the Level-3 Hydrology modules.

Core: HYDR710(16), 720(16), 725(16), 790(32), 795(32).

Electives: 16C at Level 7 selected in consultation with the Academic Coordinator and approved by the Dean.

21. Industrial and Applied Biotechnology (Pietermaritzburg)

Prerequisites: Completion of the Industrial and Applied Biotechnology programme with a credit-weighted average of at least 60% in Level-3 Microbiology modules.

Core: CTECT733(8), 773(8), MICR710(48), 721(16), 722(16), 723(16), 724(16).

22. Industrial Mathematics (Westville)

Prerequisites: Completion of a major or programme in Applied Mathematics with a credit-weighted average of at least 65% in the Level-3 Applied Mathematics modules.

Core: MATH702(16), 778(16), 792(16), 793(16), 794(16).

Electives: 48C from MATH783(16), 785(16), 786(16), 795(16), 796(16), STAT721(16).

23. Marine Biology (Westville)

Prerequisites: Completion of a major or programme in Biological Sciences with a credit-weighted average of at least 60% in 64C of the Level-3 Biology and Conservation Sciences modules. Note that acceptance into the programme may depend on availability of places.
Core: BIOL701(16), 781(16), 782(16), 784(16), 790(48), 884(16).

24. Mathematics

Prerequisites: Completion of a major or programme in Mathematics with a credit-weighted average of at least 65% in the Level-3 Mathematics modules.

a. Pietermaritzburg

Core: MATH710(16), 717(16), 721(16), 751(16).

Electives: 64C from MATH720(16), 730(16), 740(16), 762(16), 763(16), 780(8) or other modules from Statistics, Applied Mathematics or Computer Science, selected in consultation with the Academic Coordinator and approved by the Dean.

b. Westville

Core: MATH701(16), 717(16), 785(16).

Electives: 80C from Level-7 MATH. (Up to 32 of these credits may be replaced by Level-7 credits outside the School, selected in consultation with the Academic Coordinator and approved by the Dean.)

25. Microbiology

Prerequisites: Completion of a major or programme in Microbiology with a credit-weighted average of at least 60% in the Level-3 Microbiology modules.

a. Pietermaritzburg

Core: MICR710(48), 721(16), 722(16), 723(16), 724(16).

Electives: 16C chosen at Level 7 or 8 selected in consultation with the Academic Coordinator and approved by the Dean.

b. Westville

Core: BIMI701(16), MICR710(48), 711(16), 712(16), 713(16), 719(16).

26. Physics

a. Pietermaritzburg

Prerequisites: Completion of a major or programme in Physics with a credit-weighted average of at least 60% in the Level-3 Physics modules.

Core: PHYS711(32), 731(16), 732(16), 742(16),

Electives: PHYS721(16), 752(32), or up to 32C of modules from another school, subject to the approval of the Head of School and the Dean.

b. Westville

Prerequisites: Completion of a major or programme in Physics with a credit-weighted average of at least 60% in the Level-3 Physics modules. Students without Level-3 Mathematics will be required to take PHYS769.

Core: PHYS701(16), 702(16), 703(16), 704(16)

Electives: 64C chosen from PHYS760(8), 761(8), 762(8), 763(8), 765(8), 766(8), 768(8), 769(8), 770(8), 771(8), 772(8), 773(8), 775(8), 782(8), 786(8), 788(8).

Note: Up to 32C of the above Electives may be replaced by modules from the core of Applied Physics honours or modules from another school, subject to the approval of the Head of School and the Dean.

27. Plant Pathology (Pietermaritzburg)

Prerequisites: Completion of a major or programme in Plant Pathology with a credit-weighted average of at least 60% in the Level-3 Plant Pathology modules.

Core: PPTH730(16), 745(16), 750(48), 785(8).

Electives: PPTH713(16) or 723(16) plus 24 other credits selected in consultation with the Academic Coordinator and approved by the Dean.

28. Soil Science (Pietermaritzburg)

Prerequisites: Completion of a major or programme in Soil Science with a credit-weighted average of at least 60% in the Level-3 Soil Science modules.

Core: SSCI710(8), 760(8), 770(8), 780(8), 792(16), 793(48), 794(16).

Electives:16C at Level 7 or 8 selected in consultation with the Academic Coordinator and

| approved by the Dean.

29, Statistics

Prerequisites: Completion of a major or programme in Statistics with a credit-weighted

average of at least 65% in the Level-3 Statistics modules.

- a. Pietermaritzburg

- Core: STAT714(16), 730(16), 740(16), 791(16).

Electives: 64C from STAT710(16), 711(16), 715(16), 719(16), 723(16), 752(16), 753(16),

- 754(16), 760(16) or up to 32C from another discipline recommended by the Head of School and approved by the Dean.

b. Westville

- Core: STAT791(16).

â\200\231 Electives: 112C from STAT711(16), 712(16), 713(16), 714(16), 715(16), 716(16), 717(16),
718(16), 719(16), 721(16), 723(16), ACSC701(16), 703(16), 704(16), 707(16), 708(16) or up

to 32C from another discipline recommended by the Head of School and approved by the Dean.

30. Zoology (Pietermaritzburg)

Prerequisites: Completion of a major or programme in Zoology with a credit-weighted average of at least 60% in the Level-3 Biology and Conservation Sciences modules. Note that acceptance into the programme may depend on availability of places.

Core: BIOL701(16), 790(48).

Electives: 32C from (BIOL724(16), 726(16), 732(16), 764(16)), 16C from Level-7 modules within the School and a further 16C chosen from relevant Level-7 modules within the School or Faculty.

SH8 Transferability of Credits

Students may not include among the 128 credits prescribed in terms of Rule SH2 credits for modules in a subject passed at equivalent level towards the requirements of a qualification obtained in another Faculty or for modules passed at another university, except with the permission of the Senate.

Degree of Bachelor of Agriculture (Honours)

AgBah1 Eligibility

The following candidates shall be eligible to apply to register for the Bachelor of Agricul ture

Honours:

(a) A holder of a Bachelor of Agriculture degree with a credited-weighted average of at lea st
60% across third year modules.

(b) A holder of a Bachelorâ\200\231s Degree from a recognised university or a person who ha s been
admitted to the status thereof, and who has obtained a credit weighted average of at least 60% across the relevant final year modules in Agriculture or Rural Development.

(c) A person admitted by permission of the Senate under General Academic Rule GR7(b).

AgBah2 Subject of study

(a) A candidate for the degree shall pursue a programme of advanced study in a subject approved by the Senate.

(b) Except with the permission of the Senate, the subject of an Honours programme shall be one in which the student has completed all prerequisite modules for entry into the Honours programme.

AgBah3 Additional Requirements

The Senate may require a candidate for the degree to complete one or more modules in addition to the modules prescribed for the Honours programme concerned.

AgBah4 Repeating of Failed Modules

A student may repeat a failed module not more than once, except for the project module RRMG 730.

AgBah5 Duration

Except with the permission of the Senate, candidates for the degree shall be required to complete all requirements for the degree within four semesters, except that part-time stude nts
shall be required to complete all requirements for the degree within six semesters. Student s
who cannot meet these requirements shall be excluded.

AgBah6 Curriculum

The modules prescribed for the degree are listed below (128C) (numbers in parentheses refer to credits).
Core modules: RRMG700(16), 710(32), 711(16), 712(16), 730(48).

Degree of Bachelor of Agricultural Management (Honours)

AgMh1 Eligibility

(@) No student may be admitted for the degree of Bachelor of Agricultural Management Honours until he or she:

(i) has a Bachelor of Agricultural Management of the University or is a graduate of another recognized university who has been admitted to the status thereof; or

(i) is a person who has been admitted by permission of the Senate in terms of General Academic Rule GR7(b) as a candidate for the degree.

(b) In order to be accepted for the degree, candidates must have a credit weighted average of at least 60% in the relevant Level-3 modules. This rule may be relaxed only with permission from the Dean and under very special circumstances.

() Applicants may be subject to further selection as approved by the Board.

AgMh2 Additional Requirements

- The Senate may require a candidate for the degree to complete one or more modules in ˜ addition to the modules prescribed for the programme.

AgMh3 Repeating of Failed Modules

A student may repeat a failed module not more than once, except for the project modules AGEC790, AGEC791, AGPS790 and ANSI790.

AgMh4 Duration of Study

Except with the permission of the Senate, candidates for the degree shall be required to complete all requirements for the degree within four semesters, except that part-time students shall be required to complete all requirements for the degree within six semesters. Students who cannot meet these requirements shall be excluded.

AgMh5 Curriculum

The curriculum shall consist of one of the following combinations of modules (128C) (numbers

in parentheses refer to credits):

(@) Commerce Stream: AGEC730(8), 740(16), 790(40), together with 64 credits at Level 7 selected in consultation with the Academic Coordinator and approved by the Dean, of which 48 must be chosen from the Faculty of Management Studies; or

(b) Production Stream: AGEC730(8), 740(16), 791(32), (AGPS790(32) or ANSI790(32)), together with 40 credits at Level 7 selected in consultation with the Academic Coordinator and approved by the Dean.

POSTGRADUATE DIPLOMAS

Postgraduate Diploma in Community Nutrition

AgCN1 Eligibility

The following candidates shall be eligible to apply to register for the Postgraduate in

Community Nutrition:

(@) a holder of a Bachelor of Science in Human Nutrition or a graduate of another recognized university who has been admitted to the status thereof; or

(b) a person admitted by permission of the Senate under General Academic Rule GR7(b) to register for the Diploma.

Students shall produce a certificate of completed Hepatitis B immunisations.

AgCN2 Repeating of failed modules

A student who has passed at least 80 credits and has attained a mark of at least 40% for each of the remaining modules shall be permitted to repeat the failed modules (each module once only), which must be completed within the following two semesters. In the case of field placement, this is contingent on there being a position for such a placement.

AgCN3 Exclusion

Students shall be excluded if they:

(a) fail any module with a mark of less than 40%; or

(b) fail more than 72 credits; or

(c) fail on repeating a module; or

(d) fail to complete the Diploma within four successive semesters for full-time students or six successive semesters for part-time students.

AgCN4 Duration

To qualify for the Diploma, students shall complete a programme of eleven months duration at |
accredited community placements in KwaZulu-Natal recognised by the University and |
complete the modules listed in Rule AgCN5.

AgCNS Curriculum

The modules prescribed for the Diploma are listed below (152C) (numbers in parentheses |
refer to credits). â\200\230
Core modules: NUTR711(48), 730(8), 741(32), PODS701(32).

Elective modules: 32C from FDSC700(16), 720(8), 730(8), NUTR720(16).

Postgraduate Diploma in Dietetics

AgP1 Eligibility
Ehe following candidates shall be eligible to apply to register for the Postgraduate Diploma in f
ietetics: :

(a) aholder of a Bachelor of Science in Dietetics or a graduate of another recognized university who has been admitted to the status thereof; or

(b) a person admitted by permission of the Senate under General Academic Rule GR7(b) to register for the Diploma.

Note: Students shall submit a certificate of registration with the Health Professions Counc il of
South Africa when applying for admission into the Postgraduate Diploma in Dietetics.

Students shall produce a certificate of completed Hepatitis B immunisations.

AgP2 Repeating of Failed Modules

A student who has passed at least 96 credits and has attained a mark of at least 40% for ea ch
of the remaining modules shall be permitted to repeat the failed modules (each module once only), which must be completed within the following two semesters. In the case of field placement, this is contingent on there being a position for such a placement.

AgP3 Exclusion

Students shall be excluded if they:
(a) fail any module with a mark of less than 40%:; or
(b) fail more than 80 credits; or
(c) fail on repeating a module; or
(d) fail to complete the Diploma within four successive semesters for full-time students or six successive semesters for part-time students.

AgP4 Duration

To qualify for the Diploma, students shall complete a programme of eleven months duration a t
accredited community placements in KwaZulu-Natal recognised by the University and complete the modules listed in Rule AgP5.

AgP5 Curriculum

The modules prescribed for the Diploma are listed below (176C) (numbers in parentheses refer to credits).
DIET711(64), FSMT711(32), NUTR711(48), 741(32).

Postgraduate Diploma in Food Security

AgF1 Eligibility
The following candidates shall be eligible to apply to register for the Postgraduate Diplom a in
Food Security:
(a) any holder of a relevant Bachelors Degree of the University or a graduate of another recognized university who has been admitted to the status thereof: or
(b) a person who has been admitted by permission of the Senate in terms of General Academic Rule GR7(b) as a candidate for the diploma.
Note: The relevance of the qualifications offered shall be determined by the Board of the Faculty.

AgF2 Duration

(@) Except with the permission of the Senate, candidates for the Diploma shall be required to complete all components of the degree within two consecutive semesters, except that part-time students shall be required to complete all components within four consecutive semesters.

(b) Students who cannot meet these requirements shall be excluded.

AgF3 Curriculum

The modules prescribed for the Diploma are listed below (128C) (numbers in parentheses refer to credits).

Core Modules: FDSC700(16), FDSC760(8), (FDSC701(40) or 711(40)), FDSC715(8), PODS601(32), RRMG712(16).

Electives: 8C from FDSC720(8), 730(8), 755(8).

Postgraduate Diploma in Rural Resource Management

AgRp1 Eligibility

The following candidates shall be eligible to apply to register for the Postgraduate Diploma in

Rural Resource Management:

(a) A holder of a Bachelorâ\200\231’s Degree from a recognised university or a person who has been admitted to the status thereof, and who has obtained a credit weighted average of at least 60% across the final year modules in one or more of the following areas of focus

(i) Agricultural/Rural Development including subjects such as: Community Extension, Community Development/Resource Management, Sociology

(i) Natural Resource Management including such subjects as: Environmental Management & Geography

(i)˜ Small Enterprise Development including such subjects as: Development Economics, Commerce, Organizational Management, Project Management, Strategic Management, or

(b) aperson admitted by permission of the Senate under General Academic Rule GR7(b).

AgRp2 Duration

Except with the permission of the Senate, candidates for the Diploma shall be required to complete all components of the Diploma within two consecutive semesters, except that part-time students shall be required to complete all components with four consecutive semesters. Students who cannot meet these requirements shall be excluded.

AgRp3 Curriculum

The modules prescribed for the Diploma are listed below (128C) (numbers in parentheses refer to credits).

Core modules: GEOG726(16), 733(16), 735(16), RRMG700(16), 710(32), 712(16).

Elective modules: 16C at Level 7 (not from RRMG) selected in consultation with the Academic Coordinator and approved by the Dean.

MASTERS DEGREES

General Rules for Masters Degrees

SM1 Degrees Offered

The following degrees are offered with the Faculty:

Master of Science (either by Coursework or by Research)

Master of Science in Agriculture (either by Coursework or by Research)
Master of Agricultural Management

Master of Agriculture

Master of Science in Dietetics

Master of Science in Human Nutrition

Master of Environment and Development

Master of Environmental Management

Master of Marine and Coastal Management

SM2 Eligibility

(@)

(b)

(c)
(d)

The following candidates shall be eligible to apply to register for Masters degrees in the

Faculty of Science and Agriculture

() a holder a relevant qualification of the University or a graduate of another recognized university who has been admitted to the status thereof under General Academic Rule GR7(a). The relevant qualifications are listed separately under the specific rules for each Masters degree.

(i) a person who has been admitted by permission of the Senate in terms of General Academic Rule GR7(b) as a candidate for the degree.

Except with the permission of the Faculty Higher Degrees Committee, applicants

registered under (a)(i) above, must have a credit weighted average of at least 60% in the

relevant qualification.

Additional requirements are listed under the rules for the specific qualification.

Applicants may be subject to further selection as approved by the Board of the Faculty.

SM3 Additional Requirements

(@)
(b)

The Senate may require candidates for the degree to take modules in any prescribed subject in addition to those that are normally prescribed for the degree.

Any corequisite or prerequisite modules, specified to meet deficiencies in the candidateâ

\200\231s
prior training, will not be included in the calculation of the award of a degree cum laude or
summa cum laude.

SM4 Duration of Study

(a)

No student who has been registered for the degree for less than two semesters shall be eligible for the award of the degree.

(b) Full-time students who after six semesters have not completed the requirements for the degree may be refused permission to renew their registration.

(c) Part-time students who after ten semesters have not completed the requirements for the degree may be refused permission to renew their registration.

(d) Students are expected to be registered for each consecutive semester until they have completed the degree. They may, however apply for suspension of registration. Normally this will be granted only once.

(e) Students who fail to register in a particular semester and have not been granted a suspension of registration will not be granted the degree unless and until they have done so0 and paid the outstanding fees retrospectively.

SM5 Oral examinations

The examiners may require students to present themselves for oral questioning, in addition to such other examination as may be prescribed by the Senate.

SM6 Dissertation

Every dissertation shall be submitted in the manner prescribed in the general academic rules and required by the Faculty guidelines, which may be changed from time to time.

SM7 Completion of the Degree

In order to qualify for the degree, students are required to obtain at least 50% for all components (individual modules and dissertation/thesis) of the degree separately.

Rules for Specific Masters Degrees

Degree of Master of Science by Coursework

SMC1 Relevant Qualification for Eligibility

For the degree of Master of Science by Coursework in a subject, the relevant qualification for entry in terms of Rule SM2(a)(i) is an Honours degree in an appropriate subject (as recommended by the Head of School and approved by the Dean).

SMC2 Combinations

The following lists give the programmes of study within the degree of Master of Science by Coursework. Numbers in parentheses refer to credits.

1. Environmental Science (Westville)

Core: ENVS800(64).

Electives: A minimum of 48C at Level 8 from ENVS810(16), 813(16), 814(16), 815(16), 817(16). Up to 16C credits chosen from ECONSEN(16) or relevant Level 8 elective(s).

2. Environmental Science (Pietermaritzburg)

Core: ENVS800(64), 810(16), 817 (16), HYDR820(16), HYDR825(16).

Degree of Master of Science by Research

SMR1 Relevant Qualification for Eligibility

For the degree of Master of Science by Research, the relevant qualification for entry in terms of Rule SM2(a(i) is an Honours degree in an appropriate subject.

SMR2 Curricula

The degree of Master of Science by Research will be offered in all areas of study within the Faculty.

Degree of Master of Science in Agriculture by Coursework

SMAC1 Relevant Qualification for Eligibility

For the degree of Master of Science in Agriculture by Coursework, the relevant qualification for entry in terms of Rule SM2(a)(i) is a Bachelor of Science in Agriculture.

SMAC2 Combinations

The following lists give the programmes of study within the degree of Master of Science in Agriculture by Coursework. Numbers in parentheses refer to credits.

1. Agricultural and Environmental Instrumentation (Pietermaritzburg):

Core: AMET869(64).

Electives: 64C from AMET860(8), 861(8), 862(8), 863(8), 864(8), 865(8), 866(8), 867(8), or other modules selected in consultation with the Academic Coordinator and approved by the Dean.

Degree of Master of Science in Agriculture by Research

SMAR1 Relevant Qualification for Eligibility

For the degree of Master of Science in Agriculture by Research, the relevant qualification for entry in terms of Rule SM2(a)(i) is a Bachelor of Science in Agriculture.

SMAR2 Curricula

The degree of Master of Science in Agriculture will be offered in all areas of agriculture within the Faculty.

Degree of Master of Agricultural Management

SMAM1 Relevant Qualification for Eligibility

For the degree of Master of Agricultural Management, the relevant qualification for entry: in terms of Rule SM2(a)(i) is the Bachelor of Agricultural Management (Honours).

SMAM2 Curricula

The degree of Master of Agricultural Management will be entirely by research.

Degree of Master of Agriculture

SMA1 Relevant Qualification for Eligibility

For the degree of Master of Agriculture, the relevant qualifications for entry in terms of Rule SM2(a)(i) are a Bachelor of Agricultural (Honours) or a Postgraduate Diploma in Agriculture.

SMA2 Curriculum

The following lists give the programmes of study within the degree of Master of Agriculture.

1. Agricultural Extension and Rural Resource Management (Pietermaritzburg)
This programme is purely by research.

2. Food Security (Pietermaritzburg)

Core: FDSC800(16), 811(64), 840(16).

Electives: 32C from FDSC860(16), 870(16) or 880(16), or other relevant modules at Level 8 selected in consultation with the Academic Coordinator/s and approved by the Dean.

Degree of Master of Science in Dietetics
and
Degree of Master of Science in Human Nutrition

SMD1 Relevant Qualification for Eligibility

For the degrees of Master of Science in Dietetics or Master of Science in Human Nutrition, the relevant qualifications for entry in terms of Rule SM2(a)(i) are a Bachelor of Science in Dietetics or Human Nutrition (respectively) and a Postgraduate Diploma in Dietetics or in Human Nutrition (respectively).

SMD2 Additional Requirements

In addition to the requirements of SDM1 students must have obtained their Postgraduate Diploma having passed all modules on the first attempt with a credit weighted average of 60 %, inclusive of a minimum module mark of 60% in NUTR741.

Degree of Master of Environment and Development

SMED1 Relevant Qualification for Eligibility
For the degree of Master of Environment and Development, the relevant qualification for entry

in terms of Rule SM2(a)(i) is a Bachelor of Science Honours in Environmental Science or any other Honours degree deemed relevant by the Dean.

SMED2 Rules of Combination

Students will elect to undertake one of the streams for which the rules of combination follow
(numbers in parentheses refer to credits):

1. Environmental Management Stream (128C)
EDEL802(16), 805(16), 851(16), 860(16), 890(64).

2. Protected Area Management (128C)
Core: PAMT811 (16), PAMT812 (8), PAMT813 (16), PAMT814 (16), PAMT890 (64)
Electives: 8C from PAMT815 (8), PAMT817 (8) or PAMT818 (8)

In 2010 this programme is open only for continuing students

Degree of Master of Environmental Management

SMEM1 Relevant Qualification for Eligibility

For the degree of Master of Environment Management, the relevant qualification for entry in terms of Rule SM2(a)(i) is a Bachelor of Science Honours in Environmental Science or any other honours degree deemed relevant by the Dean.

SMEM2 Curriculum

In order to complete the degree, a student shall complete the following modules (128C)
(Numbers in parenthesis refer to credits):

Core: ENVS800(64), 814(16), 815(16)

Options: Any two from ECONBEN(16), ENVS810(16), 813(16), 817(16).

Degree of Master of Marine and Coastal Management

SMMC1 Relevant Qualification for Eligibility

For the degree of Master of Marine and Coastal Management, the relevant qualification for entry in terms of Rule SM2(aj)(i) is a Bachelor of Science Honours in Biological Science or any other honours degree deemed relevant by the Dean.

SMMC2 Curriculum

The coursework Master of Marine and Coastal Management requires the completion of approved graduate modules and a research dissertation. The four coursework modules will be negotiated with each student individually, and will depend on his or her prior learning (qualifications and experience). In particular, three areas of competency are sought: 1) research skills; 2) marine and coastal science; and 3) environmental management, theory and practice. The following list gives the programmes of study within the degree of Master of Marine and Coastal Management (128C). Numbers in parentheses refer to credits.

BIOL880(64), at least 32 credits chosen from BIOL884(16), ECONSPE(16), LAWS8OL(16) and up to 32 credits chosen from BIOL781(16), 782(16), GEOL712(16) or other modules recommended by the Academic Coordinator and approved by the Dean.

DOCTORAL DEGREES

Degree of Doctor of Philosophy

SD1 Eligibility

The following candidates shall be eligible to apply to register for the degree of Doctor of Philosophy in the Faculty:

(a) any Masters graduate in areas of specialisation in the Faculty of Science and Agriculture or a graduate of another recognized university who has been admitted to the status thereof;

(b) any graduate with an Honours degree or Bachelor of Science in Agriculture in areas of specialisation in the Faculty of Science and Agriculture or a graduate of another recognized university who has been admitted to the status thereof: and whom the Senate has exempted from the Masters assessment; or

(c) a person who has been admitted by permission of the Senate in terms of General Academic Rule GR7(b) as a candidate for the degree.

(d) Candidates, registered for a research Masters degree in the Faculty, who have completed the requirements for the Masters degree, may apply to have their registration converted to a Doctor of Philosophy (PhD) registration before the Masters degree is awarded. The time allowed for the PhD would be reduced by two semesters. The material from the Masters dissertation may then be used towards the PhD. If the PhD is not completed, the Masters degree will be awarded.

(e) Candidates, registered for a research Masters degree in the Faculty, who have produced research results deemed to be suitable for a Doctor of Philosophy degree, may, under Rule GR7b, apply to have their registration upgraded to a Doctor of Philosophy (PhD) registration before the Masters degree is awarded. This request must be accompanied by:

) a document completed by the candidate detailing progress made to date and outlining future development,

ii) publications from the research,

iii) a written recommendation by the supervisor and Head of School, and

iv) a written recommendation by an assessor, who is appointed by the Higher Degree and Research Committee. The total minimum registration for the PhD shall not be less than six semesters after admission to the Honours status or after the completion of a four year degree, which grants direct admission to a Master's degree. Registration may not subsequently revert to Masters.

SD2 Continuity of Registration

(a) Students are expected to be registered for each consecutive semester until they have completed the degree. They may, however apply for suspension of registration. Normally this will be granted only once.

(b) Students who fail to register in a particular semester and have not been granted a suspension of registration will not be granted the degree unless and until they have done so and paid the outstanding fees retrospectively.

SD3 Thesis

Every thesis shall be submitted in the manner prescribed in the general academic rules and required by the Faculty guidelines, which may be changed from time to time.

SD4 Additional requirements

The Senate may require candidates for the degree to take modules in any prescribed subject in addition to the required thesis.

Degree of Doctor of Science
and
Degree of Doctor of Science in Agriculture

SS1 Eligibility
The following candidates shall be eligible to apply to register for the degree;
(a) Doctor of Science:

(i) aholder of a Doctor of Philosophy in the disciplines of Science of the University or a graduate of another university who has been admitted to the status thereof, of at least two yearsâ\200\231 standing;

(i) a holder of a Master of Science of the University or a graduate of another university who has been admitted to the status thereof, of at least four yearsâ\200\231 standing;

(i) a holder of a Bachelor of Science Honours of the University or a graduate of another university who has been admitted to the status thereof, of at least ten yearsâ\200\231 standing.

(b) Doctor of Science in Agriculture:

(i) a holder of a Doctor of Philosophy in the disciplines of Agriculture of the University or a graduate of another university who has been admitted to the status thereof, of at least two yearsâ\200\231 standing;

(i) a holder of a Master of Science in Agriculture of the University or a graduate of another university who has been admitted to the status thereof, of at least four years'â\200\231 standing;

(i) a Bachelor of Science in Agriculture of the University or a graduate of another university who has been admitted to the status thereof, of at least ten years' standing.

Â§S2 Application

An intending candidate for the degree shall first submit in writing, for the approval of th e Board
of the Faculty, a statement of the subject and scope of the work to be presented for the de gree
and evidence of their relevant academic qualifications and published research.

S$83 Composition of the Thesis

(a) A candidate for the degree shall be required to present six bound copies of a thesis or published work which shall be a record of original and independent research carried out by the candidate on some subject falling within the recognised disciplines of Agriculture or Science, represented in the Faculty of Science and Agriculture.

(b) A thesis may include or consist wholly of copies of publications by the candidate (whet her
of single or multiple authorship), in which case it should contain a commentary relating the publications to the field of research covered by the thesis.

(c) Candidates may also submit any relevant books of which they are author or co-author, with a statement of which of these, if any, they desire to be examined.

S$S4 Standard

No thesis or published work shall be accepted which is not a work of distinction in its fie ld and
a substantial contribution to the advancement of learning.

SS5 Recognition of the University

A thesis accepted by the University and subsequently published as a monograph shall bear the inscription: â\200\234Thesis approved for the degree of Doctor of Science of the Univer sity of
KwaZulu-Natalâ\200\231 or â\200\234Thesis approved for the degree of Doctor of Science in A griculture of the
University of KwaZulu-Natalâ\200\235.

Syllabus 111

Introduction to the Syllabus Section
How to Understand a Syllabus

In order to understand the syllabus section that follows, consider the following example:

Electromagnetism, Waves and Modern Physics

PHYS120 P2 W2 (39L-9T-36P-0S-54H-15R-0F-0G-7A-13W-16C)
Prerequisite requirements: 40% in PHYS110 or 60% in PHYS131.

Corequisite: MATH140.

Aim: Introduction to electromagnetism, waves, physical optics and modern physics.

Content: Electricity and Magnetism: charge, Coulomb’s law, electric field, Gauss’ law, electric potential, capacitance, resistance, Ohm’s law, dc circuits, Kirchhoff’s rules, ammeters, voltmeters, AmpÃ©re’s law, Faraday’s law, inductance. Waves: transverse, longitudinal, travelling, standing, beats, Doppler effect. Physical Optics: interference, diffraction, polarisation. Modem physics: photoelectric effect, Bohr model of hydrogen atom, nucleus, radiation, elementary particles, aspects of astronomy and cosmology.
Assessment: Class tests (25%), practical reports (5%), 3 h theory exam (50%), 2 h practical exam (20%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals

Credit may not be obtained for both PHYS120 and PHYS196.

The title is Electromagnetism, Waves and Modern Physics

The code PHYS120 P2 W2 shows that the syllabus is in Physics (â\200\230PHYSâ\200\235) and that it is at Level 1. The 2 & 0 have no special significance. P2 and W2 show that it is offered in semester 2 at Pietermaritzburg and Westville. Similarly W1 would show it is offered in semester 1 in Westville. Other codes are B if the module is offered in both semesters, C if it may be offered in either the first or second semester, Y if it is a year-long module, and V if it is offered in the Winter vacation. Thus, for example, GEOL304 WV is a Westville module in Geology in 31 year during the Winter vacation.

The notional study hours
(39L-9T-36P-0S-54H-15R-0F-0G-7A-13W-16C)
are interpreted as follows:

39L means 39 hours of lectures, i.e. 52 lectures of 45 minutes

9T means 9 hours of tutorials 36P means 36 hours of practicals

0S means 0 hours of seminars 54H means 54 hours of self-study

15R means 15 hours of revision OF means 0 hours of field attachments

0G means 0 hours for problem based groups 7A means 7 hours of assessment (formal tests and exams)

13W means the module runs for 13 weeks 16C means the module is worth 16 credits.

The meanings of â\200\234prerequisiteâ\200\235, â\200\234corequisiteâ\200\235 and â\200\234DP requirementsâ\200\235 are explained in the definitions at the beginning of the handbook. It is assumed that no explanation is needed for

â\200\230aimsâ\200\235, â\200\234contentâ\200\235 etc.

SYLLABI

Actuarial Science

Offered in the School of Statistics & Actuarial Science

Financial Mathematics

ACSC200 W1 (78L-72T-0P-0S-130H-26R-0F-0G-14A-13W-32C)
Prerequisite Requirement: ACSC100 (to be passed at the first attempt with at least 65%), MATH140, STAT140.
Aim: To cover the course material for subject CT1 as prescribed by the Institute of Actuaries.

Content: Compound and simple interest, annuities certain and annuities due. Discounted cash flow problems.
Valuation of securities. Term structure models. Stochastic interest rate models.

Assessment: Continuous assessment (20%), 3 h exam (80%).

DP Requirement: 40% Class mark, 80% attendance at tutorials.

Actuarial Mathematics

ACSC210 W2 (39L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Modules: ACSC200, STAT230.

Aim: To introduce students to some actuarial science based problems in the life insurance and pension fund industry.

Content: Survival distributions. Mortality tables. An introduction to assurances and annuities on one life. An introduction to general insurance mathematics.

Assessment: Continuous assessment (20%), 3 h exam (80%).

DP Requirement: 40% Class mark, 80% attendance at tutorials.

Stochastic Modelling

ACSC300 W1 (78L-72T-0P-0S-130H-26R-0F-0G-14A-13W-32C)
Prerequisite Modules: ACSC210, STAT240.

Aim: To introduce students to some key statistical concepts that are currently in use in financial mathematics and actuarial science based applications.

Content: Markov Chains. Markov jump processes. Brownian motion. Diffusion processes. Monte Carlo simulation techniques. Time series analysis. Integrated and co-integrated series.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 40% Class mark, 80% attendance at tutorials.

Financial Economics

ACSC310 W2 (78L-72T-0P-0S-130H-26R-0F-0G-14A-13W-32C)
Prerequisite Modules: ACSC300.

Aim: To cover the course material for subject CT8 as prescribed by the Institute of Actuaries.

Content: Utility theory, stochastic dominance, measures of investment risk, portfolio theory, stochastic models of security prices, Derivative security valuation techniques.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 40% Class mark, 80% attendance at tutorials.

Introduction to Derivative Pricing

ACSC701 WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To understand the terminology and mechanics of various derivatives and the markets in which they are traded.
Content: Options. Forwards and futures. Binomial trees. Trading strategies. Asset price dynamics. Black-Scholes-Merton equation. Risk.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester.

Interest Rate Markets

ACSC702 WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To introduce students to the fundamental derivatives traded in the interest rate markets.

Content: Zero coupon bonds, forward rates, forward rate agreements, interest rate swaps and swaptions. Black's
model, cross currency derivatives, introduction to exotic interest rate derivatives.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester.

Stochastic Calculus

ACSC703 W1 (39L-18T-18P-08-66H-13R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Completion of a programme in Actuarial Science with a credit-weighted average of at
least 70% in the Level-3 Actuarial Science modules. Candidates with other qualifications may be considered.

Aim: To introduce students to the stochastic concepts necessary for pricing derivative claims.

Content: Filtration processes, martingale theory, stochastic integration techniques and Ito's formula.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Extensions to the Black-Scholes World

ACSC704 WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To introduce students to pricing derivatives in complex situations.

Content: Multi-asset European options. Volatility smiles. Deterministic volatility models. Stochastic volatility. Exotic
optiens. Numerical techniques associated with option pricing. Credit derivatives.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester.

Term Structure Modelling

ACSC705 WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To expose students to more advanced techniques in modelling exotic interest rate derivatives.

Content: Introduction to risk neutral pricing techniques using term structure modelling, construction of interest rate
trees. Vasicek, CIR, Hull-White models, exotic derivatives, HIM framework.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester.

Advanced Modelling in Finance (project)

ACSC706 WC (OL-0T-0P-1S-159H-0R-0F-0G-0A-13W-16C)
Aim: To introduce students to advanced modelling methods in finance with the aid of compute r statistics.
Assessment: Written report (80%), Class mark (20%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Martingale Methods in Finance

ACSC707 WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Completion of a programme in Actuarial Science with a credit-weig hted average of at
east 65% in the Level-3 Actuarial Science modules. Candidates with other qualifications may be considered.

Aim: To study and then exploit the relationship between arbitrage free pricing and the exis tence of equivalent
martingale measures.

Content: Feynman-Kac formula, risk neutral measures, first and second fundamental theorem o f asset pricing,
shange of measures, Girsanov theorem, pricing in incomplete markets.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester.

Credit Risk Modelling Techniques

ACSC708 W2 (89L-18T-18P-0S-66H-13R-0F-6G-0A-13W-16C)
Prerequisite Modules: ACSC703.

Corequisite: ACSC705.

Aim: Numerous disasters in the banking industry have created a need for people to be proper ly trained in credit risk
management at an honours level The purpose of this course is to achieve such an objective.

Content: Market risk, credit risk, Structural models, reduced form models, Credit migration models, credit portfolio
models, Creditmetrics, KMV, Creditportfolio, CVar.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Agribusiness

Offered in the School of Agricultural Sciences & Agribusiness

Agribusiness Research Project & Seminars

AGBU790 PY (OL-0T-0P-20S-380H-0R-0F-0G-0A-26W-40C)
Corequisite: AGEC740 and (ANSI718 or (BIOL722 and BIOL723)).

Aim: To equip students with the ability to: (a) Critically review literature, write scienti fic papers, and formally present
and defend their work, and (b) integrate theory and techniques covered in earlier modules. For the project, students
must identify a relevant research problem, develop models to test hypotheses, collect and a nalyse data, interpret
results, recommend how to solve the problem, and prepare a comprehensive research report.

Content: This module integrates topics covered in earlier modules.

Assessment: Presentation of 2 papers (50%), research report (50%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Adgribusiness Research Project & Seminar

AGBU791 PY (OL-0T-0P-20S-300H-0R-0F-0G-0A-26W-32C)
Corequisite: AGEC740 and AGPS791.

Aim: To equip students with the ability to: (a) Critically review literature, write scienti fic papers, and formally present
and defend their work, and (b) integrate theory and techniques covered in earlier modules. For the project, students
must identify a relevant research problem, develop models to test hypotheses, collect and a nalyse data, interpret
results, recommend how to solve the problem, and prepare a comprehensive research report.

Content: This module integrates topics covered in earlier modules.

Assessment: Presentation of 1 paper (33%), research report (67%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Agricultural Economics

Offered in the School of Agricultural Sciences & Agribusiness
Introduction to Agricultural Economics
AGEC210 P1 (29L-0T-39P-0S-66H-20R-0F-0G-6A-13W-16C)
Aim: (a) To understand the key economic principles of production, market demand and supply and how. these principles can assist farm decision-makers in making improved decisions, and (b) to learn key accounting principles to develop a sound farm record-keeping system.
Content: Market demand for agricultural products. Market supply of agricultural products. Price movements. The firm (farm) as a decision-making unit. Production functions of the farm business. Determining the optimum level of production. Farm costs of production. Agricultural input substitution. Decisions on the choice of agricultural products.
Practicals: Elementary farm accounting.
Assessment: 2 class tests (33%), 3 h exam (67%).
DP Requirement: 40% average for the 2 class tests, and attendance at 80% of all practicals.

Farm Management

AGEC220 P1 (39L-0T-39P-0S-57H-20R-0F-0G-5A-13W-16C)
Corequisite: AGEC210 or (ECON101, 102).

Aim: To understand the economic and management principles which guide the practice of managing farms.

Content: Farm management - definition, planning environment, managerial functions and management by objectives.
Key economic principles and planning concepts. Farm information systems, data analysis and budgeting.
Organisation of capital. Farm machinery management. Land economics. Labour management.

Practicals: Application of economic principles to farming, analysis of farm records, budgeting, capital use and machinery and labour management decisions.

Assessment: 2 class tests (33%), 3 h exam (67%).

DP Requirement: 40% average for the 2 class tests, and attendance at 80% of all practicals.

Applied Farm Financial Management

AGEC240 P2 (20L-0T-39P-0S-8H-10R-0F-0G-3A-13W-8C)
Prerequisite Modules: AGEC220 (Bioresources Engineering students are exempt).

Aim: To learn and apply the principles and tools of finance to managerial problems in agriculture.

Content: Farm financial management objectives. Information flows in farm financial management. Financial leverage,
â\200\230arm firm growth and liquidity. Risk management in agriculture. Impact of time and risk on managerial decisions. Farm and values. Estate duty and the farmer.

Practicals: Risk analysis, information flows, farm firm growth model, capital budgeting and discounted cash flow roblems.

Assessment: Class test (33%), 2 h exam (67%).

DP Requirement: 40% for the class test, and attendance at 80% of all practicals.

Sredit may not be obtained for both AGEC240 and AGEC270.

Agribusiness Finance & Marketing

AGEC270 P2 (39L-0T-39P-0S-57H-20R-0F-0G-5A-13W-16C)
Sorequisite: AGEC220 or (MGNT21M, 21P).

Aim: (a) To apply finance principles to solve managerial problems in agriculture, and (b) t o study food marketing
Jrinciples, and to craft and implement strategy in food and agricultural firms.

Sontent: Financial management objectives and information flows. Financial leverage, farm fi rm growth and liquidity.
Risk management. Impact of time and risk on managerial decisions. Farm land values. Estate duty. Food marketing
mnargins and marketing efficiency. Agricultural and food business strategy. Marketing altem atives.

>racticals: Risk analysis, information flows, farm firm growth model, capital budgeting and discounted cash flow
droblems, and agribusiness case studies.

Assessment: 2 class tests (33%), 3 h exam (67%).

P Requirement: 40% average for the 2 class tests, and attendance at 80% of all practicals.

Credit may not be obtained for both AGEC240 and AGEC270.

Production Economics & Price Analysis

AGEC370 P2 (39L-0T-39P-0S-57H-20R-0F-0G-5A-13W-16C)
Corequisite: AGEC270, FINA202 or 16C in Level-2 ECON.

Aim: To apply principles of production economics in making enterprise choices, to quantify demand & supply relations in agriculture, and assess the economic effects of policies that distort markets.

Content: Empirical farm-level production functions. Cost minimising & profit maximising criteria. Linear programming. Farm planning under risk. Market demand & supply functions in agriculture. Relationships between price, income & cross-price elasticities. Import tariffs & export subsidies. Econometric and non-econometric price analysis.

Practicals: Application of production and cost functions to agriculture. Farm planning with linear programming. Regression analysis of demand functions.

Assessment: 2 class tests (33%), 3 h exam (67%).

DP Requirement: 40% average for the 2 class tests.

Agricultural Development

AGEC380 P1 (39L-0T-8P-0S-88H-20R-0F-0G-5A-13W-16C)
Corequisite: AGEC220 or 32C in Level-2 ECON.

Aim: (a) To identify constraints which limit agricultural and economic growth in less-developed regions, and (b) to analyse policies that will alleviate these binding constraints.

Content: Characteristics of developing regions. Role of agriculture in economic development. Theories of economic and agricultural growth. Adoption of technology. Impact of property rights (land tenure), credit, risk and information on technology adoption. Demand for children.

Practicals: 1 field trip.

Assessment: 2 class tests (33%), 3 h exam (67%).

DP Requirement: 40% average for the 2 class tests.

Applied Linear Programming

AGEC730 P1 (20L-0T-39P-0S-12H-5R-0F-0G-4A-13W-8C)
Prerequisite Modules: AGEC370 or (MATH130, 140).

Aim: (a) To identify and formulate farm and agribusiness problems as linear programming (LP) problems, and (b) to solve these LP problems by computer and interpret their solutions.

Content: LP models for farm planning. MOTAD and game theory models for income risk. Multiperiod models for cash flow. Mixed Integer Programming models for plant selection. Transport and trans-shipment models. Least cost ration and forage planning models. Economic equilibrium models.

Practicals: Using the computer to solve farm planning, cash flow, plant selection, feed blending and policy-oriented models.

Assessment: 1 class test (23%), 1 project (10%); 2 h exam (67%).

DP Requirement: 40% average for the class test and the project.

Agricultural Policy Analysis

AGEC740 P2 (39L-13T-0P-0S-83H-20R-0F-0G-5A-13W-16C)
Prerequisite Modules: AGEC370.

Aim: To provide insight into the application of economic theory to a wide range of policy issues in South African agriculture. This module contributes towards an understanding of the macro-economic situation facing South African agriculture.

Content: Private versus collective choice. Product and resource market policies. Forecasting product demand. Trade issues. Demand for resources. Farmland use and value. Agricultural risk and crop insurance. Environmental policy, recreation and conservation. Policy Analysis Matrix.
Assessment: 2 class tests (33%), 3 h exam (67%).
DP Requirement: 40% average for the 2 class tests.

â\200\230Agricultural Economics Project & Seminars

{AGEC790 PY (OL-0T-0P-20S-380H-0R-0F-0G-0A-26W-40C)
Aim: To equip students with the ability and confidence to: (a) Critically review literature, write scientific papers, and formally present and defend their work; and (b) integrate theory and techniques covered in earlier modules. For the iproject, students must identify a relevant research problem, develop models to test hypotheses, collect and analyse data, interpret results, recommend how to solve the problem, and prepare a comprehensive research report.

Content: This module integrates topics covered in earlier modules.

Assessment: Presentation of 2 papers (50%), research report (50%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam. Only for students majoring in Agricultural Economics or BAgricMgtHons (Commerce Stream).

Management Research Project & Seminar

AGEC791 PY (OL-0T-0P-20S-300H-0R-0F-0G-0A-26W-32C)
Aim: To equip students with the ability and confidence to: (a) Critically review literature, write scientific papers, and formally present and defend their work; and (b) integrate theory and techniques covered in earlier modules. For the project, students must identify a relevant research problem, develop models to test hypotheses, collect and analyse data, interpret results, recommend how to solve the problem, and prepare a comprehensive research report.

Content: This module integrates topics covered in earlier modules.

Assessment: Presentation of 1 paper (33%), research report (67%).

DP Requirement: Not applicable.

Yeai-long Module. This module has no supplementary exam. Only for students majoring in BAgricMgtHons (Production Stream).

Advanced Agricultural Price Analysis

AGEC802 P1 (20L-0T-0P-0S-30H-27R-0F-0G-3A-13W-8C)
Aim: To provide insight into the application and analysis of price theory in product and resource markets with specific â\200\230eference to South African Agriculture. This module focuses on macro-economic issues.

Content: Economics of free markets (Hayek, Buchanan, and Coase). Economics of water markets. Supply and risk. Jemand for resources. Agriculture and the State.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance at lectures.

Inly for students registered for MScAgric in Agricultural Economics or Agribusiness, or MAgricMgt or MSc in Agricultural Economics.

Applied Econometrics

AGEC803 P1 (OL-39T-39P-0S-43H-36R-0F-0G-3A-13W-16C)
Aim: To enable students to apply econometric models and techniques to a wide range of empirical problems in the
ields of economic policy, price analysis, marketing, and agribusiness management.

Sontent: Methodology of Econometrics. Multicollinearity, autocorrelation and specification bias in linear regression
nodels. Dummy variables. Lag and autoregressive models. Panel data regression models. Simultaneous-equation
nodels. Cointegration. Principal components. Linear discriminant, logit and probit models. Autoregressive Conditional
1eteroskedasticity (ARCH) and Generalized ARCH (GARCH) models.

>racticals: Computer applications in practical exercises using selected econometric data.

Assessment: 1 project (30%), 3 h exam (70%).

)P Requirement: 50% for the 1 project.

{ dnly for students registered for MScAgric in Agricultural Economics or Agribusiness, MSc in Agricultural
Zconomics, MAgricMgt or MCom in Economics.

Strategic Farm & Agribusiness Management

AGEC804 P1 (0L-20T-0P-0S-30H-27R-0F-0G-3A-13W-8C)
Aim: To provide students with a thorough insight into the key issues facing farm and agribusiness managers. This module focuses on micro-economic, macro-economic and strategy issues.

Content: Strategy crafting. Competitive strategy and competitive advantage in diversified and non-diversified firms. Global strategies. Competing in foreign markets. Strategy implementation. Agribusiness case studies. Key farm and agribusiness issues (economics and management of resources, risk, inflation, information, value innovation, HIV/AIDS, ethics and empowerment).

Assessment: One agribusiness case study oral and written presentation (30%), 3 h exam (70%).

DP Requirement: 50% for the agribusiness case study presentation.

Only for students registered in MScAgric in Agricultural Economics or Agribusiness, or MAgricMgt or MSc in Agricultural Economics.

Agricultural Engineering

Offered in the School of Bioresources Engineering & Environmental Hydrology

Agricultural Mechanisation

AGEN216 P1 (20L-7T-7P-0S-30H-12R-0F-0G-4A-13W-8C)
Aim: To provide students with knowledge of the principles of operation and management of agricultural machines and their application.

Content: Farm power: spark ignition and compression ignition, intemal combustion engines; power transmission; tractors, traction and tractor operation. Agricultural machinery: implements and machines; principles of operation, adjustment and use. Farm power and machinery management: power, machinery performance; cost analysis; mechanisation planning and equipment selection.

Practicals: Engines, fuel injection, power train, ploughing, implements and planning.

Assessment: 2 tests (20%), pracs/research project (10%), 1 tutorial (5%), exam (65%)

DP Requirement: As determined by Faculty of Engineering.

(Offered by the School of Bioresources Engineering and Environmental Hydrology in the Faculty of Engineering).

Soil & Water Conservation Systems

AGEN225 P2 (39L-10T-18P-0S-68H-20R-0F-0G-5A-13W-16C)
Aim: To provide students with an understanding of the principles of soil and water conservation and their application.
Content: Conservation principles and processes; Water flow, erosion, land degradation and rehabilitation. Surveying and positioning systems: Tachiometry, contours, GPS systems. Design of soil and water conservation systems: Agricultural field layout, reclamation of a degraded area.

Practicals: Survey and field trip for assessing erosion prevention devices and degraded land areas.

Assessment: Exam (70%), 2 tests and design projects (30%)

DP Requirement: As determined by Faculty of Engineering.

(Offered by the School of Bioresources Engineering and Environmental Hydrology in the Faculty of Engineering).

Agricultural Plant Sciences

Offered in the School of Agricultural Sciences & Agribusiness

Introduction to Plant Production

AGPS200 P2 (39L-0T-43P-0S-60H-14R-0F-0G-4A-13W-16C)
Prerequisite Modules: BIOL101.

Aim: To provide knowledge of the principles of agricultural plant production locally and globally.

Content: Origins of agriculture, crop establishment from seed and vegetative material, crop classification, plant nutrition, plant morphology and development, carbon and nitrogen metabolism, principles of plant breeding, agricultural development.

Practicals: Once a week on topical subject. Practicals may include field trips.

Assessment: 2 tests (25%), laboratory reports (12.5%), project (12.5%), 2 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Sustainable Community Agriculture

AGPS210 P1 (21L-0T-15P-0S-30H-10R-0F-0G-4A-13W-8C)
Aim: To introduce students to plant production, including effects of environment, cropping practices, and their effects on the environment. Sustainable agriculture is discussed such that students will be able to do elementary problem-solving regarding plant production.

Content: Principles of agroecology, traditional farming, organic farming.

Practicals: Field trips.

Assessment: 2 tests (30%), 1 assignment (20%), 2 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Plant Propagation & Nursery Management

AGPS220 P2 (18L-0T-14P-0S-28H-16R-0F-0G-4A-13W-8C)
Aim: To familiarise students with plant propagation techniques and the management of retail and wholesale nurseries.
Content: General aspects of propagation, seed propagation, vegetative propagation including cuttings, budding, grafting, layering, specialised stems and roots, micropropagation and the selection and management of clones. Also included will be the design and management of nurseries, ranging from wholesale to retail, general to specialist.
Practicals: Demonstration of theoretical concepts, field trips.

Assessment: 2 tests (25%), prac assessment (25%); 2 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Irrigation Design & Management

AGPS301 P1 (36L-6T-45.5P-0S-44H-24R-0F-0G-4.5A-13W-16C)
Aim: To teach students the principles of irrigation design and management.

Content: Criteria for selection of land and water for irrigation; availability of soil water; measurement of soil water;

water uptake; crop water requirements and response to water stress; design of irrigation systems; pumps and flow of water in pipes and channels; irrigation scheduling; negative impacts of irrigation on soil and water resources.
Practicals: Field excursions; designing an irrigation scheme with associated management recommendations; tutorial exercises on irrigation.

Assessment: 2 theory tests (7%), irrigation design report (35%), tutorials (8%), 3 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Credit may not be obtained for both AGPS301 and HYDR313.

Resource Assessment

AGPS303 P1 (18L-0T-18P-08-30H-10R-0F-0G-4A-13W-8C)
Aim: To provide students with the necessary skills to assess the potential of natural, human, and financial resources pertaining to a farm.

Content: Techniques of assessment, mapping and interpretation of topography, climate, soils, water, vegetation, land use, management and financial resources.

Practicals: Air photo interpretation, mapping and resource data interpretation.

Assessment: 2 theory tests (24%), prac exercises (9%), 2 h exam (67%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Greenhouse Management

AGPS304 P2 (18L-0T-18P-0S-30H-10R-0F-0G-4A-13W-8C)
Aim: To provide students with an understanding of the influence of environmental conditions on development and growth of crops and the optimisation of these conditions in a controlled environment.

Content: The influence of environment on plant growth and development, greenhouse structures and covering materials, artificial lighting and daylength control, climate control, irrigation and growing systems, with special emphasis on hydroponic production.

Practicals: Excursions to commercial greenhouses and growing plants in controlled environments.

Assessment: 2 tests (25%), prac assessment (25%); 2 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Field Crop Management

AGPS305 P1 (38L-0T-43P-0S-60H-14R-0F-0G-5A-13W-16C)
Aim: To provide students with knowledge of management practices involved in the production of field Crops.

Content: Soil fertilization and liming, tillage and residue management, mulching, crop improvement techniques, weed and pest control, ley-cropping, forage preservation and grain storage.

Practicals: Research project with field trips.

Assessment: 2 tests (25%), research project (15%), prac evaluations (10%), 3 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Principles of Plant Breeding

AGPS306 P2 (36L-3T-27P-12S-47H-30R-0F-0G-5A-13W-16C)
Prerequisite Modules: GENE240.

Aim: To provide students with an understanding of principles and practical skills in classical plant breeding.

Content: Sexual and asexual modes of reproduction; quantitative or polygene inheritance; fertility-regulation; breeding self-pollinated, cross-pollinated, hybrids and clonally propagated plants; utilization of polyploidy and induced mutations.

Practicals: Conducting hand-pollinations of selected plant species, data collection and statistical analysis, and selections from segregating populations.

Assessment: 2 tests (24%), 1 mini-seminar presented in both written & verbal form (12%), 1 prac report (14%), 3 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Orchard Management

AGPS307 P1 (38L-0T-43P-0S-60H-14R-0F-0G-5A-13W-16C)
Aim: To provide students with skills and experience in managing intensively produced orchard crops.

Content: Climate and climate modification, modification of the plant environment, managing orchard soils and the orchard floor, plant factors in the orchard, plant manipulation, crop protection, harvesting and postharvest handling.
Practicals: Field trips to commercial orchards, as well as at the University research farm.

Assessment: 2 theory tests (25%), prac assessment (25%), 3 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Syllabus izl

Crop Protection

AGPS308 P2 (39L-0T-36P-0S-60H-20R-0F-0G-5A-13W-16C)
Prerequisite Modules: BIOL101, 102.

Aim: To introduce students to the principles of integrated control of crop pests, diseases and weeds.

Content: Principles of integrated pest control, ecological interaction, management and use of threshold level of pests, diseases and weeds; pesticide formulation; sprayer calibration and nozzle function. Safe handling and storage of pesticides.

Practicals: Pest and disease recognition, weed identification, scouting; disease and weed assessment; field evaluation of herbicides and phytotoxicity; calibration of applicators. Disease control project. Field visits.

Assessment: 2 tests (25%), practicals and projects (25%), 3 h exam 50%.

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Agricultural Plant Physiology

AGPS320 P2 (38L-0T-36P-0S-51H-30R-0F-0G-5A-13W-16C)
Prerequisite Modules: CHEM110, 120.

Corequisite: BIOC201 or 212.

Aim: To develop skills required for analysis of mechanisms controlling and coordinating plant growth and development.

Content: Physiological processes related to plant mineral nutrition, photosynthesis in agriculture, source-sink relationships, fruit growth and development pre- and post-harvest.

Practicals: To demonstrate the above mentioned processes.

Assessment: 2 tests (10%), 1 essay (20%), prac assignments (20%), 3 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Principles of Agricultural Research

AGPS701 P1 (18L-6T-9P-0S-34H-10R-0F-0G-3A-13W-8C)
Aim: To acquire the skills to plan, implement, and communicate results of agricultural research.

Content: Presentation of technical information and communication skills; development, organization and financing of agricultural research; research philosophy and policy. Research methods with emphasis on the scientific method and economic plant improvement. Field plot, glasshouse and controlled environment research techniques.

Practicais: Critical reviews of published scientific papers; conduct of field and pot experiments; visits to research establishments.

Assessment: Theory test (20%), oral & written criticisms (30%); 2 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Forage Production & Utilisation

AGPS710 P2 (38L-0T-39P-0S-62H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: An academic background deemed suitable by the Academic Coordinator in consultation with the Dean.

Aim: To equip students with an understanding of the principles of selection, growth, management and utilization of cultivated forages.

Content: Accumulation and utilization of energy reserves, nitrogen fixation, soil amelioration and fertilization, and uses of forage crops for animal production systems.

Practicals: Demonstrations, visits, exercises and assignments designed to enhance the understanding of the lectures.

Assessment: 2 tests (30%), prac exercises (15%), 3 h exam (55%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Field Crop Production

AGPS711 P1 (21L-0T-15P-0S-30H-10R-0F-0G-4A-13W-8C)
Prerequisite Requirement: AGPS305 or permission of the Academic Coordinator in consultation with the Dean.
Aim: To provide an understanding of the crop-environment interaction and its management to sustain crop production.
Content: A study of the management and production of selected field crops drawn from sugar, cereal, oil and protein,
and fibre crops; impact of environmental variables, particularly stress on crop production, management to sustain
productivity; harvesting, grading and storage of crop products.

Practicals: 1 mini project/poster presentation. Visits to research stations and crop producers.

Assessment: 2 theory tests (10%), 1 project (40%), 2 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Advanced Seed Technology

AGPS712 P2 (36L-0T-37P-0S-65H-15R-0F-0G-7A-13W-16C)
Prerequisite Requirement: AGPS200 or permission of the Academic Coordinator in consultation with the Dean.

Aim: To provide skills and experience in seed science and technology.

Content: Physiology, biochemistry and molecular biology of orthodox and recalcitrant seeds in relation to seed
production, development, germination, conditioning, storage and marketing.

Practicals: A project pertinent to the objectives of the course will be undertaken by students as individuals or groups.
One trip to a seed related institution. One field trip to a farming community.

Assessment: 2 theory tests (15%), 1 project (35%); 3 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Field Crop Production Self Study

AGPS713 P1 (44L-0T-26P-0S-65H-20R-0F-0G-5A-13W-16C)
Prerequisite Requirement: AGPS305 or permission of the Academic Coordinator in consultation with the Dean.
Aim: Students will, through acquisition of an understanding of the basis of crop growth and development, be able to
improve crop productivity.

Content: A detailed study of the agronomy, crop physiology, nutrition, growth and development in relation to
environmental factors of selected field crops. Crop improvement. Harvesting, storage and grading of crop products.
Practicals: A mini-project, visits to research stations, plant breeding enterprises and cropping areas.

Assessment: 1 project (11%), 2 theory tests (11%), 1 field trip report (11%), 3 h exam (67%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Tropical & Subtropical Fruit Production

AGPS720 P2 (18L-0T-35P-0S-14H-8R-0F-0G-5A-13W-8C)
Aim: To develop proficiency in managing a variety of tropical and subtropical crops.

Content: Subtropical and tropical crops; avocado, banana, mango, papaya and macadamia. Their origin, distribution, classification, cultivars and rootstocks; fruit and tree morphology, phenological cycle and techniques of manipulation; orchard design and canopy architecture; principles of integrated pest and disease management; causes and symptoms of physiological disorders; maturity indexing techniques and preparation for harvest.

Practicals: lllustration of theoretical concepts; field trips.

Assessment: 2 tests (30%), self study assignments (20%), 3 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Vegetable Crop Production

AGPS721 P1 (18L-0T-14P-0S-29H-16R-0F-0G-3A-13W-8C)
Aim: To understand growth and development of vegetable crops as well as to apply the acquired knowledge to understand and design management practices.

Content: Principles and advanced techniques of management of different root, bulb, leaf and fruit vegetable crops.
Practicals: Growth and development of different vegetable crops, project on managing a vegetable plot, field trips.
Assessment: 1 test (5%), prac evaluations (10%), study assignments (35%), 2 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Citrus Management

AGPS723 P1 (18L-0T-34.5P-0S-15H-8R-0F-0G-4.5A-13W-8C)
Aim: To enable the student to be proficient in managing citrus as a crop.

Content: The origin and distribution of citrus, classification, rootstocks and cultivars. An understanding of fruit and tree morphology together with the phenological cycle and management techniques for tree and crop manipulation.
Knowledge of integrated pest and disease management, physiological disorders, fruit maturity indexing and preparation for harvest.

Practicals: lllustration of theoretical concepts; at least two field trips.

Assessment: 2 tests (30%), self study assignments (20%), 3 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Post Harvest Technology

AGPS724 P2 (18L-0T-35P-0S-14H-8R-0F-0G-5A-13W-8C)
Aim: For students to be proficient in postharvest management of horticultural crops.

Content: Physiological attributes of the major groups of Horticultural products, with reference to preharvest physiology, temperature, water loss and humidity and storage atmosphere; packhouse design and technologies, fruit coatings, packaging, physiological and pathological disorders, effects and requirements of phytosanitary regulations, product processing for added value and storage life and quality and food safety management systems.

Practicals: lllustration of theoretical concepts; field trips.

Assessment: 2 tests (30%), self study assignments (20%), 3 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Deciduous Fruit Crop Production

AGPS725 P1 (18L-0T-14P-0S-29H-16R-0F-0G-3A-13W-8C)
Aim: To understand the basis of growth and development of temperate fruit crops as well as their management practices.

Content: Principles of cultivation of small fruit, pome and stone fruit and nut crops, advances in temperate fruit producticn.

Practicals: Establishing and managing temperate fruit crops, field trips.

Assessment: 1 test (10%), prac evaluations (15%), self study assignments (25%), 2 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Floriculture

AGPS726 P2 (18L-0T-14P-0S-28H-16R-0F-0G-4A-13W-8C)
Aim: To provide students with an understanding of growth, development and management of floricultural crops.
Content: Production, management, growth manipulation and marketing of: cut flowers, cut foliage, pot plants, bulbs and bedding plants.

Practicals: Excursions to commercial farms, plant identification and a project.

Assessment: 2 tests (25%), prac assessment (25%); 2 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Sport and Amenity Turf

AGPS727 P1 (18L-0T-18P-0S-30H-10R-0F-0G-4A-13W-8C)
Aim: To Provide students with an understanding of sports and amenity turfs and their growth and management requirements.

Content: Common turf grass identification. Characteristics of turf rootzones. Fertilization and irrigation. Specialised turf and field management practices, and the basics of sports field design and construction.

Practicals: Visits, exercises, demonstrations and assignments to reinforce and supplement the lectures.
Assessment: 2 tests (24%), practical exercises (9%), 2 h exam (67%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Landscaping & Ornamental Plants

AGPS728 P2 (18L-0T-14P-0S-28H-16R-0F-0G-4A-13W-8C)
Aim: To introduce students to basic concepts of landscape design and plant selection.

Content: Key concepts of landscape design, plant selection, indigenous alternatives, alien invaders.

Practicals: Demonstration of theoretical concepts, design project, plant identification, fi eld trips.

Assessment: 2 tests (25%), prac assessment (25%); 2 h exam (50%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Advanced Plant Breeding

AGPS730 P1 (36L-0T-33P-0S-56H-30R-0F-0G-5A-13W-16C)
Prerequisite Modules: GENE310, 732; BMET210, 222.

Corequisite: BMET710.

Aim: To expose students to advanced concepts in applied plant breeding.

Content: Critical analysis and vigorous debate of topics e.g. interpreting genotype x envir onment interactions;
genetics of host x parasite interactions; gene action; marker assisted selection; ideotype breeding; alternative
approaches such as somatic ceil hybridization and cell selection.

Practicals: Analysis and discussion of applied problems. A mini-literature review on a sele cted topic to be presented
in both written and verbal form.

Assessment: 2 theory tests (25%), assignment report (15%), 3 h exam (60%).

DP Requirement: 40% Class mark, attendance at 80% of practicals & 100% of tests.

Applied Plant Sciences Project & Seminar

AGPS790 PY (10L-0T-0P-30S-280H-0R-0F-0G-0A-26W-32C)
Aim: To develop written and verbal communication skills; critical and creative thinking; in formation retrieval,
evaluation, comprehension and review skills.

Content: Undertake and present a literature review on an approved topic and undertake an ap propriate research
project.

Practicals: Survey of relevant literature. A research project including design and manageme nt, record and analyze
data, a written report, Verbal presentations will include use of modern presentation media.

Assessment: Written & verbal presentations are assessed by internal & extermnal examiners. Students may be
required to go on a field trip. Seminar (40%), project (60%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Observation & Analysis of Agro-Industry

AGPS791 P2 (OL-0T-64P-16S-0H-0R-0F-0G-0A-2W-8C)
Corequisite: AGPS701 or 790.

Aim: To introduce students to a variety of agro-industries, and integrate theoretical knowledge within the operations
within a diverse commercial sector.

Content: Visit agro-industries, including farms, companies, processing plants and research institutions during
vacation periods to observe and evaluate production as well as value adding, marketing and distribution of products
related to plant based agricultural industries.

Practicals: Site visits to several agricultural enterprises.

Assessment: Seminar comprising written and oral analyses related to the agro-industries that were visited (100%).
DP Requirement: Not applicable.

This module has no supplementary exam.

Agriculture (General Modules)

Offered in the School of Agricultural Sciences & Agribusiness

Scientific Communication

AGRI710 P1 (18L-50T-0P-0S-92H-0R-0F-0G-0A-13W-16C)
Aim: To prepare postgraduate science students with core communication skills in reading, writing and oral presentations for effective and efficient performance in postgraduate (and professional) work.

Content: Planning and conducting a literature review, summarizing, information retrieval; characteristics of well-written, formal scientific writing; constructing an argument; mind maps; the principles and strategies of efficient and effective advanced reading; the professional writing process; common errors in scientific English; oral presentations in science.

Assessment: Library project (15%), summaries (10% x 2), 2 science essays (20% x 2), reading test (5%), oral presentation (20%).

DP Requirement: Not applicable.

To be offered only in the ACCI programme. This module has no supplementary exam.

Research Project Management

AGRI810 PV (18L-50T-0P-0S-92H-0R-0F-0G-0A-4W-16C)
Aim: To prepare senior postgraduates with the understandings and skills they need to: plan, budget for, and manage research; to raise funding for research; to manage funding; and to maintain optimal relations with grant-makers.
Content: Basic communication principles underlying "Grantsmanship"; planning a research project with basic planning tools; budgeting the project; the concept note and proposal; communication with the grant-maker; identifying sources of funding; managing research funds; reporting to the grant-maker; oral presentation on project.
Assessment: Portfolio concept note (15%); research plans (15%); budget (20%); outline and notes of research proposal (10%); correspondence (10%); financial reports (10%); oral presentation (20%).

DP Requirement: Not applicable.

Offered in the Winter vacation. To be offered only in the ACCI programme. This module has no supplementary exam.

Advanced Scientific Communication

AGRI820 P2 (18L-50T-0P-0S-92H-0R-0F-0G-0A-13W-16C)
Aim: To provide postgraduate students with the knowledge, understanding and skills they need for their research thesis, writing and publishing journal articles, and important forms of professional communication in management positions.

Content: Requirements for a research thesis; characteristic, functional features of the science journal research paper for both reader and writer; introduction to the publishing process; initial postgraduate.

Assessment: Continuous: Thesis outline (5%); initial literature review (35%); real/simulate

d journal article (35%);
planning and sketches for poster (15%); basic types of business communication (10%).

DP Requirement: Not applicable.

To be offered only in the ACCI programme. This module has no supplementary exam.

Agrometeorology

Offered in the School of Environmental Sciences

Agrometeorology & Environmental Biophysics

AMET210 P1 (36L-5T-40P-0S-50H-24R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 32C at Level 1.

Aim: Provision of concepts and applications in applied environmental, agricultural and ecophysiological sciences.
Content: The atmosphere, greenhouse effect. Climate change. Earth's radiation and energy balance. Remote sensing. Role of water in the environment. Glasshouse climate. Windbreaks. Energy and water exchange processes above canopies. Animal climate. Meteorology: rain processes. Weather systems.

Practicals: Temperature measurement; reflectivity, radiation profiles in crops; humidity; rainfall and evaporation; leaf resistance and water potential. Project.

Assessment: Tests (15%), practicals (12%), project (6%), 3h exam (67%).

DP Requirement: 80% attendance at lectures and practicals.

Environmental Instruments:Life/Earth Sciences

AMET211 P2 (20L-0T-39P-0S-0H-17R-0F-0G-4A-13W-8C)
Prerequisite Requirement: 32C at Level 1.

Aim: To provide students taking agriculture and environmental science options with the skills to set up an automatic weather station.

Content: Datalogging measurement and control techniques using an automatic weather station (AWS) and other sensors for measurement and control purposes. Intemet techniques, information retrieval and storage and data display.

Practicals: Identifying, checking electronic components. Use of an AWS.

Assessment: Test (10%), practicals (23%), 3 h practical exam (67%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Students may not obtain credit for both AMET212 and AMET211.

Environmental Instruments:Life/Earth Sciences

AMET212 P2 (23L-0T-115P-0S-0H-17R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 1.

Aim: To provide students taking agriculture and environmental science options with the skills to set up an automatic weather station.

Content: Datalogging measurement and control techniques using an automatic weather station (AWS) and other sensors for measurement and control purposes. Intemet techniques, information retrieval and storage and data display.

Practicals: Identifying, checking electronic components. Use of an AWS. Grass reference estimation; fire index; wind

chill and chilling index estimation. Intemet techniques, information retrieval and storage and data display.
Assessment: Test (5%), 13 practicals (12 %), project (50%), 3 h practical exam (33%).

DP Requirement: 80% attendance at all academic contact activities, 100% at practicals; 45% subminimum on the
project.

Students may not obtain credit for both AMET212 and AMET211.

Evaporation Estimation

AMET860 PY (20L-5T-18P-0S-27H-7R-0F-0G-3A-26W-8C)
Aim: This module is to provide students with the theory necessary to understand the principles of evaporation
estimation and techniques for turbulence measurement.

Content: Water and energy in the environment; radiation and energy transfer; lysimetry; atmometers. Sap flow theory
and measurement; Bowen ratio, eddy covariance, surface renewal. Penman-Monteith equation and use; infra red
thermometry; energy balance closure; Monin-Obukhov similarity theory; scintillometry.

Practicals: Field use of equipment and sensors; advanced data analysis using a spreadsheet including VBA.
Assessment: 1 h test (33%), 2 h exam (67%).

DP Requirement: 80% attendance at lectures and practicals.

Year-long module.

Automatic Weather Station Technologies 1

AMET861 PY (20L-5T-18P-0S-27H-7R-0F-0G-3A-26W-8C)
Aim: To provide theory and skills to set up an automatic weather station and the checking a nd use of collected data.
Included here is the checking of the electronic components and an understanding of the sens ors used.

Content: Datalogging measurement and control technologies, including datalogging programmin g. Theory of sensors
used. Procedures for the checking and use of automatic weather station (AWS) data. Data pro cessing and
presentation. Theory and use of the AWS sensors and their use for measurement and control. Data
telecommunication techniques. Internet techniques, information retrieval and storage, scien tific graphics display.
Practicals: Field use of equipment. Advanced data analysis using a spreadsheet.

Assessment: 1 h test (33%), 2 h exam (67%).

DP Requirement: 80% attendance at lectures and practicals.

Year-long Module.

Digital Data Treatment & Representation

AMET862 PY (20L-5T-18P-0S-27H-7R-0F-0G-3A-26W-8C)
Aim: This module is designed to provide students with the skills necessary to process and e xchange, present, store,
retrieve, display and publish data and information.

Content: Data presentation and information. Data exchange. Internet techniques. Data retrie val and information
storage. Desk-top publishing. Display of scientific graphics. Speed reading and report writ ing.

Practicals: Assignments based on generated and other data sets.

Assessment: 1 h test (33%), 2 h exam (67%).

DP Requirement: 80% attendance at lectures and practicals.

Year-long Module.

AWS Measurement & Control Technologies

AMET863 PY (20L-5T-18P-0S-27H-7R-0F-0G-3A-26W-8C)
Aim: This module is designed to provide students with the theory necessary to understand th e use of automatic
weather station sensors for the measurement and control of various microclimates.

Content: Theory and use of the following systems and sensors: automatic weather station (AW S) sensors and their
use for measurement and control, for example, of frost protection, reference evaporation, g lasshouse microclimate.
Practicals: Field use of equipment.

Assessment: 1 h test (33%), 2 h exam (67%).

DP Requirement: 80% attendance at lectures, 100% at practicals.

Year-long Module.

AWS Measurement & Control Technologies

AMET864 PY (20L-5T-18P-0S-27H-7R-0F-0G-3A-26W-8C)
Aim: This module is to provide students with the theory necessary to understand the following AWS systems and measurement systems.

Content: Theory and use of the following systems and sensors: automatic weather station (AWS) sensors and their use for measurement and control, for example, of disease forecasting, fire-danger warning; leaf wetness measurements, radio telemeters, infrared thermometry, AWS sensors, time-domain reflectometry.

Practicals: Field use of equipment and sensors.

Assessment: 1 h test (33%), 2 h exam (67%).

DP Requirement: 80% attendance at lectures and practicals.

Year-long Module.

Heat Pulse Measurement in Plants & Soils

AMET865 PY (20L-5T-18P-0S-27H-7R-0F-0G-3A-26W-8C)
Aim: This module is to provide students with the theory necessary to understand the following heat pulse technologies for use in soils and plants.

Content: Heat pulse technologies for the measurement of sap flow in trees and other non-woody stems and the measurement of the thermal properties of porous materials.

Practicals: Field use of equipment and sensors.

Assessment: 1 h test (33%), 2 h exam (67%).

DP Requirement: 80% attendance at lectures and practicals.

Year-long Module.

Modelling Exchanges in the SPAC System 1

AMET866 PY (20L-5T-18P-0S-27H-7R-0F-0G-3A-26W-8C)
Aim: This module is to provide students with the theory necessary to understand the principles of modelling energy and water flow in the SPAC.

Content: Principles of modelling: CERES and SWB models; modelling using finite differences; application of models; specialized data techniques for model evaluation.

Practicals: Field use of equipment and sensors.

Assessment: 1 h test (33%), 2 h exam (67%).

DP Requirement: 80% attendance at lectures and practicals.

Year-long Module.

Environmental Temperature & Radiation

AMET867 PY (20L-5T-18P-0S-27H-7R-0F-0G-3A-26W-8C)
Aim: This module is to provide students with the theory necessary to understand the principles of temperature measurement and calibration of radiation instrumentation.

Content: Principles of temperature measurement using resistance thermometers, thermocouples and thermistors. Soil temperature and soil heat flux measurement. Net radiation and canopy interception measurement. Calibration of radiation instrumentation. Applications.

Practicals: Field use of equipment and sensors.

Assessment: 1 h test (33%), 2 h exam (67%).

DP Requirement: 80% attendance at lectures and practicals.

Year-long Module.

Agric/Environment Instrumentation Research

AMET869 PY (OL-0T-390P-0S-250H-0R-0F-0G-0A-26W-64C)
Aim: To allow distance students to undertake a research project at their place of employment.

Content: Research on a topic agreed upon by the supervisor, the student and the employer(s).

Practicals: This forms the basis of the research project.

Assessment: 1 project report (100%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Animal Science

Offered in the School of Agricultural Sciences & Agribusiness

Pig & Poultry Production

ANSI201 P2 (38L-0T-39P-0S-38.5H-40R-0F-0G-4.5A-13W-16C)
Prerequisite Modules: BIOL101.

Aim: To enable students to solve problems encountered in pig and poultry production.

Content: Applied anatomy and physiology of male and female fowl. Environmental control of ovulation in hens.
Management of pullet, broiler, broiler breeder and pig production systems. Economic factors influencing management decisions in broiler, egg and pork production. Pig and poultry welfare.

Practicals: Anatomy of a chicken, visit different pig and poultry production systems.

Assessment: Essays (12.5%), development of spreadsheet models (12.5%), oral & written presentations (7.5%), practical reports (7.5%), participation in debate on animal welfare issues (5%), formal tests (5%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Livestock Production

ANSI202 P2 (38L-0T-39P-0S-38.5H-40R-0F-0G-4.5A-13W-16C)
Prerequisite Modules: BIOL101.

Aim: Students should develop a holistic approach towards the production of beef, sheep, goats and dairy and be capable of identifying and solving production problems associated with these systems.

Content: Beef, sheep, goats and dairy production systems.

Practicals: Visit various beef, sheep, goat and dairy farms.

Assessment: Impromptu tests (7.5%), formal test (25%), essays and/or projects (7.5%), breed project (10%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including 80% attendance at practicals.

Animal Feeding and Feed Formulation

ANSI318 P2 (9L-30T-39P-0S-53H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: BIOL 101.

Aim: Students should develop understanding of the aftributes of feed used in different animal production systems.
This module also aims to introduce principles of feed formulation with emphasis in economic feeding of animals.
Content: Nutritive and anti-nutritional attributes of raw materials commonly used in animal feeds. Feed classification and processing. Principles of feed formulation, exchange or replacement of raw materials, formulation of least cost rations, sensitivity and parametric analyses, assessment and improvement of rations.

Assessment: Referenced essays (5%), practical write-ups (15%), poster and oral presentation (10%), formal tests (20%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Animal Health

ANSI322 P2 (9L-9T-18P-0S-30H-10R-0F-0G-4A-13W-8C)
Prerequisite Modules: BIOL101.

Aim: To understand the factors that affect animal health and their effects in constraining the expression of the animalâ\200\231s potential.

Content: Infectious, environmental and nutritional factors affecting growth and production in animals.

Assessment: Oral/poster presentation (10%) practical reports (10%) written assignments (10%), tests (20%), 2 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Practical Skills in Animal Science

ANSI324 P2 (OL-0T-6P-0S-33H-0R-39F-0G-2A-13W-8C)
Aim: To formalise the existing practical skills requirements for Animal and Poultry Science majors.

Content: Minimum of 8 weeks work experience in an animal science-related endeavour; 10 hours of lab assistantship in the ANSI feed evaluation laboratory; attendance at or participation in: Al course, Sheep shearing/wool classing course, Cattle judging course, Steers project, Fat lamb project. The above to be performed outside of lecture times throughout the duration of the degree, & when courses are available.

Assessment: Report including overview of the activities and functioning of the host company, summary of the work conducted, signed by the host company (20%), Reports on completion of courses & projects (60%), Impromptu presentations & assessments (20%)

DP Requirement: Certificates for Al course, wool classing course (BKB) & cattle judging course. Participation in steers project & fat lamb project.

Only for students registered in programmes in Animal Science, Agribusiness (Animal Science) and Agricultural Management. This module has no supplementary exam.

Animal Growth & Development

ANSI332 P1 (38L-0T-39P-0S-47H-32R-0F-0G-4A-13W-16C)
Aim: Students should analyze the relationships between body size and composition over time as a means of predicting the consequences of intemal and external stimuli on growth and development of domestic and non-domestic animals.

Content: Basic growth terminology, analysis of growth curves, scaling and allometry, growth modelling, manipulation of growth, physiology of muscles, conversion of muscle to meat and meat quality.

Practicals: Allometric measurements and analyses.

Assessment: Practical reports (20%), poster/oral presentations (5%), essay (5%), formal tests (20%); 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Digestive Physiology & Herbivore Nutrition

ANSI344 P1 (38L-0T-39P-0S-54H-24R-0F-0G-5A-13W-16C)
Aim: To learn how to evaluate the digestive, absorptive & metabolic processes in animals and how these influence the nutritive value of feeds and to associate ways of measuring nutritive value to the nutrient requirements.

Content: Functional anatomy & physiology of the digestive tract; nutrient absorption; Ruminal micro-organisms, digestive & synthetic processes in the rumen; determination of digestibility and protein quality; the metabolizable protein system; the use of metabolizable energy system for rationing livestock; Mineral and vitamin nutrition.
Practicals: Different digestive systems, determination of rumen digestibilities, case studies.

Assessment: Essays (10%), report on feed evaluation (10%), impromptu test (5%), formal tests (25%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Applied Reproductive Physiology

ANSI370 P2 (38L-0T-39P-0S-54.5H-24R-0F-0G-4.5A-13W-16C)
Aim: Students integrate animal physiology and endocrinology with nutritional, behavioural, health and environmental factors by implementing strategies for improving reproductive efficiency.

Content: Reproductive cycles. Control of ovulation. Follicular development. Sexual behaviour. Oestrus detection. Superovulation. Artificial insemination. Seasonal breeding. Improving and evaluating reproductive efficiency. Reproduction technology and bioethics.

Practicals: Superovulation and in vitro culture techniques. Ultrasonography.

Assessment: Essays (10%), oral presentations (15%), formal tests (20%), project (5%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Companion Animal Nutrition

ANSI703 P1 (38L-0T-39P-0S-39H-39R-0F-0G-5A-13W-16C)
Aim: To familiarise students with the pet food industry and to integrate nutritional principles with the peculiarities of various companion animal requirements.

Content: Unique nutrient requirements and feeding management of cats, dogs and horses. Feeding for activity, reproduction, health and longevity. Preparation of food and its effect on nutrient quality. Regulation, marketing and labelling of pet food. Dynamics of the pet food industry in South Africa.

Practicals: Determine nutrient requirements of pets. Marketing and labelling of pet food. Trips to feed companies.
Assessment: Problem-solving based tests (10%), essays (5%), practicals (25%), oral & written presentations (10%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Applied Pig and Poultry Nutrition

ANSI718 P2 (3L-39T-36P-0S-23H-24R-0F-30G-5A-13W-16C)
Prerequisite Modules: ANSI305.

Aim: Students should integrate nutritional theory into solving more advanced nutritional problems using simulation models.

Content: Nutrient requirements of poultry and pigs. Solving nutritional problems using broiler and pig simulation models. Advanced feed formulation theory and practice.

Practicals: Using simulation models, feed formulations.

Assessment: Assignments (15%), problem solving exercises (15%), oral presentations (10%), formal test (10%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Modelling Animal Growth

ANSI730 P1 (5L-20T-19P-2S-90H-20R-0F-0G-4A-16W-16C)
Aim: Students should understand and analyze the relationships between body size and composition over time as a means of predicting the consequences of dietary manipulations on growth and development of domestic and non-domestic animals.

Content: Analysis of growth curves. Scaling and allometry. Manipulation of growth, growth modelling.

Practicals: As appropriate to the above.

Assessment: Formal tests (10%), review of scientific papers (15%), design & construction of growth/allometry models (15%), project data collection & presentation (5%), posters/oral presentation (5%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Quantitative Nutrition

ANSI741 P1 (38L-0T-39P-0S-39H-39R-0F-0G-5A-13W-16C)
Prerequisite Modules: ANSI332.

Aim: Students should optimise feeding strategies for farm animals through integration of biological and economic factors, these being associated with the animal, the feed and the environment.

Content: Theories of prediction of voluntary food intake. Amino acid responses in broilers and laying hens. Effective energy system for determining requirements of animals for energy. Determining optimum economic feeding systems for growing and reproducing animals.

Practicals: Feed formulation and modelling projects

Assessment: Problem-solving based tests (20%), essays (10%), spreadsheets and modeling exercises (15%), oral & presentation of reports (5%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Research Methods in Rumen Metabolism

ANSI742 P1 (18L-18T-39P-2S-56H-15R-0F-7.5G-4.5A-13W-16C)
Prerequisite Modules: ANS|344.

Aim: To increase studentsâ\200\231 research skills and in-depth understanding of rumen function.

Content: Plant cell and plant cell wall architecture. Metabolism of carbohydrates and protein in the rumen. Ruminal microbial protein synthesis. Kinetic of passage of liquid and particulate matter and implications on intake and microbial efficiency.

Assessment: Assignments (20%), formal test (10%), practical reports (20%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Advanced Reproductive Physiology

ANSI770 P2 (5L-20T-19P-2S-90H-20R-0F-0G-4A-13W-16C)
Aim: Students integrate previous knowledge in reproductive physiology whilst mastering techniques related to reproductive management.

Content: Evaluation of reproductive cycles in different domestic species. Control of ovulation, follicular development, sexual behaviour, oestrus detection, superovulation, artificial insemination, seasonal breeding, improving & evaluating reproductive efficiency. Reproduction technology and bioethics.

Practicals: As appropriate to the above.

Assessment: Scientific essay (15%), formal tests (10%), project including oral presentation (25%), 3 h exam (50%).
DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

Animal Science Research Project & Seminars

ANSI790 PY (5L-10T-0P-5S-300H-0R-0F-0G-0A-26W-32C)
Aim: This is a module with a heavy focus on integrated assessment of the exit-level outcomes specified for the programme in Animal and Poultry Science. It involves information and data management, analysis and communication, self-evaluating reflection and personal organisation.

Content: Seminar/review paper writing. Literature search. Presentation skills. Topical discussions with industrial players. Formulating and presenting a project proposal. Conducting an experiment, analyzing results and presenting as scientific paper. Interviews on career awareness.

Assessment: Oral & written presentation of review (50%), scientific paper (50%).

DP Requirement: Not applicable. ;

Year-long Module. This module has no supplementary exam.

Applied Chemistry

Offered in the School of Chemistry

Environmental Chemistry

APCH211 W1 (27L-9T-36P-0S-66H-17R-0F-0G-5A-13W-16C)
Prerequisite Modules: CHEM110, CHEM120.

Aim: To introduce a wide range of science students to the principles of environmental chemistry.

Content: Chemical pollution: acid rain, photochemical smog, global warming, and ozone depletion. Water purification,
recycling and waste management. The toxicity of heavy metals and organic compounds.

Practicals: A combination of laboratory work, assignments and workshops.

Assessment: Tests (8%), practicals (25%), 3 h exam (67%).

DP Requirement: Class mark 40%, 80% attendance at practicals.

Chemistry & Industry

APCH221 W2 (27L-9T-36P-0S-67H-17R-0F-0G-4A-13W-16C)
Prerequisite Modules: CHEM110, CHEM120.

Aim: To highlight how chemistry can be applied to create a successful industrial venture.

Content: Insights into the South African and global chemical industry, highlighting the chemistry, the manufacturing processes, the costs and profits and the environmental consequences. A holistic view will be taken where one or two processes will be covered in detail outlining the cradle-to-grave approach necessary in today's economic and social climate.

Practicals: A combination of laboratory work, assignments and workshops.

Assessment: Tests (8%), practicals (25%), 3 h exam (67%).

DP Requirement: Class mark 40%, 80% attendance at practicals.

Chemical Analysis

APCH231 W2 (27L-9T-36P-0S-67H-17R-0F-0G-4A-13W-16C)
Prerequisite Modules: CHEM110, CHEM120 and (MATH130 or 133).

Aim: To show the role and importance of analytical chemistry in industry and society and to provide basic theory and practical skills in "wet analytical" techniques.

Content: Analytical methodology, titrimetric and gravimetric methods of analysis, errors and uncertainties in measurements, principles of calibration, industrial applications.

Practicals: Volumetric and gravimetric analysis. Treatment of experimental results. Generation of calibration curves.
Assessment: Tests (8%), practicals (25%), 3 h exam (67%).

DP Requirement: Practical mark 50%, 80% attendance at practicals.

Materials

APCH312 W1 (27L-9T-36P-0S-67H-17R-0F-0G-4A-13W-16C)
Prerequisite Modules: CHEM210, 230.

Aim: To show the relationship between the microstructure and macroscopic properties of materials.

Content: Introduction to the atomic structures of crystalline materials, glasses and polymers. The relationship between structure, microstructure and useful macroscopic properties.

Practicals: Preparation and characterisation of various materials.

Assessment: Tests (10%), practicals (15%), assignment (5%), 3 h exam (70%).

DP Requirement: Class mark 40%, 80% attendance at practicals.

Industrial Chemistry

APCH322 W1 (27L-6T-36P-0S-68H-18R-0F-0G-5A-13W-16C)
Prerequisite Modules: CHEM230.

Corequisite: CHEM330.

Aim: To make students aware of the link between the traditional subjects of chemistry and c
hemical engineering.
Content: The industrial manufacturing process, qualitative and quantitative process flow di
agrams, unit operations
and unit processes, mass and energy balances on steady state systems â\200\224 recycle, byp
ass and purge, heat
˜ exchangers and steam tables, industrial separations and applications of phase chemistry.

Practicals: Phase chemistry; problem-solving workshops; flow sheet simulation using compute
r software; industrial
project. The course includes field trips.

Assessment: Tests (5%), practicals (14%), assignments (14%), 3 h exam (67%).

DP Requirement: Class mark 40%, 80% attendance at practicals and workshops.

Students may be required to contribute to the cost of field trips.

Environmental Analysis

APCH332 W2 (27L-9T-36P-0S-67H-17R-0F-0G-4A-13W-16C)
Prerequisite Modules: CHEM230; APCH231 or CTEC233.

Aim: To show the role and importance of analytical chemistry in studying the environment.

Content: Speciation, partition and transport, solubility, advanced analytical techniques, sampling: strategy, techniques and preservation.

Practicals: Sampling and analysis of real systems, use of modern instrumental methods of analysis.

Assessment: Tests (10%), practicals (23%), 3 h exam (67%).

DP Requirement: Class mark 40%, 80% attendance at practicals.

Integrated Project

APCH342 W2 (20L-0T-54P-0S-77H-0R-0F-0G-9A-13W-16C)
Prerequisite Modules: CHEM210, 220, 230, 340; APCH231 or CTEC233.

Aim: To develop an integrated approach to practical work.

Content: This module builds on elementary experimental techniques and focuses on experimental chemistry as a whole rather than as isolated segments of laboratory work. It is intended that students learn to carry out independent research/study. Sampling strategy, practical methodology, research techniques, record-keeping, writing laboratory reports, library practice and data sources, use of spreadsheets in chemistry.

Practicals: Mini-projects.

Assessment: Continuous assessment of laboratory work, written project reports and seminar (80%), tests and assignments (20%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Biochemistry

Offered in the School of Biochemistry, Genetics & Microbiology

Introductory Biochemistry and Microbiology

BIMI120 P2 W2 (36L-10T-36P-0S-55H-17R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in CHEM110.

Aim: To introduce students into the world of biochemistry and microbes.

Content: Major organic compounds of living organisms. Factors involved in biochemical reactions: thermodynamics, redox potential & enzymology; energy requirements for living organisms. Genes & their influence on the organism.
Discovery of micro-organisms. Definitions, scope, principles and concepts in Bacteriology, Mycology, Virology and Microbial Biotechnology. Microbiological methods: from aseptic techniques to microscopy. Microbial growth. Role & applications of microorganisms in Agriculture, Industry and the Environment.

Practicals: Introduction to practical aspects of Biochemistry & Microbiology.

Assessment: 3 h tests (20%), practical reports & assignments (20%), 3 h exam (60%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Biochemistry for Optometry

BIOC200 W1 (39L-10T-0P-08-21H-7R-0F-0G-3A-13W-8C)
Prerequisite Modules: CHEM110, 120, BIOL101.

Aim: To provide an overview of Biochemistry to Optometry students.

Content: Chemistry and metabolism of carbohydrates, lipids, amino acids and proteins. Porphyrins, vitamins and cofactors. Introductory enzymology and kinetics. Protein synthesis, nucleic acids and introduction to genetic engineering. Selected clinical correlations.

Assessment: Class Tests (50%), 2 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

For students in the Faculty of Health Sciences only.

Introduction to Biomolecules

BIOC201 P1 W1 (39L-10T-39P-0S-48H-18R-0F-0G-6A-13W-16C)
Prerequisite Modules: BIMI120 or BIOL101. CHEM110, CHEM120.

Aim; To provide an insight into the molecular diversity in living systems.

Content: Hierarchy of chemical structures in prokaryotic and eukaryotic cells. Chemistry of carbohydrates, amino acids, peptides and proteins. Introductory enzymology and kinetics. Structure and function of vitamins and cofactors.
Nucleic acid biochemistry and protein synthesis.

Practicals: Analyses of carbohydrates, amino acids, proteins and vitamins.

Assessment: Theory tests (25%), practical test and reports (25%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Credit may not be obtained for both of BIOC201 and BIOC203.

Bioenergetics and Integrated Metabolism

BIOC202 W2 (39L-10T-39P-0S-48H-18R-0F-0G-6A-13W-16C)
Prerequisite Modules: BIMI120 or BIOL101. CHEM110, CHEM120.

Aim: To introduce students to integrated biochemical pathways.

Content: Hierarchy of chemical structures in prokaryotic and eukaryotic cells. Chemistry of carbohydrates, amino acids, peptides and proteins. Introductory enzymology and kinetics. Structure and function of lipids, biomembranes, vitamins and cofactors. Nucleic acid biochemistry and protein synthesis.

Practicals: Spetrophotometric techniques, electrophoresis and chromatography of serum and other metabolites.
Assessment: Class Tests (25%), practical test and reports (25%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Credit may not be obtained for both of BIOC202 and BIOC203.

Biochemistry for Biologists

BIOC203 W1 (39L-0T-39P-0S-65H-11R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 64C at Level 1 including CHEM110, BIOL101, BIOL102.

Aim: To provide an overview of Biochemistry for Biologists in order to understand the processes involved in cellular metabolism, and the experimental techniques used to facilitate understanding in this field.

Content: Chemistry and metabolism of carbohydrates, lipids, amino acids and proteins. Introduction to enzymology and kinetics. Clinical correlations resulting from aberrations in individual metabolic pathways. Bioenergetics, regulation and control of metabolic pathways.

Practicals: Experimental techniques in biochemistry.

Assessment: Class Tests (25%), practical test and reports (25%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of lectures and practicals.

Credit may not be obtained for both BIOC203 and either of BIOC201 or BIOC202.

Signal Transduction and Metabolism

BIOC212 P2 (36L-22T-22P-0S-56H-18R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in BIMI120 or BIOL101.

Prerequisite Modules: CHEM110, 120.

Aim: To introduce the fundamentals of cell biology.

Content: Properties and function of biological membranes and subcellular organelles. Bioenergetics of metabolism.
Carbohydrate, lipid and amino acid metabolism; photosynthesis and nitrogen metabolism. Integration and regulation of metabolic pathways in animals, humans, plants, and microbes.

Practicals: Extraction & analyses of cell components & diagnostic procedures. Video illustration of properties & role of lipids in signal transduction.

Assessment: Continuous assessment: 6 h theory tests (50%), quizzes (25%), prac reports and test (25%), 60% externally examined.

DP Requirement: Not applicable.

This module has no supplementary exam.

Protein Structure & Function

BIOC304 P2 (14L-7T-12P-0S-32H-12R-0F-0G-3A-13W-8C)
Prerequisite Modules: BIOC201, 212, CHEM220.

Aim: To provide insight into the three levels of protein structure and the relationship between the structure and function (and evolution) of proteins.

Content: Concepts and methods in the determination of primary, secondary and tertiary structures of proteins; methods for the representation of the 3-D structure of proteins and the families of proteins which have thus been identified; mapping of enzyme active sites; enzyme reaction mechanisms.

Practicals: Computer-based exercises using animations & other tools to study protein structure & function.
Assessment: Continuous assessment: assignments (36%), quizzes (24%) and class tests (40%) (no exams), 50% externally examined.

DP Requirement: Not applicable.

This module has no supplementary exam.

RNA Chemistry and Gene Expression

BIOC307 W1 (30L-7T-36P-0S-57H-25R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 40% in CHEM220.

Prerequisite Modules: BIOC201, 202, RDNA202.

Aim: To introduce students to more advanced aspects of gene expression in prokaryotes and eukaryotes.

Content: Structure and chemistry of RNA. RNA-modifying enzymes. Transcription in prokaryotes and eukaryotes.
Control of transcription. Inhibitors, enhancers, promoters and transcription factors. Post-transcriptional modifications of RNA. Aminoacyl tRNA synthetases, codon-anticodon interactions, ribosome structure/morphology. Polypeptide synthesis, translational accuracy, inhibitors and control of translation. Post-translational modifications and protein degradation.

Practicals: Methods of RNA isolation, characterization and quantification.

Assessment: 2 h class tests (25%), practical reports and assignments (25%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Physiological Biochemistry

BIOC308 W2 (30L-7T-36P-0S-57H-25R-0F-0G-5A-13W-16C)
Prerequisite Modules: BIOC201, 202, CHEM220, RDNA202.

Aim: To introduce students to the physiological relatedness of various biomolecules.

Content: Sterol and hormone biosynthesis and regulation, lipoprotein structure and metabolism, inborn errors and gene therapy, biomembranes structure and function and signal transduction. Viral and chemical carcinogenesis.
Practicals: Properties and analysis of ATP, genetic mutation, isoenzymes and polyacrylamide gel electrophoresis.
Assessment: 2 h class tests (25%), practical reports and assignments (25%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Regulation of Metabolism

BIOC310 P2 (14L-20T-0P-0S-31H-12R-0F-0G-3A-13W-8C)
Prerequisite Modules: BIOC201, 212.

Aim: To provide insight into how metabolism and cell processes are regulated and may be manipulated in cells and the whole organism.

Content: The integration and regulation of metabolism, under normal, stressful (e.g. diabetes and cancer), and toxic conditions (e.g. microbial toxins and drugs), and the treatment of disease, from a mechanistic, signalling and cell biological perspective.

Assessment: 1 h tests (25%), assignments (15%), 2 h exam (60%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Biochemical Methods

BIOC311 P1 (27L-10T-22P-0S-71H-25R-0F-0G-5A-13W-16C)
Prerequisite Modules: BIOC201, 212, PHYS131.

Aim: To introduce techniques for protein, DNA, lipid and carbohydrate identification, isolation and analysis for biochemical, biological, medical, agricultural, and food sciences.

Content: Identification, extraction, separation and analysis of proteins, DNA, lipids and carbohydrates; centrifugation, precipitation, chromatography, electrophoresis, laboratory safety, cell culture, accessing the scientific literature.
Practicals: Techniques for protein, DNA, lipid and carbohydrate identification, isolation and analysis

Assessment: 2 h class tests and assignments (24%), practical reports (16%), 3 h exam (60%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

DNA Chemistry

BIOC315 P1 W1 (30L-10T-30P-0S-60H-25R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 40% in CHEM220.

Prerequisite Modules: BIOC201, (BIOC202 or 212), RDNA202.

Aim: To provide a detailed account of the chemistry and biochemistry of DNA and aspects of its manipulation.
Content: Molecular structure, enzymology, synthesis and repair of nucleic acids; advanced recombinant nucleic acid methodology, sequencing and analysis.

Practicals: DNA isolation, characterisation and manipulation.

Assessment: 2 h class tests (25%), practical reports and assignments (25%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Immuno- and Protein Chemistry

BIOC316 P2 W2 (30L-8T-30P-0S-62H-25R-0F-0G-5A-13W-16C)
Prerequisite Modules: BIOC201, (BIOC202 or 212), CHEM220, RDNA202.

Aim: To introduce a biochemical view of immunology and advanced aspects of protein conformation as well as to develop skills in the concomitant laboratory techniques.

Content: Innate and acquired immunity, biochemistry of humoral and cell-mediated immune responses, antibody-antigen interactions, immune cell receptors, cytokines; protein conformation and folding; peptide synthesis.
Practicals: Physico-chemical analysis of proteins and immunochemical techniques.

Assessment: 2 h class tests (25%), practical reports and assignments (25%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Specialized Molecular Techniques

BIMI701 W1 (20L-20T-60P-0S-44H-10R-0F-0G-6A-6W-16C)
Aim: To familiarize students with the selected advanced techniques.

Content: Capillary electrophoresis, anaerobic techniques, HLPC, SDS PAGE, preparation of competent cells, transformation of bacterial cells with plasmid DNA, isolation of plasmid and chromosomal DNA, agarose gel electrophoresis, colony hybridization, Southern hybridization, PFGE, AFLP analysis, RFLP and PCR. DNA sequencing, non-radioactive labelling and detection, documentation and analysis of protein and DNA gels, tissue culture and plant cell transformation, isolation and fusion of protoplasts, preservation of cultures (microbank, freeze-drying). y

Practicals: Molecular Techniques.

Assessment: Practical and theory tests (50%), oral exam (50%).

DP Requirement: Class mark of 40%, 80% attendance at tutorials & pracs.

T o b S Syllabus

Cell Biology & Methods in Cell Biology

BIOC701 P1 (24L-12T-50P-08-57H-6R-0F-8G-3A-13W-16C)
Aim: To introduce the theoretical aspects of intracellular trafficking of biomolecules.

Content: Topological continuity between organelle lumens and extracellular space; glucoprotein synthesis and trafficking; composition and autoassembly of extracellular matrix; structure and function of cytoskeleton; reciprocity between intracellular and extracellular order; relevance to cellular diseases such as cancer. Methods in subcellular fractionation, histochemistry, immunochemistry, various electron microscopy techniques, application of radioisotopes, animal cell culture and lysosome-endosome trafficking.

Practicals: Introduction to aspects to study of trafficking.

Assessment: Assignments (25%), practical reports (25%) and 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Research Project

BIOC702 PY WY (OL-20T-320P-8S-109H-10R-0F-12G-1A-26W-48C)
Aim: To instruct students in research methodology through the vehicle of a research project in Pure and Applied Biochemistry.

Content: Students will prepare and deliver seminars in selected areas of Biochemistry including fields such as Malaria, Poultry Pathogens, Immunodiagnostics, Trypanosomiasis, Immunotechnology, Immunocytochemistry, Electron microscopy, Cancer, Mechanisms of metastasis, Stem cells, Biochemical Education, Enzyme analysis, Modelling and purification, Biotechnology and undertake a research project selected under the supervision of staff.
Assessment: Dissertation and 1h oral presentation (100%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Antigens and Vaccines

BIOC703 P1 (241-12T-50P-08-57H-6R-0F-8G-3A-13W-16C)
Aim: To introduce the student to antigen presentation and vaccine design.

Content: Vaccine development - the malaria and HIV models; immunological, parasitological, molecular and metabolic considerations for host and parasite. Preparation and evaluation of affinity purified antigens. In silico vaccine design. Molecular Modelling. Antigen processing and presentation.

Practicals: Epitope mapping, advanced immunochemical techniques.

Assessment: Assignments (25%), practical reports (25%) and 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Modelling, visualisation & information retrieval

BIOC705 P1 (12L-20T-40P-44S-32H-0R-0F-10G-2A-13W-16C)
Aim: To critically evaluate current Biochemistry literature. To give students insight into the use of models, modelling and animations as visualization tools for biochemistry education and research.

Content: Biochemistry journal article discussion and presentation. Meaning, type and examples of models. Use of models, modelling and animations as visualization tools in teaching and research. The cognitive process of visualizing and interpreting models. Research methods for identifying visualization difficulties. Improving visual literacy in biochemistry.

Practicals: Practicals, Tutorials.

Assessment: Assignments (75%) and 2 h oral presentations (25%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Advanced Biochemistry Topics

BIOC707 P1 (OL-20T-57P-44S-35H-0R-0F-2G-2A-13W-16C)
Aim: To develop skills to access, collect and present scientific information on contemporary topics in Biochemistry.
Content: Written and oral presentations on selected topics. Data collection, recording and analysis on selected topics.
Practicals: Practicals, Tutorials.

Assessment: Assignments (50%) and 2 h oral and poster presentations (50%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Advanced Biochemical Core Topics 3

BIOC708 W2 (24L-20T-0P-0S-93H-18R-0F-0G-5A-6W-16C)
Aim: To instruct students in selected advanced aspects of the control of gene expression an d applications of genetic
engineering technology.

Content: Role of DNA methylation in eukaryotic DNA and nucleic acid based approaches to the attenuation of gene
expression. Industrial, medical and pharmaceutical applications of genetic engineering tech nologies. Students will
critically analyze recent peer-reviewed scientific publications.

Assessment: Tests (256%), 3 h exam (75%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Advanced Biochemical Core Topics 1

BIOC709 W1 (24L-20T-0P-0S-93H-18R-0F-0G-5A-6W-16C)
Aim: To instruct students in gene transfer and methodologies.

Content: Selected advanced topics from the areas of gene transfer protocols and reporter ge ne assay techniques.
The module will help develop theoretical competence and capacity in these areas.

Assessment: 2 h class tests and assignments (25%), 3 h exam (75%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Agric Biochemistry Research Skills

BIOC710 PC (12L-20T-40P-44S-32H-0R-0F-10G-2A-13W-16C)
Aim: To Introduce students to contemporary Biochemistry research skills.

Content: Qualitative and quantitative analysis, manipulation and interpretation of experime ntal and in silico data.
Statistical analysis of Biochemical data. Financial research planning and management. Anima l and human research
ethics.

Assessment: Assignments (75%) and 2 h oral and poster presentations (25%).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. This module has no supplementary exam.

Specialized Biochemical Techniques 1

BIOC711 W1 (10L-10T-90P-0S-39H-8R-0F-0G-3A-6W-16C)
Aim: To instruct students in the practical aspects of mammalian cell culture and the transf ection of selected cell lines.
Content: The propagation and cryopreservation of mammalian cells including immortal lines. Cell viability assays.
Transient or stable transfections and transgene assays will be performed.

Assessment: Practical report (50%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Advanced Biochemical Core Topics 2

BIOC713 W1 (24L-20T-0P-0S-93H-18R-0F-0G-5A-6W-16C)
Aim: To instruct students in recombinant DNA technology.

Content: Selected topics in recombinant DNA technology.

Assessment: 2 h class tests and assignments (25%), 3 h exam (75%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Biological Sciences

Offered in the School of Biological & Conservation Sciences

Foundation Biology

BIOL099 PY WY (31L-27T-81P-0S-55H-30R-0F-0G-16A-26W-24FC-0DC)
Corequisite: CHEM099, MATH099, PHYS099, (SCOM003 or 013).

Aim: To develop practical and cognitive science process skills, and basic content in biology.

Content: Nature of Life and biology; diversity & classification of living organisms; continuity of Life, ecological organization; cell structure and function; scientific method; natural selection and evolution; the rocky shore ecosystem; selected aspects from botany or zoology to teach generic academic skills.

Practicals: Related laboratory work and field excursions.

Assessment: Practical work, tests, essays, exercises (24%); June theory & practical tests (10%); 3 h theory exam (33%); 3 h practical exam (33%).

DP Requirement: Class mark of 40%; 80% attendance at all lectures, tutorials, practicals, and field excursions.
Year-long Module. This module is only for students in the Science Foundation Programme and carries 24 foundation credits only. Students may be required to contribute to the cost of field trips.

The Smaller Side of Life

BIOL101 P1 W1 (39L-10T-36P-0S-43H-24R-0F-0G-8A-13W-16C)
Aim: To introduce structure, function and synthesis of biological molecules, structure and function of cells, introductory genetics.

Content: Living organisms, scientific method, science ethics, origin and diversity of life. Important biological molecules and metabolic processes. DNA replication, transcription, genetic code, translation. Cell theory, prokaryote cells, eukaryote cells. Mitosis & meiosis. Introductory genetics.

Practicals: Selected from topics above.

Assessment: Tests/assignments (20%), practical reports (20%), 3 h practical test (10%), 3 h theory exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Subminimum to pass: 40% in each exam. Credit may not be obtained for both BIOL101 and BIOL195.

Life on Earth

BIOL102 P2 W2 (39L-10T-37P-0S-51H-15R-0F-0G-8A-13W-16C)
Aim: To develop basic knowledge and understanding of the diversity of organisms, their origin and their importance.
Content: Levels of biological complexity. Evolutionary innovations and radiation of organisms (bacteria, fungi, plants and animals). Principles of classification. Biodiversity and conservation.

Practicals: Selected from the topics above. Field trips.

Assessment: Tests/assignments (30%), practical reports (20%), 3 h theory exam (50%).

DP Requirement: Class mark of 40%; attendance at 80% of tutorials and practicals.

Subminimum to pass: 40% in each exam. Credit may not be obtained for both BIOL102 and BIOL1
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Introductory Biology for Health Sciences

BIOL103 W1 (39L-10T-39P-0S-60H-4R-0F-0G-8A-13W-16C)
Aim: To introduce students to a range of biological topics pertinent to the health sciences
.

Content: This module comprises three themes: history and diversity of life, cytology and ge
netics. Where possible
students are shown how these topics apply to real-life situations.

Practicals: Viruses, Archaea, Bacteria, Eukaryotes, Protista, Fungi, Rhodae, Stromenopilae,
spore-producing and
seed-producing Plantae, biomolecules, mitosis and meiosis, membrane structure and function,
structure of plant and
animal cells, Hardy-Weinberg principle.

Assessment: Theory tests (20%), assignment (5%), practical reports (10%), 3 h practical exa
m (25%), 3 h theory
exam (40%).

DP Requirement: Class mark of 40%:; attendance at 80% of tutorials and practicals.

Service module for Faculty of Health Sciences, not available in the Faculty of Science and
Agriculture.
Subminimum to pass: 40% in each exam.

Smaller Side of Life (Augmented)

BIOL195 P1 W1 (78L-78T-76P-0S-17H-60R-0F-0G-11A-13W-16FC-16DC)
Aim: To introduce structure, function and synthesis of biological molecules, structure and function of cells,
introductory classical genetics.

Content: This module is available only to students registered for the BSc4 (Augmented stream). It covers the syllabus
of BIOL101 but, in addition, includes a substantial amount of supplementary material and tuition designed for students
who are under-prepared for university-level studies to a maximum of 160 additional hours.

Practicals: See BIOL101.

Assessment: Tests/assignments (20%), practical reports (20%), 3 h practical test (10%), 3 h theory exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Subminimum to pass: 40% in each exam. Credit may not be obtained for both BIOL195 and BIOL101. This
module is worth 16 degree credits and 16 foundation credits.

Life on Earth (Augmented)

BIOL196 P2 W2 (78L-78T-76P-0S-17H-60R-0F-0G-11A-13W-16FC-16DC)
Aim: To develop basic knowledge and understanding of the diversity of organisms, their origin and their importance.
Content: This module is available only to students registered for the BSc4 (Augmented stream). It covers the syllabus
of BIOL102 but, in addition, includes a substantial amount of supplementary material and tuition designed for students
who are under-prepared for university-level studies to a maximum of 160 hours.

Practicals: See BIOL102.

Assessment: Tests/assignments (30%), practical reports (20%), 3 h theory exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Subminimum to pass: 40% in each exam. Credit may not be obtained for both BIOL196 and BIOL102. This
module carries 16 degree credits and 16 foundation credits.

Foundation Biology

BIOL199 PY WY (31L-27T-81P-08-55H-30R-0F-0G-16A-26W-20FC-4DC)
Corequisite: CHEM199, MATH199, PHYS199, (SCOM103 or 113).

Aim: To develop practical and cognitive science process skills, and basic content in biology.

Content: Nature of Life and biology; diversity & classification of living organisms; continuity of Life, ecological
organization; cell structure and function; scientific method; natural selection and evolution; the rocky shore ecosystem;
selected aspects from botany or zoology to teach generic academic skills.

Practicals: Related laboratory work and field excursions.

Assessment: Practical work, tests, essays, exercises (24%); June theory & practical tests (10%); 3 h theory exam

(33%); 3 h practical exam (33%).

DP Requirement: Class mark of 40%; 80% attendance at all lectures, tutorials, practicals and field excursions.
Year-long Module. This module is only for students in the Foundation Stream of the BScd. It carries 20 foundation credits and 4 degree credits. Students may be required to contribute to the cost of field trips.

Biological Sciences Toolkit
BIOL200 P1 W1 (23L-7T-27P-0S-73H-25R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64 C at Level 1.
Prerequisite Modules: BIOL101, 102 and STAT143.
Aim: To cover, within a biologicallecological context, experimental design, statistical analysis, and scientific writing.
Content: Experimental/Sampling design, hypothesis and prediction generation in biology. Basic statistics as applied to biological problems, summary and interpretation of biological/ecological data. Training in scientific writing related to above course content.
Practicals: Hypotheses generation and testing, experimental design, biological data analysis, data interpretation, scientific writing.
Assessment: Continuous assessment (50%); 3 h theory exam (50%).
DP Requirement: Class mark of 40%.
Subminimum to pass: 40% in exam.

Plant and Animal Ecophysiology

BIOL204 P1 W1 (27L-3T-36P-0S-73H-15R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 64C at Level 1.

Prerequisite Modules: BIOL101, 102.

Aim: To provide a basic understanding of major physiological processes of plants and animals, and their relevance, in relation to environmental fluctuations.

Content: Topics from, but not restricted to: Plants: physical environment; growth; photosynthesis; mineral nutrition; water relations; stomatal physiology. Animals: Homeostasis & control theory; thermoregulation; osmoregulation, excretion; circulation; respiration; energy metabolism; endocrinology; nervous system; digestion. Application of key concepts to society.

Practicals: Skills covering the above concepts.

Assessment: Tests (15%), practical assessments, practical reports and scientific reports (35%); 3 h exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam. Credit may not be obtained for both BIOL204 and BIOL216.

Modern Applications of Molecular Biology

BIOL205 P2 W2 (27L-9T-36P-0S-68H-15R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 1.

Prerequisite Modules: BIOL200, CHEM110.

Aim: To introduce the fundamental concepts of molecular biology, their practical applications for biologists, and their relevance to society.

Content: Fundamental concepts (genome structure and organization, transcription, translation, control of gene expression) underlying the application of modern molecular biology to: molecular systematics, behavioural and conservation ecology, bioinformatics and society. Applications could include: fingerprinting, Human Genome Project, transcriptomics, forensics.

Practicals: Practical exercises linking the theoretical foundations with the applications outlined above.

Assessment: Tests and practical reports (50%); 3 h theory exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam. Credit may not be obtained for both BIOL205 and BIOL232.

Plant Diversity and Use

BIOL211 P2 (36L-0T-45P-0S-59H-15R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64 C at Level 1.

Prerequisite Modules: BIOL102.

Aim: To provide an evolutionary framework of the continuity from unicellular organisms through evolution of increasingly complex lifecycles to the explosive radiation of the Anthophyta, and skills in plant identification.

Content: Algae. Lichens. Liverworts & mosses. Lower vascular plants. Evolution of seeds; radiation of gymnosperms;
key innovations. Origin and radiation of angiosperms, their success and diversification into contemporary families.
Practicals: Characteristic features, identification & recognition of plant groups, with special emphasis on grasses and
trees; weekend field trip(s).

Assessment: Assessment: Assignments (including plant collections) (15%), tests (15%), practical test (10%), essay
(10%); 3 h exam (50%).

DP Requirement: Class mark of 40%; attendance at field trip(s).

Subminimum to pass: 40% in exam. Students may be required to contribute to the cost of the field trip(s).
Credit may not be obtained for both BIOL211 and BIOL212.

Angiosperm Evolution & Diversification

BIOL212 W1 (30L-4T-39P-8S-68H-4R-0F-0G-7A-13W-16C)
Prerequisite Requirement: 64 C at Level 1.

Prerequisite Modules: BIOL102.

Aim: To develop understanding of angiosperm classification using DNA analyses, cladistic analyses and the latest
fossil finds.

Content: Angiosperm structure & evolution: phylogenetic principles & structural evolution, angiosperm ancestry,
flowering plants as creations of the insects & dinosaurs, angiosperm flower theories, angio sperm time & place of
origin. Angiosperm diversification: evolutionary trends; importance of pollination syndrome s, classificatory versus
cladificatory hypothesis

Practicals: Use of diagnostic keys. Prominent & economically important South African flower ing plant families.
Assessment: Practical reports (10%), plant collection (5%), seminar (5%), theory tests (15%), practical test (15%); 3
h theory exam (50%).

DP Requirement: Class Mark of 40%.

Subminimum to pass: 40% in exam. Credit may not be obtained for both BIOL211 and BIOL212.

Invertebrate Diversity & Conservation

BIOL213 P1 (221.-18T-42P-0S-57H-15R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 64 C at Level 1.

Prerequisite Modules: BIOL102.

Aim: To expose students to the diversity of invertebrates through working with them in natu ral habitats, and to
develop the foundations of scientific skills and approaches in the context of exploring inv ertebrate diversity.

Content: Origin of and evolutionary trends in invertebrates. Classification and diversity. |dentification of major groups.
Invertebrates and people. Conservation.

Practicals: Sampling strategies for invertebrates. Invertebrate diversity and survival in d ifferent habitats (marine,
freshwater and terrestrial).

Assessment: Tests (15%), scientific report (15%), assignments (20%), 2 h practical test (15 %, externally examined);
3 h theory exam (35%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam. Credit may not be obtained for both BIOL213 and BIOL214.

Invertebrate Diversity & Ecology

BIOL214 W1 (12L.-24T-42P-0S-62H-15R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64 C at Level 1.

Prerequisite Modules: BIOL102.

Aim: To introduce the diversity and ecological significance of the dominant invertebrates i n marine and terrestrial
habitats.

Content: Origin of and evolutionary trends in invertebrates. Invertebrate classification an d diversity. Identification of
major groups of invertebrates, with emphasis on marine phyla including an introduction to p rotozoans. Ecological
importance of dominant marine and terrestrial taxa, emphasising their habitat, mode of feed ing, and role in food-web

processes.

Practicals: Field trips with subsequent analysis in laboratory; insect collection.

Assessment: Field assessment (10%), field-trip report (10%), insect collection (10%), class tests (20%); 3 h theory exam (50%).

DP Requirement: Class mark of 40%; attendance at field trip.

Subminimum to pass: 40% in exam. Students may be required to contribute to the cost of the field trip. Credit may not be obtained for both BIOL214 and BIOL213.

Vertebrate Biology

BIOL222 P2 (31L-5T-48P-0S-55H-15R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 64 C at Level 1.

Prerequisite Modules: BIOL102.

Aim: To enable students to acquire an understanding of the relationships and comparative biology of vertebrate animals.

Content: Classification, origin and evolution, anatomy and physiology, adaptive radiation and adaptation, life histories, behaviour, ecology, demography and social organisation of fishes, amphibians, reptiles, birds and mammals.
Practicals: Use of identification keys, dissection, biological illustration, life tables, census, capture mark-and-release, mist-netting and ringing, small-mammal trapping, scientific writing in an integrated comparative style.

Assessment: Theory & practical tests (24%), practical reports (16%); 3 h theory exam (60%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Rangeland:Plants, Ecology and Management

BIOL223 P1 (27L-9T-36P-0S-68H-15R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 1.

Prerequisite Modules: BIOL102.

Aim: To introduce the principles of rangeland ecology and management in conservation, game ranching, agricultural & communal systems. To develop expertise in rangeland research techniques.

Content: Key ecological principles and applications in range & wildlife management. Responses of grasses to defoliation, grazing systems, veld condition, fodder flow management, ecological & production characteristics of livestock systems, veld burning, rangeland monitoring techniques.

Practicals: Assessment of veld condition & forage quality. Field visits. Identification & collection of grass & tree species. Microscope techniques, keys for plant identification.

Assessment: Tests (20%), assignments (10%), practical reports (20%), 3 h exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Marine Environment

BIOL231 W2 (27L-9T-36P-0S-68H-15R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64 C at Level 1.

Prerequisite Modules: MATH133.

Aim: To introduce the geological, chemical, physical & biological processes of the marine environment.

Content: Geological: continental drift, plate tectonics, geological environments, sediments. Chemical: seawater, macronutrients, trace elements, dissolved gases, nitrogen cycle. Physical: circulation patterns, upwelling, tides, waves, near-shore currents, vertical processes. Biological: light and primary production, food webs, benthic/pelagic subsystems, functional ecosystems.

Practicals: Measurement of particle size, sediment characterization, wave characteristics, flow rates, salinity, temperature, dissolved oxygen, photon flux, biomass and production.

Assessment: Course work, practical exercises and tests (50%); 3 h exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Immune Systems

BIOL233 W2 (27L-9T-36P-0S-68H-15R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 1.

Prerequisite Modules: BIOC203, BIOL101, 102.

Aim: To introduce immunology & the functioning of the immune system, relating it to both cellular and molecular biology, but placing it in the context of vertebrate systems.

Content: Anatomy of the immune system. Haematopoetic tissue. Lymphocyte populations. Innate immunity. Adaptive immunity: generation of B-cell and T-cell diversity- genetic control of antibody diversity, antibody-antigen interactions.
Histocompatibility & human diversity, transplant rejection. Hypersensitivity, HIV and AIDS, autoimmune dysfunction.
Alternative immune systems (invertebrates and cyclostomes).

Practicals: Appropriate to the above.

Assessment: Tests (15%), Tutorials (10%), Practicals (10%), Essay (15%), 3h Exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Cytology & Cellular Biology

BIOL234 W2 (29L-9T-36P-8S-56H-15R-0F-0G-7A-13W-16C)
Prerequisite Requirement: 64C at Level 1.

Prerequisite Modules: BIOC203, BIOL101, 102.

Aim: To introduce the science of cell structure and function.

Content: Theory and use of light and electron microscopy; cell walls, cellulose biosynthesis and specialization; the endomembrane and cytoskeletal systems; organelles; cell communication and signalling, ultrastructural morphology and functions of secretory tissues.

Practicals: Introduction to the principle and practice of light and electronmicroscopy; app lication of histo- and cyto-
chemical tests to plant and animal cells. Histology.
Assessment: Seminar (5%), Assignment (5%), Theory Test (15%), Practical Test (15%), Practic al Reports (10%); 3 h
exam (50%).

P Requirement: Class mark of 40%.
Subminimum to pass: 40% in exam.

Professional Communication for Biologists

BIOL300 P1 W1 (7L-23T-3P-108-117H-0R-0F-0G-0A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To train students to contextualise, critically evaluate, synthesise, & express biologi cal information and concepts
for a range of audiences.

Content: A sequence of iterative tasks focussing on a particular topic designed to develop core competencies
required for the study of biology and its component disciplines. Particular emphasis on ski lls relating to
contextualising, critically evaluating, synthesising and expressing biological information and concepts so that they can
be effectively communicated to a range of audiences.

Assessment: Introductory exercise (5%), letter to the editor (20%), critical assessment of school seminars (10%),
press conference (15%), multi-component review paper (50% externally examined).

DP Requirement: Not applicable.

| Subminimum to pass: 50% weighted average in externally examined components. This module h as no

supplementary exam. Available only to students registered for a qualification within the SB CS.

Community Ecology

BIOL303 P1 W1 (30L-6T-36P-30S-37H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To understand the origin, maintenance & consequences of biological diversity in local communities.

Content: Patterns & processes in collections of species from particular places. Topics from , but not restricted to:
community patterns; food webs; competition & disturbance in community assembly; species int eraction & coexistence;
succession; spatial dynamics & species-area theory; macroecological issues, landscape ecolo gy.

Practicals: Field trip(s); sampling methods, data collection; measurement of diversity; cla ssification and ordination;
comparing community composition; species-area theory; succession-matrix models.

Assessment: 2 tests (20%), 3 prac & field-trip reports (20%), research-paper review (5%), s

eminar (5%); 3 h exam
(50%).

DP Requirement: Class mark of 40%; attendance at field trips.

Subminimum to pass: 40% in exam. Students will be required to contribute to the costs of the field trip(s).

Evolution and Systematics

BIOL304 P2 W2 (27L-5T-39P-0S-68H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To understand the processes of evolution, modern debates in evolutionary biology, phylogenetic estimation and biological systematics.

Content: Evolutionary thinking; microevolution; species concepts and speciation; classification systems; molecular evolution; phylogenetic estimation; molecular systematics. Topics from: natural selection; adaptation; convergence; co-evolution and mimicry; adaptive radiation; primate evolution; gradualism; neutralism; chromosomal, protein and DNA variation; nomenclature.

Practicals: Selected from the topics above.

Assessment: Review essay (15%), Test (15%), Practical reports (20%), 3 h exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Wildlife Conservation and Management

BIOL312 P2 (18L-6T-60P-0S-56H-16R-0F-0G-4A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200, 203.

Aim: To measure and assess key ecosystem processes underlying decision-making in management of wildlife- |
conservation areas. j
Content: Scientific principles relevant to management of conservation areas, including understanding the resource :
base, rangeland management principles, vegetation/animal interactions, fire as a management tool and restoration. |
Management philosophies and practices. |
Practicals: Extended field trip to a conservation area chosen to expose students to realistic conservation- |
management issues; data collection, integration and analysis. !
Assessment: Assignments (5%), tests (5%), essay (5%), field-trip report (50%, externally examined); 2 h theory :
exam (35%). :
DP Requirement: Class mark of 40%; attendance at field trip. :
Offered in Semester 2, with the compulsory field trip in the winter vacation. Subminimum to pass: 40% in
exam. Students will be required to contribute to the cost of the field trip.

Applied Biotechnology

BIOL315 P2 (29L-10T-36P-5S-59H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2. â\200\230
Prerequisite Modules: BIOL101. â\200\230
Aim: To introduce students to the principles of plant bio- and molecular technology and their applications (in
agriculture and industry). |
Content: Principles of gene cloning; plasmid vector selection; transformation techniques; gene location and structure.
Gene transfer and analysis. Cell culture. Manipulation of growth and development in vitro. Emphasis is placed on the
relevance of biotechnology in modern society.

Assessment: Tests (10%), essay (5%), practical reports (20%), seminar (5%); 3 h exam (60%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam. Credit may not be obtained for both BIOL315 and BIOL316.

Animal and Plant Biotechnology

BIOL316 W2 (36L-33T-3P-20S-47H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200, 205.

Aim: To introduce students to the basic concepts of genetic engineering and biotechnology and their applications to
the fields of agriculture, forestry, animal husbandry, medicine, forensics, etc.

Content: Ancient, classical and modern biotechnology. Classical studies on cloning. Basic principles of recombinant-
DNA technology. Gene transfer methods in animals and plants. Topics plant and animal biotechnology. Biotechnology
and forensics. Regulations, patents and society.

Assessment: Tests (25%), tutorial assignments (10%), poster (15%), 3 h exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam. Credit may not be obtained for both BIOL316 and BIOL315.

Plant Growth and Development |
BIOL321 P1 (29L-10T-36P-0S-64H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2. |
Prerequisite Modules: BIOL101, 102.

Aim: To provide understanding of scientific principles with respect to biotic and abiotic factors that play a role in correlative processes such as germination, juvenility, rooting, apical dominance, flowering, senescence, abscission and plant movements.

Content: Scientific principles with respect to biotic and abiotic factors that play a role in correlative processes such as germination, juvenility, rooting, apical dominance, flowering, senescence, abscission and plant movements.
Assessment: Tests/assignments (20%), practical reports (20%); 3 h theory exam (60%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Syllabus 14/

Insect Diversity and Evolution

â\200\230BIOL322 P1 (30L-9T-36P-0S-63H-16R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

’Prerequisite Modules: BIOL102.

Aim: To develop an understanding of the evolutionary relationships of insects, their diversity, comparative biology and relevance to human society.

Content: Functional morphology and ontogenetic systems of insects; life histories, ecological interactions, biological Tequirements, biotic significance and classification of important families of all orders of insects, emphasising evolutionary relationships, adaptations and relevance to human society.

Assessment: Review paper (10%), practical reports (8%), theory and practical tests (12%), insect collection (20%); 3 h exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass 40% in exam.

Advanced Rangeland Ecology

BIOL323 P1 (27L-12T-36P-0S-64H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To provide a grounding in applied rangeland ecology and objective-based management.

Content: Determinants of community composition in natural and transformed rangelands; the roles of disturbance and competition for resources. Productivity, carrying capacity, stocking rates, secondary productivity in complex, dynamic interactive systems. Management & rehabilitation of vegetation types to achieve particular outcomes. Historical & contemporary theories of rangeland function.

Practicals: Manipulative experiments to examine determinants of community composition; long-term ecological rials; transformed rangelands; weekend field trip.

â\200\230Assessment: Practical reports (10%), assignment (20%), class tests and spot tests (20%); 3 h exam (50%).

DP Requirement: Class mark of 40%; attendance at field trips.

Subminimum to pass: 40% in exam. Students may be required to contribute to the cost of the field trip(s).

Evolutionary Animal Physiology

BIOL324 P1 (27L-3T-36P-0S-73H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To explore the evolution of physiological diversity and adaptation, following the theme of tracing the fate of energy from the environment to offspring.

Content: Environmental resource availability, gross energy of consumption, metabolizable energy, maintenance energy, net energy, production energy, reproductive energy, energetic basis of fitness, physiological adaptation.
Practicals: Mammalian digestive systems, rumen morphology and physiology, bomb calorimetry, respirometry, telemetric systems, analysis of energetic data, the comparative method, quantitative genetics of energetic parameters, analysis of life-history data.

| Assessment; Scientific papers (40%), tests (10%); 3 h exam (50%).

| DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Reproductive & Behavioural Ecology

BIOL325 P2 (30L-5T-46P-0S-58H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To develop an understanding of evolutionary ecology. To encourage critical thought and the ability to construct and test hypotheses in evolutionary ecology.

Content: Evolutionary ecology (Introduction). Reproductive ecology: concept of sexual selection, reproductive ecology in animals (including sociality), reproductive ecology in plants. Foraging theory: animals, plant defence strategies.
Coevolution.

Practicals: 10 laboratory exercises and a weekend field trip.

Assessment: Theory tests (20%), reports (12%), mini-project report (18%); 3 h exam (50%).

DP Requirement: Class mark of 40%; attendance at field trip.

Subminimum to pass: 40% in exam. Students may be required to contribute to the cost of the field trip.

Marine Systems

BIOL341 W1 (27L-5T-50P-0S-57H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To contextualise interactions among marine organisms and between these organisms and their environment,
emphasising that many marine ecosystem services vital to the global biosphere emerge only at the ecosystem level.
Content: The Earth as a system. Overviews of marine systems, their ecosystem processes and their future. Ocean
systems in relation to biogeochemical cycles, climate and humanity from a local to global perspective.

Practicals: Selected from the topics above, including group work. Field Trip(s).

Assessment: Field trip reports (35%), class tests (15%), 3 h exam (50% externally examined).

DP Requirement: Attendance at field trip(s). Class mark of 40%.

Subminimum to pass: 40% in exam. Students will be required to contribute to the costs of the field trip(s).

Marine Ecophysiology

BIOL342 W2 (27L-9T-36P-7S-60H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200, 204.

Aim: To focus on the physiological functioning of animals, algae and plants in relation to the marine environment.
Content: Animals: feeding, growth and production; respiration and diving mammals; water density and strategies
used to achieve neutral buoyancy; osmotic regulation in marine vertebrates and invertebrates; nitrogen excretion and
utilisation. Algae and plants: effects of light intensity and quality, temperature, salinity, nutrient status, pigments,
osmotic balance on growth, stress and production.

Practicals: Selected from the topics above.

Assessment: Practical reports (25%), class tests (15%), seminar (10%); 3 h exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Applied Marine Biology

BIOL343 W2 (29L-9T-36P-0S-47H-16R-0F-20G-3A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200, 231.

Aim: To provide students with understanding of practical and conceptual applications of marine biological principles.
Content: Concepts and applications, including marine conservation, mariculture and biotechnology, marine pollution,
coastal-zone management, sustainable utilization and fisheries science.

Practicals: Selected from the topics above. Field trip(s).

Assessment: Assignments (50%); 3 h theory exam (50%).

DP Requirement: Class mark of 40%; attendance at field trips.

Subminimum to pass: 40% in exam. Students may be required to contribute to the cost of the field trip(s).

Parasites and People

BIOL344 W1 (29L-18T-18P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL101, 102.

Aim: To survey animals that cause parasitic disease in people in South Africa, to identify those of public-health
importance and to discuss measures to control them.

Content: Animals that cause parasitic disease in people in South Africa: morphology and life-cycles, modes-of-
transmission, effects, epidemiology, species of public-health importance (morbidity, burdens of disease, influence of
water-resource developments on disease transmission, control programmes, drugs and drug resistance, insecticides,
molluscicides, parasites and AIDS).

Practicals: Selected from the topics above.

Assessment: Practical write-ups (15%), test (10%), essay (15%, externally examined), practical test (20%), 3 h theory exam (40%).

DP Requirement: Class mark of 40%.

Subminimum to pass 40% in exam.

Functional Cell Architecture

BIOL345 W1 (271-18T-39P-0S-52H-16R-0F-0G-8A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL205.

Aim: To provide an overview of structure, function and coordination at the subcellular, cellular and tissue levels in plants and animals.

Content: Membrane structure. Properties & biophysics of intracellular water. Intracellular spatial organisation. Membrane biosynthesis & flow. Integration of non-endomembrane-related organelles. Intra- and extracellular coordination. Theory of light microscopy. Theory of scanning and transmission electron microscopy.

Practicals: Theory & practice of light microscopy, transmission & scanning electron microscopy and adjunct techniques. Microscopical image recording. Mini-project.

Assessment: Theory tests (25%); mini project report (10%); practical test (15%); 3 h theory exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in the exam.

Pollution and Remediation Biology

BIOL347 W1 (29L-21T-18P-0S-71H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To apply theoretical concepts from cellular biology to contemporary environmental problems involving pollution.
Content: Basic principles of pollution, ecotoxicology and remediation. This include: (1) the nature, sources and ultimate fate of pollutants, (2) the effect of pollutants on all levels of organization, including biochemical, cellular, whole organism, populations, communities and ecosystems, and (3) remediation of polluted ecosystems.

Practicals: Preparation and presentation of a scientific poster. Mini-project on a topic selected from above content.
Assessment: Tests (25%), Mini-project (15%), Poster presentation (10%), 3 h Exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Applied Plant Physiology

BIOL348 W2 (28L-0T-39P-0S-72H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To illustrate the importance of whole-plant physiology in the growth and performance of plants in natural and managed ecosystems.

Content: Advanced plant water relations: pressure-volume curves; transpiration; modelling of evapotranspiration; hydraulic characteristics. Photosynthesis: response of assimilation to intercellular CO_2; stomatal limitations; water-use efficiency; introduction to chlorophyll fluorescence. Stress physiology: responses of plants to environmental stresses; stress resistance; determinants of plant growth & productivity.

Practicals: Modern techniques in plant ecophysiology; mini-project.

Assessment: Reports on practical exercises (30%), tests (20%); 3 h exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Seeds and Vegetative Propagation

BIOL349 W1 (29L-15T-36P-0S-58H-16R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To provide students with an insight into the theoretical information and practical skills relevant to this applied field of plant sciences.

Content: Seed structure and development, water in seeds, orthodox and recalcitrant/non-orthodox seeds. Traditional and modern approaches to plant propagation and breeding (e.g. macro- and micropropagation, in vitro cultures) and germplasm conservation. Applications to agriculture, forestry and conservation.

Practicals: Selected exercises from the topics above.

Assessment: Tests (25%), practical write-ups (25%); 3 h exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Developmental Biology

BIOL350 W2 (29L-9T-33P-6S-62H-16R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 64C at Level 2.

Prerequisite Modules: BIOL200, 205.

Aim: To provide an overview of core concepts and principles of Developmental Biology and the application of these to society.

Content: Topics selected from, but not restricted to: Gametogenesis, from Sperm to Egg to Embryo, Germ Cells, Genetic regulation of development, Organizing the multicellular embryo (Morphogensis), Generating cell diversity (Hox Genes, Cell determination and differentiation, programmed cell death). Application of selected key concepts to society, including: Reproductive (Fertility) technology, Development and cancer.

Practicals: Skills covering the above concepts.

Assessment: Practical reports (10%), Seminar (15%), Tests (25%), 3 h exam (50%).

DP Requirement: Class mark of 40%.

Subminimum to pass: 40% in exam.

Biology/Ecology Research Project

BIOL390 PB WB (OL-6T-98P-0S-56H-0R-0F-0G-0A-13W-16C)
Prerequisite Requirement: 96C at Level 2 including 48C in biological sciences.

Prerequisite Modules: BIOL200.

Aim: To introduce students to independent research in biological and/or ecological sciences, thereby improving their problem-solving abilities, and increasing their interest in and enthusiasm for the subject matter.

Content: Conception, design, execution and reporting of a small independent research projec t chosen from a list appropriate to the student’s qualification/specialisation (as approved by the Academic Coordinator) and supervised by individual staff members.

Assessment: Performance and attitudes (30%), project write-up (70%, externally examined).

DP Requirement: Not applicable.

Offered in Semester 1 and 2. Subminimum to pass: 50% in project write-up. This module has no supplementary exam. Available only to students registered for a qualification within the SBCS and who are in their final or penultimate year of registration.

Marine Biology Research Project

BIOL391 WB (OL-6T-98P-0S-56H-0R-0F-0G-0A-13W-16C)
| â\200\230Prerequisite Requirement: 96 C at Level 2.

Prerequisite Modules: BIOL200.

Aim: To introduce students to independent research in Marine Biology, thereby improving their problem-solving
| abilities, and increasing their interest in and enthusiasm for the subject matter.

Content: Conception, design, execution and reporting of a small independent research project chosen from a list
| appropriate to Marine Biology (as approved by the Academic Coordinator) and supervised by individual staff

members.

Assessment: Performance and attitudes (30%), project write-up (70%, extemnally examined).

DP Requirement: Not applicable.

Offered in Semester 1 and 2. Subminimum to pass: 50% in project write-up. This module has no

supplementary exam. Available only to students registered for the Marine Biology Programme within the

SBCS.

Biology/Ecology Tools and Skills

BIOL701 P1 W1 (36L-36T-36P-10S-42H-0R-0F-0G-0A-6W-16C)
Prerequisite Requirement: 64C at Level 3 in biological and/or ecological sciences.

Aim: To provide skills for planning, implementing, analyzing and interpreting research in ecology and biology.
Content: Two compulsory sections are (a) Introduction to the philosophy of biology (quarter of module), and (b)
Introduction to statistical analysis for biological research (quarter of module). The remainder will be skills-based
options decided in consultation with academic staff, including advanced biological statistics (multivariate techniques),
electron microscopy, bioinformatics, radiochemistry, museum techniques, botanical techniques, GIS, ecological field
techniques.

Practicals: As appropriate.

Assessment: Continuous (100%); exercises comprising at least 50% of the final mark externally examined.

DP Requirement: Not applicable.

Subminimum to pass: 50% weighted average in externally examined components. This module has no
supplementary exam.

Terrestrial Biodiversity

BIOL711 WC (OL-9T-24P-16S-111H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological sciences.

Aim: To introduce advanced aspects of terrestrial biodiversity classification, measurement and management.

Content: A common assignment and seminar are undertaken by all students after which they may opt to pursue one of three themes: floristic, faunal or ecological diversity. Topics covered will include biological classification, species concepts, reproductive biology, biogeography, patterns and determinants of diversity, interspecific interactions, and biological invasions.

Practicals: Field trips may be undertaken to museums, herbaria, field stations or botanical gardens.

Assessment: Continuous (100%); exercises comprising at least 50% of the final mark externally examined.

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. Students may be required to contribute to the cost of the field trip(s). This module has no supplementary exam.

Parasitology

BIOL712 WC (OL-30T-0P-0S-130H-0R-0F-0G-0A-7W-16C)
Prerequisite Modules: BIOL344.

Aim: To provide an overview of some of the aspects of parasitology, notably in the biomedical field, that are currently being debated in the literature.

Content: A selection of three topics that are of current interest to medical parasitologists worldwide. These topics may. change from year to year. Examples are: host manipulation by parasites, emerging diseases, drug and insecticide resistance in parasites and arthropod vectors respectively, the DDT dilemma in malaria control, the use of GIS in control-programme planning. Weekly tutorials to discuss issues arising from the assignments.

Assessment: Continuous (100%); exercises comprising at least 50% of the final mark externally examined.

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Biodiversity Dynamics

BIOL713 WC (OL-30T-0P-0S-130H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in Biological Sciences.

Aim: To understand biodiversity dynamics through analyses and interpretations of ecosystem processes.

Content: The functioning of ecological systems. Techniques for the analysis of complex systems and for the detection of different order processes. Scaling effects and fractal structures in systems analysis. Assembly rules in community ecology. The approach will be modern, from the perspective of ecosystems being dynamic.

Assessment: Continuous (100%); exercises comprising at least 50% of the final mark externally examined.

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Molecular Ecology and Systematics

BIOL715 WC (7L-39T-0P-14S-100H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 48C at Level 3 in biological sciences.

Prerequisite Modules: BIOL205 or BIOL232.

Aim: To introduce students to basic concepts of molecular systematics, bioinformatics, phylogeography and conservation genetics.

Content: Species concepts, population dynamics, data used for molecular systematic analysis, methods used to infer phylogenies, phylogeogeography and conservation genetics. Basic bioinformatics: sequence retrieval from internet-based sequence databases, multiple sequence alignments and phylogenetic inference using appropriate analysis packages. The mode of delivery will include lectures, seminar presentation by students and hands-on computer-based bioinformatics tutorials.

Assessment: Seminar (20%), essay (30%), bioinformatics project (50%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined component. This module has no supplementary exam.

Plant Ecophysiology

BIOL716 WC (OL-30T-0P-0S-130H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological sciences.

Aim: To illustrate the importance of whole-plant physiology in the growth and performance of plants in natural and managed ecosystems.

Content: Tailored to suit the interests of the participants. Key fields followed by case studies. Key fields include: determinants of plant growth, plant-water relations and photosynthesis. Case studies will be selected from the following list: sun/shade adaptations, effects of elevated atmospheric CO_2, relationship between xylem hydraulic conductivity and leaf physiology, and selected examples of stress physiology.

Assessment: Continuous (100%); exercises comprising at least 50% of the final mark externally examined.

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Recent Advances in Applied Entomology

BIOL721 PC (OL-36T-0P-16S-90H-15R-0F-0G-3A-7W-16C)
Prerequisite Requirement: 32C from AGPS308, BIOL213, 322, or suitable alternatives.

Aim: To enable students to specialize in topics of their choice from the broad field of applied entomology in order to acquire the most recent information and approaches.

Content: Choice of a relevant topic in any two fields of applied entomology, such as systematics, integrated pest management, biological control, forensic science and medical or veterinary entomology.

Assessment: Continuous: Seminar (20%), review paper (30%); Final test (50%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. 50% weighted average in externally examined components. This module has no supplementary exam.

Rangeland Ecology: Soil/Plant Interactions

BIOL722 PC (12L-36T-20P-10S-82H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological and/or ecological sciences.

Aim: To consolidate knowledge of important specialist topics in range and wildlife science in the soil/plant continuum.
Content: Choice of four specialist topics in consultation with staff. Topics include resource degradation, principles of rehabilitation, revegetation, management to arrest and reverse degradation for sustainability of commercial livestock, communal livestock and game-ranching systems. Review of papers and synthesis of literature interspersed with tutorial discussions.

Practicals: Field trip(s) to appropriate locations.

Assessment: Assignments (20%), seminars (20%), reports (60%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam. Students may be required to contribute to the cost of the field trip(s).

Rangeland Ecology: Plant/Animal Interactions

BIOL723 PC (12L-36T-20P-10S-82H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological and/or ecological sciences.

Aim: To consolidate knowledge of important specialist topics in range and wildlife science in the plant/animal continuum.

Content: Choice of specialist topics in consultation with staff. Topics focus on plant-animal interactions with emphasis on grazing and browsing behaviour, patterns, impacts and management for domestic livestock under different management systems and wild herbivores in game ranching and conservation systems. Review of papers and synthesis of literature interspersed with tutorial discussions.

Practicals: Field trip(s) to appropriate locations, collection, analysis and synthesis of d
ata.

Assessment: Assignments (20%), seminars (20%), reports (60%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally e
xamined
components. This module has no supplementary exam. Students may be required to contribute t
o the cost of
the field trip(s).

Conservation Ecology

BIOL724 PC (15L-8T-25P-10S-82H-10R-0F-10G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in ecological or biological sciences.

Aim: To provide students with an understanding of conservation problems ranging from small
populations to
ecosystems, and the tools and skills required for managing these.

Content: Factors creating small populations, biological implications, and strategies for ma
naging small populations.
Case studies of small populations and metapopulations. Experimental approaches to conservat
ion. Holistic
conservation at the landscape level.

Practicals: Analysis and interpretation of population data, interpretation of other data. Group project to design a research strategy. :
Assessment: Modelling exercises (30%), seminars based on readings (20%), assignments (50%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Insects and Alien-Plant Control

BIOL726 PC (10L-14T-36P-0S-100H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological and/or ecological sciences.

Aim: To provide an understanding of biological invasions and the management of alien invasive plants, in particular the initiation and management of a biological-control programme against an alien weed.

Content: Theory and practice of biological weed control in the context of integrated weed management. Targeting a weed for biological control. Analyzing the risks of releasing a new biological-control agent. Motivation, design and budgeting of a research programme targeting a new weed for biological-control.

Practicals: Trips to field sites & research organisations.

Assessment: Practical reports and assignments (60%, half externally examined), research-design report (40%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam. Students may be required to contribute to the cost of the field trips.

Cytotaxonomy and Biodiversity

BIOL731 WC (OL-30T-0P-0S-105H-12R-0F-10G-3A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological sciences.

Aim: To provide in-depth understanding of speciation and mechanisms of reproductive isolation.

Content: Classification systems. Biological, recognition, phylogenetic concepts of species; speciation theory; numerical taxonomy and phenetic analysis, cladistic analysis, tree construction methods. Chromosomal evolution, allozyme variation and other methods to detect gene products.

Assessment: Continuous: Tutorial participation (10%), essay (20%), data-set analysis (20%); final test (50%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Topics in Evolutionary Biology

BIOL732 PC (OL-33T-20P-16S-91H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological sciences.

Aim: To expose students to contemporary methods and recent advances in evolutionary biology.

Content: Topics such as: Comparative method; evolutionary physiology; evolutionary biogeography; hominid evolution; measuring phenotypic selection; plant-herbivore coevolution.

Practicals: As appropriate to content.

Assessment: Assignments (60%), review essay (30%), seminar (10%) (components comprising at least 50% of the final mark externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Plant Breeding Systems

BIOL733 PC (16L-4T-7P-13S-107H-10R-0F-0G-3A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological or agricultural sciences.

Aim: To develop understanding of plant breeding systems.

Content: Sexual versus asexual reproduction, outbreeding versus selfing, self-incompatibility mechanisms,
heteromorphy, sex expression, determinants of seed production, evolutionary trends, ecological consequences of
breeding systems for rarity and colonization ability, mating-system analysis.

Practicals: Controlled hand-pollination experiments.

Assessment: Continuous: Seminar (25%), essay (25%); final test (50%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined
components. This module has no supplementary examination.

Plant Biosystematics

BIOL734 WC (OL-12T-0P-0S-140H-5R-0F-0G-3A-7W-16C)
Prerequisite Requirement: 64C at level 3 in biological sciences.

Aim: To introduce students to advanced aspects of plant biosystematics.

Content: Students may choose from a range of topics which include plant biodiversity and classification, phenetics,
cladistics, species concepts, reproductive biology, pollination biology and plant biogeography.

Assessment: Continuous: Four assignments (80%), Portfolio (20%). All assessments externally examined.

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined
components. This module has no supplementary exam.

Functional Cell Biology

BIOL741 WC (0L-30T-0P-08-130H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in cell biology or related subjects.

Aim: In-depth exploration of the literature to reveal contemporary views on selected topics in Cell Biology, by means
of participatory discussion and critique.

Content: A selection of major themes that emphasise intracellular integration of structure and function, drawn mainly
from topical review articles and amplified by material from Current Opinion in Cell Biology.

Assessment: Continuous (100%); exercises comprising at least 50% of the final mark externally examined.

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Plant Ultrastructure

BIOL744 WC (OL-10T-40P-14S-89H-4R-0F-0G-3A-7TW-16C)
Prerequisite Requirement: 48C at Level 3 in plant sciences.

Aim: To introduce students to advanced aspects of plant cell structure and function.

Content: A common assignment and seminar are undertaken by all students after which they may opt to pursue one of two themes: secretory structures in important medicinal plant species or secretory structures in halophytes. Topics covered include the endomembrane system; intracellular transport involving ion localization, vesicular traffic and use of fluorescent proteins to 'light up' secretory pathways. Studies will include use of state-of-the-art equipment in electron microscopy.

Practicals: As required by the topic chosen.

Assessment: Continuous: Seminar (10%), portfolio (10%), assignments (30%); final test (50%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Bioprocesses Engineering

BIOL745 WC (OL-28T-12P-0S-103H-14R-0F-0G-3A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological, environmental and/or chemical sciences.

Aim: To expose students to the application of the metabolic processes of microorganisms in solving waste-treatment problems.

Content: A selection of the following topics will be covered: wastewater characterisation, microbial growth kinetics, activated sludge processes, hydrolysis, nitrification/denitrification, biological phosphorus removal, anaerobic digestion processes, methanogenesis, bioenergetics, health implications of waste-treatment technologies, sustainability of waste-treatment technologies.

Practicals: Field visit; spreadsheet-based modelling exercises.

Assessment: Continuous: Participation in discussions (10%), assignments (40%); final test (50%, extemally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. No supplementary exam. Students may be required to contribute to the cost of the field trip.

Plant Biotechnology

BIOL747 WC (OL-24T-0P-0S-100H-36R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 48C at Level 3 in plant sciences.

Aim: To investigate, discuss and debate the methodologies, applications and risks of plant tissue culture, genetic engineering and other plant biotechnologies.

Content: Various in vitro culture systems, cryopreservation and genetic engineering. Emphasis will be on applications to crop improvement, food production and conservation, public perceptions, risk assessment and patents. Efforts will be directed at including up-to-date topics and technologies as new developments occur.

Assessment: Essays (40%), written critiques of colleagues’ submissions (20%), open-book assignment (40%) (components comprising at least 50% of the final mark externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Cryobiology

BIOL748 WC (OL-30T-60P-0S-70H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological sciences.

Aim: To establish a sound foundation of the theory and practice of cryopreservation relevant to biodiversity conservation, biomedical and commercial spheres, and specialised microscopy.

Content: Overview and historical perspectives; water and biophysics of freezing; fundamenta ls of cryopreservation;
applications of cryobiology; procedures to optimise specimen recovery; in vitro practices; retention of genetic and
phenotypic fidelity; cryomicroscopy; etc.

Practicals: The practical application of fundamental principles to achieve survival of cryo preservation of biological
material.

Assessment: Continuous (100%); exercises comprising at least 50% of final mark externally e xamined.

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally e xamined
components. This module has no supplementary exam. Students may be required to contribute t o the cost of
the field trips.

Desiccation Tolerance in Seeds and Plants

BIOL749 WC (OL-30T-0P-0S-130H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological sciences.

Aim: To gain an appreciation of the differences and similarities between desiccation sensitivity and tolerance in seeds and vegetative plant parts, by means of participatory discussion and critique.

Content: A selection of major themes that underlie the complexities of acquisition and maintenance of desiccation tolerance in seeds and vegetative plant tissues, compared with similar material that is desiccation sensitive.
Discussions will be based on contemporary literature and current research.

Assessment: Continuous (100%); exercises comprising at least 50% of the final mark externally examined.

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Biomarkers of Environmental Change

BIOL750 WC (OL-26T-3P-6S-125H-0R-0F-0G-0A-6W-16C)
Prerequisite Requirement: 96C at Level 3 in biological and /or environmental sciences.

Aim: To provide an overview of core concepts and principles of Biomarker development and its application in a changing environment.

Content: Topics selected from, but not restricted to: Biomarkers and their application, Biomarker characterization, cholinesterases, DNA techniques, mixed function oxygenases, conjugative enzymes, Endocrine disrupting compounds, histopathology, limitations to the biomarker approach, from biomarker to ecological effects.

Practicals: Skills covering concepts selected from the above.

Assessment: Practical report (20%), seminar (20%), assignments (60%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Stress Physiology and Plant Genes

BIOL762 PC (26L-5T-0P-10S-101H-15R-0F-0G-3A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological sciences.

Aim: To elucidate the physiological responses of plants to environmental conditions that deviate significantly from those that are optimal, and technologies to genetically alter the responses of plants to stress.

Content: Impact of environmental stress on plant growth and crop production, including oxidative stress, high- and low-temperature stress, water stress, and man-made stresses. Signal transduction and gene expression in response to stress. Review of ethical, social, legal and environmental aspects of genetically modify

ing plants for increased
stress tolerance.

Assessment: Continuous: Assignments (15%), seminars (15%), final test (70%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined
components. This module has no supplementary exam.

Advanced Plant Physiology

BIOL763 PC (30L-18T-12P-108-70H-15R-0F-0G-5A-6W-16C)
Prerequisite Requirement: 64C at Level 3 in biological sciences.

Aim: To provide in-depth insight into how plants function at cellular, tissue and organ levels. To provide opportunities
to manipulate plant growth by application of biotechnology techniques.

Content: Emphasis on the relevance of biotechnology in modem society. Secondary metabolites: Biochemical origin
and biosynthesis; classes and categories; economics of metabolite production. Traditional medicine and
phytochemistry. Trade in medicinal plants. Conservation of medicinal plants. Biotechnology and medicinal plants.
Practicals: Hormone extraction and manipulation. Secondary-metabolite extraction and identification.

Assessment: Continuous: Tests (7%), assignments (18%), seminars (5%), final test (70%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined
components. This module has no supplementary exam.

Terrestrial African Vertebrate Zoology

BIOL764 PC (10L-20T-50P-15S-40H-0R-0F-20G-5A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in Zoological or Animal Sciences.

Aim: To educate and train students in aspects of the origins and phylogeny, biogeography, environmental physiology, ecology and conservation of terrestrial African vertebrates (reptiles, birds and mammals).

Content: Origins of the African terrestrial vertebrate fauna; phylogeny and inter-relationships; African endemics and endangered species; adaptations to the African environment (un-predictability and extremes); ecology and conservation of keystone and flagship species.

Practicals: Field Trips. Hormone extraction and manipulation. Secondary-metabolite extraction and identification.
Assessment: Test (50%), Assignments (25%), Practicals-projects-field course (25%).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. This module has no supplementary exam.

Marine Biodiversity

BIOL781 WC (4L-30T-0P-10S-98H-15R-0F-0G-3A-7W-16C)
Prerequisite Requirement: 64C at Level 3, of which 32C or equivalent must be in Aquatic/Marine topics.

Aim: To gain understanding of some of the most recent findings and issues involving the diversity of marine organisms and ecosystems, through critical review and analysis of current literature.

Content: International and local conventions for the protection of marine biodiversity; species and ecosystem diversity; diversity and biogeography of marine organisms, with emphasis on southern Africa; detailed analysis of special ecosystems, such as hydrothermal vents, coral reefs, upwelling areas, estuaries, polar oceans, etc.
Assessment: Continuous: Seminars with written reports (50%); final test (50%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Fisheries Science

BIOL782 WC (0L-49T-0P-0S-63H-18R-0F-30G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological sciences, of which 32C or equivalent must be in Aquatic/Marine topics.

Aim: To provide students with the basic concepts of marine-resource stock assessment, and the nature of fisheries in South Africa, and to expose them to some standard fishery analyses.

Content: Introduction to the theory of fisheries stock assessment and practical assessment modelling; synopsis of the various fisheries sectors in South Africa; mini-project (class task) analysing aspects of a local fishery, possibly including fieldwork.

Practicals: Catch Per Unit Effort (CPUE) assessment; stock-assessment modelling.

Assessment: Tutorials (25%), modelling practicals (25%), mini-project (50%, externally examined).

DP Requirement: Attendance at all tutorials.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Marine Ecosystem Analysis

BIOL784 WC (OL-30T-0P-0S-130H-0R-0F-0G-0A-7W-16C)
Prerequisite Requirement: 64C at Level 3 in biological sciences, of which 32C or equivalent must be in Aquatic/Marine topics.

Aim: To understand marine ecosystem functioning through theory discussions and data analyses.

Content: Marine ecosystem structure and functioning, resilience and organization; food-web analysis; species trophic interdependencies; indirect interspecies effects; trophic cascades, including top-down vs bottom-up effects; species competition and mutualism; trophic-flow networks; nutrient cycling; energy flow; trophic signatures; ecosystem indices.
Computer-based exercises to analyse and interpret trophic-flow networks.

Assessment: Continuous (100%); exercises comprising at least 50% of final mark externally examined.

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Biology/Ecology Research Project

BIOL790 PY WY (OL-10T-0P-10S-460H-0R-0F-0G-0A-26W-48C)
Corequisite: BIOL701.

Aim: To gain experience in formulation, planning, execution, analysis and reporting of a re search project, and mastery of relevant techniques.

Content: Supervised research project requiring the student to collect, analyse, and evaluat e data; integrate practical and theoretical skills; develop independent and critical thought; and communicate effective ly in the form of written and oral reports. Students will be provided with a list of supervisors and possible research to pics. The choice of the research project will be decided by discussion between the student and supervisor.

Assessment: 2 presentations: project proposal & research findings (10%), written project pr oposal (5%), research report (85%, externally examined).

DP Requirement: Not applicable.

Year-long module. Subminimum to pass: 50% in project write-up. This module has no supplemen tary exam.

Applied Cell Biology for Env Engineers

BIOL851 HC (30L-0T-9P-3S-86H-20R-0F-0G-12A-7W-16C)
Aim: To acquaint students without a biological background with the basic concepts of genera l biology, biochemistry & microbiology relevant to environmental engineering.

Content: Biological macromolecules; heredity & molecular biology; prokaryotic & eukaryotic cells; phylogeny. of bacteria; microbial ecology; metabolic pathways; bioenergetics; enzyme kinetics; enzyme inh ibition & regulation; microbial growth and Monod kinetics; overview of biological processes applied to waste trea tment.

Practicals: Use of light microscope; identification of micro-organisms; aseptic laboratory technique; kinetic constants for a simple enzyme-catalysed reaction.

Assessment: Class test (10%), tutorials (10%), practical reports (15%), self-study assignme nt (15%); 3 h open-book exam (50%).

DP Requirement: Class mark of 40%.

Offered to students in the Faculty of Engineering only.

Coursework Marine Biology Dissertation

BIOL880 WB (OL-0T-0P-0S-640H-0R-0F-0G-0A-26W-64C)
Prerequisite Requirement: 48C at Level 7, or permission of Dean.

Aim: To generate research analytical and writing skills at the postgraduate level, with emp hasis on critical review of literature and collection/processing of new original data.

Content: Literature review, preparation of proposal, collection and analysis of data and sa mples, critical interpretation of results in relation to management issues.

Assessment: Mini-dissertation (100%).

DP Requirement: Not applicable.

Offered in Semester 1 and 2. This module has no supplementary exam.

Coastal Ecology â\200\230

BIOL884 WC (6L-18T-0P-16S-115H-2R-0F-0G-3A-7W-16C)
Prerequisite Requirement: 48C at Level 3 in relevant biological sciences, or permission of Dean.

Aim: To investigate in depth selected aspects relating to the nature of the South African coastal environment, plant and animal adaptations, ecosystem function and coastal management.

Content: The nature of the biologically relevant components of the South African coastal environment. Physiological and behavioural adaptations of selected species of the coastal flora and fauna. Ecosystem function. Coastal management.

Assessment: Continuous: Assignments combining written and oral presentations (50%); final test (50%, externally examined).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. Subminimum to pass: 50% weighted average in externally examined components. This module has no supplementary exam.

Biomedical Sciences

Offered in the School of Medical Sciences

Bioenergetics & Exercise Physiology

HMBC3EB W2 (16L-5T-15P-08-37H-0R-0F-0G-6A-6W-8C)
Prerequisite Modules: (BIOC201 or 203), HPHS2C1, HPHS2E2, HPHS2G2, HPHS2N1.

Aim: To introduce students to the concept of bioenergetics and the impact of exercise on the functioning of the human body. Students will gain an understanding of the energy producing pathways of metabolism. Differences in metabolism at rest and following exercise will be discussed. The influence of mutations on energy metabolism will be explored

Content: Introduction to nutritional requirements of exercise. Introduction to energy transfer (Systems of energy delivery and utilization), oxidative phosphorylation, metabolism of macronutrients during physical activity. Different types of muscle fibres with emphasis on their energy metabolism. Lactate metabolism and the metabolic basis of fatigue in humans. The effect of exercise training on metabolic disorders such as diabetes (I & II), hypertension and hyperlipidemia are discussed.

Practicals: Various methods are employed to assess the effect of exercise on the human body. Student volunteers will perform different types of endurance exercises; a blood sample will be extracted before and after the exercise routine. Lymphocytes and serum (Histopague 1077) will be isolated from the blood and stained with JC-1 (to determine the role of mitochondria in energy metabolism. In addition, the following methods will be performed, viz., Single Cell Gel Electrophoresis, protein isolation and SDS-PAGE. Other biochemical assays that utilise spectrophotometry may be employed, viz., creatine kinase and lactate dehydrogenase assays.

Assessment: A written test covering the content covered during the semester. Practicals will be assessed by a comprehensive practical report at the end of each practical. Assignments as determined by lecturer. Final mark consists of 40% formative and 60% summative marks Formative: 60% tests and 40% classwork Summative: 100% exam mark.

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all tests.

A lecture note fee will be charged for this module.

Environmental Toxicology

HMBC3ET W1 (16L-5T-15P-0S-37H-3R-0F-0G-6A-6W-8C)
Prerequisite Modules: BIOC201 or 203.

Aim: This module will introduce students to the basic principles of toxicology and diseases associated with hazardous environmental substances.

Content: Basic principles of toxicology with emphasis on the biochemical, cellular and organ system basis of intoxication including biotransformation of toxicants, biochemical mechanisms underlying to

xicity and biomarkers of
exposure will be covered. Various classes of toxicants will also be studied including heavy metals, pesticides and
mycotoxins. Specific organ systems susceptible to toxicant exposure will also be introduced (these include pulmonary,
hepatic and renal toxicity).

Practicals: The course includes five 3-hour practical sessions. These aim to introduce students to the different
methods used in toxicology. The impact the toxicant has at cellular and molecular level will be studied using tissue
culture, cytotoxicity tests such as MTT and JC-1 and the comet assay.

Assessment: A written test covering the content covered during the semester. Practicals will be assessed by a
comprehensive practical report at the end of each practical. Assignments as determined by lecturer. Final mark
consists of 40% formative and 60% summative marks Formative: 60% tests and 40% classwork Summative: 100%
exam mark.

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all
tests.

A lecture note fee will be charged for this module.

Metabolic Diseases

HMBC3MD W1 (32L-9T-12P-0S-104H-0R-0F-0G-6A-13W-16C)
Prerequisite Modules: BIOC201 or 203.

Aim: Knowledge of the advanced theory of molecular biology and how this relates to various genetic defects that impact human health. This module will explore the molecular/genetic mechanisms of non-infectious and non-cancerous diseases.

Content: Biochemistry/mechanisms of the disorders associated carbohydrate, lipid, protein, purine and pyrimidine metabolism. The following major themes: advances in modemn molecular biology (recombinant DNA technology); abnormal metabolism and inborn errors of metabolism such as phenylketonuria, sickle cell anaemia, mitochondrial myopathies, collagen disorders, etc. will also be discussed. Practicals or case studies will be used to facilitate application of knowledge gained.

Practicals: Practicals include the oral glucose tolerance test, cholesterol and lipid quantitation in serum using spectrophotometry, thin layer chromatography to detect amino acids in unknown solutions and electrophoresis to determine plasma protein content and detect haemoglobinopathies. Case studies will be used to facilitate application of knowledge gained.

Assessment: A written test covering the content covered during the semester. Practicals will be assessed by a comprehensive practical report at the end of each practical. Assignments as determined by lecturer. Final mark consists of 40% formative and 60% summative marks Formative: 60% tests (equally weighted) and 40% classmark
Summative: 100% exam mark.

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all tests.

A lecture note fee will be charged for this module.

Medical Biochemistry Research Project

HMBC3RP W2 (8L-12T-72P-8S-60H-0R-0F-0G-0A-15W-16C)
Prerequisite Requirement: 128C at Level 2 from the modules in the Biomedical Sciences Programme.

Aim: To introduce students to the research milieu in the field of Medical Science and expose them to other â\200\230working scientistsâ\200\231.

Content: Content: Designing, undertaking, interpretation and reporting on a small independent research project.
Practicals: Practicals: Relevant laboratory-based techniques.

Assessment: Written project motivation (15%), oral presentation of results (10%), formal written project report (75%).
DP Requirement: Attendance at all laboratory sessions.

A laboratory fee will be charged for this module. This module is offered in semesters 1 & 2.

Wound Healing

HMBC3WH W2 (16L-5T-15P-0S-37H-0R-0F-0G-6A-6W-8C)
Prerequisite Modules: (BIOC201 or 203), HPHS2C1, HPHS2E2, HPHS2G2, HPHS2N1.

Aim: To introduce the basics of wound healing, as well as the modern developments in the understanding of wound healing.

Content: Introduction to the basic and biochemical principles involved in wound healing. Importance of extracellular matrix in wound healing. Factors regulating wound healing, with emphasis on the role of growth factors, cytokines and various nutrients. Wound healing and wound infection. The cellular and molecular basis for therapy (cell cycle & apoptosis as they relate to wound repair). Complicating factors (diabetes, scars, keloids and wound infection). Healing in specialised tissues (GIT, bone, skin).

Practicals: Practicals include: Wound care and basic first aid (sprains, fractures, bums). In vitro testing models are used to assess the bodyâ\200\231s response to different types of injury (mechanical, thermal, chemical, radiation). Cells are exposed to the above stresses and proteins (SDS-PAGE) and DNA (SCGE) are analysed. Also, standard histological staining will be employed to demonstrate the importance of the extracellular matrix in wound healing.

Assessment: A written test covering the content covered during the semester. Practicals will be assessed by a comprehensive practical report at the end of each practical. Assignments as determined by lecturer. Final mark consists of 40% formative and 60% summative marks Formative: 60% test and 40% classmark Summative: 100% exam mark

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all tests.

A lecture note fee will be charged for this module.

MedS 1A 2 Human Body:Form/Func

HPHS1H2 W2 (50L-0T-12P-0S-89H-0R-0F-0G-9A-15W-16C)
Aim: On completion of this module, students should gain a basic understanding of how the normal body functions.
Content: Cell membrane transport. Nerves and muscles. Blood. Biochemistry of haemoglobin and plasma proteins.
Immunology. Cardiovascular system. Respiratory system. Autonomic nervous system. Central nervous system.
Endocrinology. Gastrointestinal tract. Renal system. Temperature Control.

Practicals: Introduction to safe laboratory practice. Reflexes, special senses, spirometry, blood.

Assessment: Assessment: Classmark (40%), 2 h exam (60%).

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all
tests.

A lecture note fee of R45-00 will be charged for this module.

CVS/Respiratory

HPHS2C1 W1 (32L-0T-20P-0S-90H-3R-0F-0G-15A-15W-16C)
Prerequisite Modules: CHEM110, CHEM120, PHYS131.

Aim: To provide core knowledge on the integrated function and control of the cardiorespiratory system.

Content: Functional histology of the cardiovascular and respiratory systems. Gross anatomy of the cardiovascular
and respiratory systems. Electrical and mechanical activity of the heart. Dynamics of blood and lymph flow.
Cardiovascular regulatory mechanisms. Mechanics of respiration. Gas exchange in the lungs. Pulmonary circulation.
Gas transport between the lungs and tissues. Regulation of respiration.

Practicals: Practicals: Histology of epithelial and connective tissues, the cardiovascular and respiratory systems. CVS
response to exercise, ECG, Haemodynamics and lung function testing.

Assessment: Assessment: Classmark (40%), 3 h exam (60%).

DP Requirement: DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100%
attendance at all tests.

A lecture note fee of R45-00 will be charged for this module.

Endocrine & Renal

HPHS2E2 W2 (32L-0T-18P-0S-95H-0R-0F-0G-15A-15W-16C)
Prerequisite Modules: CHEM110, CHEM120, PHYS131.

Aim: To provide core knowledge of the structure and functions of the endocrine and renal systems.

Content: The function and functional Histology of the endocrine organs, reproductive organs and kidneys. Body fluid
and electrolyte balance. Acid base balance.

Practicals: Practicals: Histology of the endocrine, renal, and reproductive systems. Glucose Tolerance Test. Renal
function physiology-and pregnancy testing.

Assessment: Assessment: Classmark (40%), 3 h exam (60%).

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all tests.

A lecture note fee of R45-00 will be charged for this module.

Gastrointestinal and Blood

HPHS2G2 W2 (32L-0T-27P-0S-86H-0R-0F-0G-15A-15W-16C)
Prerequisite Modules: CHEM110, 120, PHYS131.

Aim: To provide core knowledge of the structure and function of the human gastrointestinal system and blood.
Content: Content: GIT: Composition of food; basic gross anatomy and the functional histology of the formed blood elements and the organs of the gastrointestinal tract and the associated accessory organs/structures; The physiology of the gastrointestinal tract. Blood: Composition and functions of blood; Anaemia; Leucopaenia and leucocytosis; Basic concepts of immunity; Blood groups and transfusion; Haemostasis; Basic diagnostic tests.

Practicals: Histology of the gastrointestinal tract, blood, lymphoid tissue and the haemopoietic organs. Quantitative blood constituents, blood groupings.

Assessment: Assessment: Classmark (40%), 3 h exam (60%).

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all tests.

A lecture note fee of R45-00 will be charged for this module.

Neurophysiology

HPHS2N1 W1 (32L-0T-27P-0S-86H-0R-0F-0G-15A-15W-16C)
Prerequisite Modules: CHEM110, CHEM120, PHYS131.

Aim: To provide relevant core knowledge of excitability in cells, and extrapolate this principle to a comprehension of
the mechanisms governing neural and muscular responses and the functioning of sense organs.

Content: Neural control mechanisms. The sensory systems. Muscle. Control of Body Movement. Consciousness and
Behaviour. Basic functional histology.

Practicals: Histology of nerve, muscle and the sensory organs. Application of physiological principles in nerve and
muscle interactions; vision, hearing and reflex testing.

Assessment: Assessment: Classmark (40%), 3 h exam (60%).

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all
tests.

A lecture note fee of R45-00 will be charged for this module.

MedS3N2 Neuro-endocrinology

HPHS3N2 W2 (15L-5T-0P-0S-52H-0R-0F-0G-8A-15W-8C)
Prerequisite Modules: HPHS2E2, HPHS2G2, HPHS2C1, HPHS2N1.

Aim: To extend the understanding of neuro-endocrine physiology and its application to the human body.

Content: Neurochemistry, steroid biochemistry. Receptor diseases. Hormone biosynthesis. Basic endocrine
disorders. Pain and its management.

Assessment: Assessment: Classmark (40%), 2 h exam (60%).

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all
tests.

A lecture note fee of R45-00 will be charged for this module.

MedS3P2 Research Project

HPHS3P2 W2 (OL-0T-0P-0S-160H-0R-0F-0G-0A-13W-16C)
Prerequisite Requirement: 128C at Level 2 from the modules in the Biomedical Sciences Programme.

Aim: To introduce the student to a research environment and to apply selected research techniques in a research
project.

Content: Designing, undertaking and reporting of a small independent research project.

Assessment: Written project motivation (15%), oral presentation of results (10%), formal written project report (75%).
DP Requirement: DP Requirement: Not applicable.

A lecture note fee of R45-00 will be charged for this module.

MedS3P1 Research Project

HPHS3R1 W1 (OL-0T-0P-0S-160H-0R-0F-0G-0A-13W-16C)
Prerequisite Requirement: 128C at Level 2 from the modules in the Biomedical Sciences Progr amme.

Aim: To introduce the student to a research environment and to apply selected research tech niques in a + research
project.

Content: Designing, undertaking and reporting of a small independent research project.

Assessment: Assessment: Written project motivation (15%), oral presentation of results (10%), formal written project
report (75%).

DP Requirement: Not applicable.

A lecture note fee of R45-00 will be charged for this module.

Offered in the School of Pathology & Laboratory Medicine

MedH3H1 Haematology

MHA3HA1 W1 (14L-5T-18P-0S-37H-0R-0F-0G-6A-13W-8C)
Prerequisite Requirement: 80 C at Level 2 from modules in the Bio-medical Science programme.

Aim: To understand the physiology of haemopoeisis, functions of blood components and disorders of the haemopoeitic system.

Content: Detailed functions of blood. Erythropoiesis. Anaemias. Granulocytes, macrophages and lymphocytes in health and disease. The red cell membrane. Platelet function and disorders. Haemostasis and its disorders. Inflammation. Immunity. Blood groups and blood transfusion.

Practicals: Morphology, haemolytic, flow cytometry, molecular, coagulation. These are conducted at the Haematology laboratory at the Inkosi Albert Luthuli Central Hospital.

Assessment: Assessment: Classmark (assignments) (40%), 2 h exam (60%).

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all tests.

Non-Biomedical Science students taking this module as an elective must have been vaccinated against Hepatitis B at their own expense.

MedM3M2 Medical Microbiology

MMI3MM2 W2 (29L-0T-36P-0S-89H-0R-0F-0G-6A-13W-16C)
Aim: To introduce the role of medically-significant micro-organisms, their immuno-pathogenesis and the role of the laboratory in the diagnosis of infection.

Content: Pathogenic mechanisms of micro-organisms, Host defence mechanisms, principles of antimicrobial activity, sterilisation and disinfection, molecular approach to infectious diseases e.g. outbreak and population-based analysis for epidemiological control of infection, syndrome based infections.

Practicals: The practicals are geared to define the role of the Medical Microbiology laboratory and to reinforce diagnostic procedures and their significance.

Assessment: Classmark (40%), 3 h exam (60%).

DP Requirement: 40% classmark, 80% attendance at all lectures, tutorials and practicals, 100% attendance at all tests.

Non-Biomedical Science students taking this module as an elective must have been vaccinated against Hepatitis B at their own expense.

MedV3V1 Molecular Virology

MVI3MV1 W1 (29L-0T-36P-0S-89H-0R-0F-0G-6A-13W-16C)
Prerequisite Modules: BIOC201 or 203.

Aim: To instill core knowledge of the principles of human virology; the diagnosis, treatmen

t and prevention of viral
disease in humans; and the application of science and technology to the study of viruses.

Content: Viral taxonomy, pathogenesis and immunology. Diagnosis, treatment and prevention of viral disease
(including viral vaccines, gene therapy and antiviral drugs). Common examples of viruses causing human disease
(Hepatitis B and C, Polio, influenza, HIV). Molecular Virology and Bioinformatics including antiretroviral resistance and
recombinant DNA technology).

Assessment: Classmark (40%), 3 h written exam (60%).

DP Requirement: 40% classmark, 80% attendance at all lectures and tutorials, 100% attendance at all tests.
Non-Biomedical Science students taking this module as an elective must have been vaccinated against
Hepatitis B at their own expense.

Biometry

Offered in the School of Statistics & Actuarial Science

Introduction to Biometry

BMET210 P1 (39L-0T-36P-0S-66H-13R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH133.

Aim: To provide students in Agriculture and the Life Sciences with the skills necessary adequately to analyze and summarize various types of data using appropriate statistical methods.

Content: Types of data. Discrete distributions: binomial, Poisson, and negative binomial. Continuous distributions: Normal, t-, F- and chi-square. Statistical methods for analyzing single, two- and multi-sample problems, including z-tests, t-tests and ANOVA. Correlation and linear regression analysis. Introduction to non-parametric tests. Analysis of categorical data.

Practicals: Computer-based exercises on the above topics.

Assessment: Two tests (20%), practical assignments (10%), 3 h exam (70%).

DP Requirement: 30% Class mark; Minimum 80% of Practical attendance, completion of assignments & tutorials.
Credit may not be obtained for BMET210 and STAT143.

Experimental Design & Multiple Regression

BMET222 P2 (39L-0T-40P-0S-55H-20R-0F-0G-6A-13W-16C)
Prerequisite Modules: STAT130 or BVET210.

Aim: To introduce students in Agriculture and the Life Sciences to the concepts of efficient experimental design and statistical modelling.

Content: Experimental units. Error reduction by blocking, including randomized complete blocks & Latin square designs. Use of more than one square. Split-plot, split-split-plot and split-block designs. Repeated measurements. Repeated experiments over time and space. Factorial treatment structures. Covariance analysis. Multiple linear regression methods for data analysis. Resolution of problems arising from corrupted experiments using linear regression. Analysis of unbalanced data using REML.

Practicals: Computer-based exercises.

Assessment: Two tests (20%), practical assignments (10%), 3 h exam (70%).

DP Requirement: 30% Class mark; Minimum 80% of practical attendance, completion of assignments & tutorials.

Multiple Regression Analysis

BMET314 P1 (20L-0T-15P-0S-31H-10R-0F-0G-4A-13W-8C)
Prerequisite Modules: STAT130 or STAT230 or BMET210.

Aim: To provide an overview of multivariate regression methods, including logistic regression.

Content: Review of matrix algebra. Multiple linear regression methods, including least squares estimates, the variance-covariance matrix associated with such estimates and the concept of studentized residuals. Various forms of residual analytic methods. Data transformation including the Box-Cox method. Automatic model selection methods including forward, backward, stepwise and all-subsets selection. Logistic regression methods and the concept of odds-ratios.

Practicals: Computer-based exercises.

Assessment: Two tests (20%), practical assignments (10%), 2 h exam (70%).

DP Requirement: 30% Class mark; Minimum 80% of Practical attendance, completion of assignments & tutorials.

Multivariate Analysis

BMET316 P1 (20L-0T-21P-0S-25H-9R-0F-0G-5A-13W-8C)
Prerequisite Modules: STAT130 or STAT230 or BMET210.

Aim: To teach students to use multivariate analysis.

Content: General principles of multivariate analysis. Principal component analysis, Factor analysis, Canonical correlation analysis, Cluster analysis, Discriminant analysis, MANOVA and other techniques. GENSTAT multivariate analysis.

Practicals: Computer-based exercises on the above topics.

Assessment: Two tests (20%), practical assignments (10%), 2 h exam (70%).

DP Requirement: 30% Class mark; Minimum 80% of Practical attendance, completion of assignments & tutorials.

Practical Advanced Experimental Design

BMET710 P1 (19L-0T-18P-0S-29H-10R-0F-0G-4A-13W-8C)
Prerequisite Modules: BMET222.

Aim: To teach students practical design and analysis of complex experiments.

Content: Factorial experiments at 2, 3 and 4 levels. Confounding for incomplete blocks in factorial experiments.
Incomplete block designs for non-factorial treatments.

Practicals: Computer-based exercises on the above topics.

Assessment: Two tests (30%), two assignments (70%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Bio-Resources

Offered in the School of Environmental Sciences

Introduction to the Environment

BIOR118 P2 (18L-5T-15P-0S-27H-10R-0F-0G-5A-7W-8C)
Aim: To introduce important environmental issues as they affect and are affected by the atmosphere, hydrosphere, lithosphere, pedosphere and biosphere.

Content: Atmosphere: composition; radiative processes, greenhouse effect, ozone controversy, climate change, El Nino, acid rain pollution. Global dimming. Hydrosphere: oceans and currents, hydrologic cycle. Lithosphere: earth structure, plate tectonics, earthquakes, vulcanism. Pedosphere: soils and pollution, waste disposal, soil erosion, organic and mineral matter. Biosphere: structure and function of ecosystems, energy flows, food chains, succession, conservation of biodiversity.

Practicals: Visit to a weather station. Two field excursions.

Assessment: 2 or 3 theory tests (33%), 2 h exam (67%).

DP Requirement: 40% Class mark; 80% attendance at practicals.

Offered in the School of Agricultural Sciences & Agribusiness

Nature of Agricultural Systems

BIOR130 P2 (18L-5T-12P-0S-28H-13R-0F-0G-4A-7W-8C)
Aim: To introduce the nature and functioning of agroecosystems.

Content: Nature and functioning of agricultural systems including: commercial forests, orchard crops, intensive field crops, controlled environment systems, grasslands, animal production; economics of agricultural resource use.
Practicals: 3 Field excursions, one applied exercise, one project.

Assessment: 2 tests (23%), assignments (10%), 2h exam (67%).

DP Requirement: 40% Class mark.

Chemical Technology

Offered in the School of Chemistry

Chemical Analysis

CTEC233 P2 (27L-9T-36P-0S-67H-17R-0F-0G-4A-13W-16C)
Prerequisite Modules: CHEM110, CHEM120; MATH130 or 133.

Aim: To show the role and importance of analytical chemistry in industry and society and to provide basic theory and practical skills in "wet analytical" techniques.

Content: Analytical methodology, titrimetric and gravimetric methods of analysis, errors and uncertainties in measurements, principles of calibration, industrial applications.

Practicals: Volumetric and gravimetric analysis. Treatment of experimental results. Generation of calibration curves.
Assessment: Tests (10%), practicals (30%), 3 h exam (60%).

DP Requirement: Practical mark 50%, 80% attendance at practicals.

Environmental Analyst

CTEC313 P2 (27L-9T-36P-0S-67H-17R-0F-0G-4A-13W-16C)
Prerequisite Modules: CHEM230; either APCH231 or CTEC233.

Aim: To introduce students to strategies and techniques used in the chemical analysis of environmental samples.
Content: Reasons for environmental analysis, types of environmental sample, obtaining a representative sample, sample preservation and treatment, methods for separating and determining the analyte.

Practicals: Sampling and analysis of real systems, use of modern instrumental methods of analysis.

Assessment: Test (8%), practical reports (25%), 3 h exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

Materials

CTEC323 P1 (27L-9T-36P-0S-67H-17R-0F-0G-4A-13W-16C)
Prerequisite Modules: CHEM210, 220.

Corequisite: CHEM330, 340.

Aim: To introduce students to metals, composites and polymers highlighting the role of catalysts in industry.

Content: Metals, organic polymers, composite materials, catalysis.

Practicals: Synthesis and characterization of materials.

Assessment: Tests (10%), practical reports (23%), 3 h exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

Process Technology

CTEC333 P1 (27L-6T-36P-0S-73H-13R-0F-0G-5A-13W-16C)
Prerequisite Modules: CHEM220.

Aim: To introduce students to some important industrial chemical processes.

Content: Petrochemical and downstream processes, preparation of polymers, production of chemicals by fermentation processes.

Practicals: Manual and automated industrial manipulations.

Assessment: Tests (7%), practicals (26%), 3 h exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

Industrial Chemistry

CTEC343 P2 (27L-6T-36P-0S-68H-18R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 40% in CHEM330.

Prerequisite Modules: CHEM230.

Aim: To make students aware of the link between the traditional subjects of chemistry and chemical engineering.
Content: The industrial manufacturing process, qualitative and quantitative process flow diagrams, unit operations and unit processes, mass and energy balances on steady state systems - recycle, bypass and purge, heat exchangers and steam tables, industrial separations and applications of phase chemistry.

Practicals: Phase chemistry; problem-solving workshops; flow sheet simulation using computer software; industrial project. The module includes field trips.

Assessment: Tests (8.25%), practicals (24.75%), 3 h exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals and workshops.

Students may be required to contribute to the cost of field trips.

Business Management

CTEC733 P1 (20L-12T-0P-0S-30H-15R-0F-0G-3A-13W-8C)
Aim: To introduce science students to the tenets of business and management.

Content: Macroeconomics and microeconomics, planning, organizing and staffing, leading, controlling, decision making, strategic and operations planning, ethics, entrepreneurship and intrapreneurship, managing change in organizations.

Assessment: Assignments (30%), 3 h exam (70%).

DP Requirement: Class mark 40%.

Industrial Chemistry

CTEC743 P1 (20L-12T-0P-0S-30H-14R-0F-0G-4A-13W-8C)
Aim: To introduce students to advanced concepts in industrial process analysis.

Content: Topics selected from (amongst others): advanced mass and energy balances; mass transfer: reactor design, technological economics.

Assessment: Tests (10%), assignments (20%), 3 h exam (70%).

DP Requirement: Class mark 40%.

Operations Management in Chemical Technology

CTEC773 P2 (20L-12T-0P-0S-30H-15R-0F-0G-3A-13W-8C)
Aim: To give students a working knowledge of how systems that create goods or provide services are managed effectively.

Content: Plant location and layout; types of process; production planning; inventory control; MRP, MRP2 and JIT: supply chain management; quality assurance - ISO 9000 & 14000. Benchmarking; project management - Gantt charts, critical path method. Financial management - accounting and economic appraisal.

Assessment: Assignments (33%), 3 h exam (67%)

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Chemistry

Offered in the School of Chemistry

Foundation Chemistry .

CHEM0099 PY WY (60L-20T-65P-0S-25H-50R-0F-0G-20A-26W-24FC-0DC)
Corequisite: BIOL099, (MATH0099, PHYS099, (SCOM003 or 013).

Aim: To ensure that students with an inadequate grounding in chemistry develop a level of theoretical knowledge and practical and problem-solving skills to enable them to succeed in a BSc programme.

Content: Energy and matter; substances - elements, compounds and mixtures; chemical reactions; solutions - solubility and concentration; separation of mixtures; atomic structure - electronic configuration and the Periodic Table; compounds - bonding and nomenclature; the mole; reactions in aqueous solution.

Practicals: Observation and measurement.

Assessment: Tests (21%), Practicals (12%), 3 h exam (67%).

DP Requirement: 40% Class mark plus 80% attendance at all lectures, practicals, tutorials and field work.

Year-long Module. This module is only for students in the Science Foundation Programme and carries 24 foundation credits only.

Special Science

CHEM100 H1 (38L-15T-0P-0S-70H-30R-0F-0G-7A-13W-16C)
Aim: To introduce nursing students to basic chemistry and physics relevant to their discipline.

Content: Chemistry: Units of measurement, properties of matter, radioactivity, chemical bonding and chemical reactions, the gaseous state, solutions, suspensions, colloids and emulsions, acids, bases and salts, organic chemistry, carbohydrates, lipids and proteins. Physics: Mechanics, statics, torque, equilibrium, work, energy, power, elastic and thermal properties of matter, mechanics of fluids, pressure, density, viscosity, cohesion, waves, sound light, nerve conduction, ionizing radiation, ultrasound, x-ray and radionuclide imaging.

Assessment: Tests (20%), two 2 h exams (80%).

DP Requirement: Class mark 40%, 80% attendance at practicals.

For students in the School of Nursing only.

General Principles of Chemistry

CHEM110 P1 W1 (36L-9T-36P-0S-44H-30R-0F-0G-5A-13W-16C)
Aim: To introduce the principles and practice of chemistry.

Content: Introduction to: quantitative chemistry, types of reaction, atomic spectroscopy, electronic configuration, bonding, gases, thermochemistry, kinetics, and gas and solution equilibria.

Practicals: Volumetric analysis, measurement of physical quantities, shapes of molecules.

Assessment: Tests (8%), practical reports (25%), 3 h exam (67%).

DP Requirement: Class mark 40%, 80% attendance at practicals.

Credit may not be obtained for both CHEM110 and either of CHEM161 or CHEM195.

Chemical Reactivity

CHEM120 P2 W2 (36L-9T-36P-0S-44H-30R-0F-0G-5A-13W-16C)
Prerequisite Requirement: At least 40% in CHEM110.

Aim: To present the physical and descriptive inorganic and organic aspects of introductory chemistry.

Content: Phase equilibria and colligative properties, buffers, electrochemistry, nomenclature, reactions, main group elements, solid state structures, acid/base behaviour of oxides, and industrial chemistry of sulfur, phosphorus, nitrogen and the halogens.

Practicals: Physical measurements, qualitative analysis, organic techniques.

Assessment: Tests (8%), practical reports (25%), 3 h exam (67%).

DP Requirement: Class mark 40%, 80% attendance at practicals.

Credit may not be obtained for both CHEM120 and either of CHEM171 or CHEM196.

Chemical Engineering Chemistry 1

CHEM161 H1 (36L-9T-36P-0S-44H-30R-0F-0G-5A-13W-16C)
Aim: To introduce the principles and practice of chemistry.

Content: Introduction to: quantitative chemistry, types of reaction, atomic spectroscopy, electronic configuration,
bonding, gases, thermochemistry, kinetics, and gas and solution equilibria.

Practicals: Volumetric analysis, measurement of physical quantities, shapes of molecules.

Assessment: Tests (8%), practical reports (25%), 3 h exam (67%).

DP Requirement: Class mark 40%; attendance at practicals 80%.

For students in the Faculty of Engineering only. Credit may not be obtained for both CHEM161 and either of
CHEM110 or CHEM195.

Chemistry & Society 1

CHEM163 P1 (18L-9T-18P-0S-26H-6R-0F-0G-3A-13W-8C)
Aim: To provide students with an overview of the role chemistry plays in everyday life.

Content: Recap on the mole; energy in chemical reactions; kinetics; equilibrium; gas laws; solubility; acids and bases;
redox chemistry; electrochemical processes.

Practicals: Measurement of physical constants.

Assessment: Tests (7%), practical reports (26%), 2 h exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

For students in the Faculty of Engineering only.

Chemical Engineering Chemistry 2

CHEM171 H2 (36L-9T-36P-0S-44H-30R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 40% in CHEM161.

Aim: To present the physical and descriptive inorganic and organic aspects of introductory chemistry.

Content: Phase equilibria and colligative properties, buffers, electrochemistry, nomenclature, reactions, main group elements, solid state structures, acid/base behaviour of oxides, and industrial chemistry of sulfur, phosphorus, nitrogen and the halogens.

Practicals: Physical measurements, qualitative analysis, organic techniques.

Assessment: Tests (8%), practical reports (25%), 3 h exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

For students in the Faculty of Engineering only. Credit may not be obtained for both CHEM171 and either of CHEM120 or CHEM196.

Chemistry & Society 2

CHEM173 P2 (18L-9T-18P-0S-24H-8R-0F-0G-3A-13W-8C)
Aim: To provide students with an overview of the role chemistry plays in everyday life.

Content: The Periodic Table - elements, trends and classification; bonding - covalent, ionic and metallic; chemical and physical properties arising from bonding - some specific examples; polymers - PVC, Teflon, Nylon-6,6, silicones, polyethylene, additives, physical properties; explosives.

Practicals: Qualitative analysis.

Assessment: Tests (7%), practical reports (26%), 2 h exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

For students in the Faculty of Engineering only.

Chemistry for Engineers 1A

CHEM181 H1 (18L-5T-18P-0S-24H-12R-0F-0G-3A-13W-8C)
Aim: To provide students with the basic chemical knowledge and expertise necessary to understand the chemical behaviour and properties of materials used by engineers.

Content: Units, measurements; elements; compounds and reactions; mole; bonding in compounds. Cements, silicates and silicones. Stoichiometry; gases and gas laws, Henry's Law. Thermochemistry.

Practicals: Introduction to the measurement of chemical properties; study of chemical behaviour of simple substances.

Assessment: Tests (8%), Practicals (25%), 2 h Exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

For students in the Faculty of Engineering only.

Chemistry for Engineers 1B

CHEM191 H2 (18L-5T-18P-0S-24H-12R-0F-0G-3A-13W-8C)
Prerequisite Requirement: 40% in CHEM181.

Aim: To provide students, who would now have some basic chemical background, with further i nformation and skills
needed to understand how substances behave chemically.

Content: Water - its chemistry and purification. Rates of reaction. Equilibrium. Acids, bas es, buffers, pH. Solubility.
Oxidation/reduction, electrochemistry, conductivity, corrosion, batteries. Chemistry of sel ected metals and their
compounds. Chemistry of carbon and its compounds. Phase changes, phase diagrams.

Practicals: The practical study of inorganic and organic materials.

Assessment: Tests (8%), Practicals (25%), 2 h Exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

For students in the Faculty of Engineering only.

General Principles of Chemistry (Augmented)

CHEM195 P1 W1 (72L.-18T-72P-0S-86H-60R-0F-0G-12A-13W-16FC-16DC)
Aim: To introduce the principles and practice of chemistry.

Content: This module is available only to students registered for the augmented stream of the BSc4. It covers the syllabus of CHEM110 but, in addition, includes a substantial amount of supplementary material and tuition designed for students who are under-prepared for university-level studies to a maximum of 160 hours.

Practicals: Volumetric analysis, measurement of physical quantities, shapes of molecules.

Assessment: Tests (8%), Practicals (256%), 3 h Exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

Credit may not be obtained for both CHEM195 and either of CHEM110 or CHEM161. This module is worth 16 degree credits and 16 foundation credits.

Chemical Reactivity (Augmented)

CHEM196 P2 W2 (72L-18T-72P-0S-88H-60R-0F-0G-10A-13W-16FC-16DC)
Prerequisite Requirement: At least 40% in CHEM110 or CHEM195.

Aim: To present the physical and descriptive inorganic and organic aspects of introductory chemistry.

Content: This module is available only to students registered for the Augmented stream of the BSc4. It covers the syllabus of CHEM120 but, in addition, includes a substantial amount of supplementary material and tuition designed for students who are under-prepared for university-level studies to a maximum of 160 hours.

Practicals: Physical measurements, qualitative analysis, organic techniques.

Assessment: Tests (8%), Practicals (25%), 3 h Exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

Credit may not be obtained for both CHEM196 and either of CHEM120 or CHEM171. This module is worth 16 degree credits and 16 foundation credits.

Foundation Chemistry

CHEM199 PY WY (60L-20T-65P-0S-25H-50R-0F-0G-20A-26W-20FC-4DC)
Corequisite: BIOL199, MATH199, PHYS199, (SCOM103 or 113).

Aim: To ensure that students with an inadequate grounding in chemistry develop a level of theoretical knowledge and practical and problem-solving skills to enable them to succeed in a BSc programme.

Content: Energy and matter; substances - elements, compounds and mixtures; chemical reactions; solutions - solubility and concentration; separation of mixtures; atomic structure - electronic configuration and the Periodic Table; compounds - bonding and nomenclature; the mole; reactions in aqueous solution.

Practicals: Observation and measurement.

Assessment: Tests (21%), Practicals (12%), 3 h exam (67%).

DP Requirement: 40% Class mark plus 80% attendance at all lectures, practicals, tutorials a nd field work.

Year-long Module. This module is only for students in the Foundation Stream of the BSc4. It carries 20 foundation credits and 4 degree credits.

Inorganic Chemistry

CHEM210 P1 W1 (27L-9T-36P-0S-44H-39R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 55% in CHEM120.

Prerequisite Modules: CHEM110.

Aim: To develop a theoretical and content base for inorganic chemistry.

Content: Molecular orbital theory of diatomic molecules, coordination chemistry: ligands and complexes, introduction to solid state chemistry, descriptive main group element chemistry.

Practicals: Synthesis and characterization of main group and coordination compounds.

Assessment: Tests (10%), practical reports (25%), 3 h exam (65%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

Organic Chemistry

CHEM220 P1 WA1 (27L-9T-36P-0S-43H-40R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 55% in CHEM120.

Prerequisite Modules: CHEM110

Aim: To introduce students to carbonyl, aromatic and aliphatic chemistry and basic spectros copic methods used in
the identification of organic compounds.

Content: An introduction to nuclear magnetic resonance spectroscopy, stereochemistry, carbo nyl chemistry, the
chemistry of aromatic compounds and alkenes, substitution and elimination reactions.

Practicals: The preparation and characterization of organic compounds.

Assessment: Tests (15%), practicals (18%), 3 h exam (67%).

DP Requirement: Class mark 40%, 80% attendance at practicals.

Physical Chemistry

CHEM230 P2 W2 (27L-9T-36P-08-66H-17R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 55% in CHEM120; at least 16C of appropriate MATH at Level 1.

Prerequisite Modules: CHEM110.

Aim: To introduce students to the principles of the discipline of physical chemistry, and t o develop an appreciation of
its quantitative aspects and the way in which it underpins the whole of modem chemistry.

Content: Chemical thermodynamics, chemical equilibrium, equilibrium electrochemistry, kinet ics, introduction to
spectroscopy.

Practicals: Measurement and calculation of thermodynamic, kinetic and spectroscopic data.

Assessment: Tests (8%), practical reports (25%), 3 h exam (67%).

DP Requirement: Class mark 40%, 80% attendance at practicals.

Applied Organic Chemistry for Chem Eng

CHEM241 H1 (14L-0T-18P-0S-25H-20R-0F-0G-3A-13W-8C)
Prerequisite Modules: CHEM161 and CHEM171.

Aim: To provide students with a basic understanding and relevant skills in selected areas o f organic chemistry
relevant to chemical engineers.

Content: The reaction of aliphatic and aromatic functional groups, Polymers, Petrochemicals , Sugars, Proteins and
Pharmaceutical chemistry. Spectroscopic methods.

Practicals: Six 3 hr practicals relating to the course content.

Assessment: Tests (15%), practicals (18%), 2 h exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

For students in the Faculty of Engineering only.

Applied Physical Chemistry for Chem Eng

CHEM251 H2 (14L-0T-18P-0S-25H-20R-0F-0G-3A-13W-8C)
Prerequisite Modules: CHEM161 and CHEM171.

Aim: To provide students with a basic understanding and relevant skills in selected areas of physical chemistry.
Content: Properties of gases, chemical thermodynamics, chemical equilibrium, equilibrium electrochemistry.
Practicals: Measurement of physical quantities.

Assessment: Tests (8%), practicals (25%), 2 h exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.

For students in the Faculty of Engineering only.

Applied Inorganic Chemistry for Chem Eng

CHEM261 H1 (14L-0T-18P-0S-25H-20R-0F-0G-3A-13W-8C)
Prerequisite Modules: CHEM161 and CHEM171.

Aim: To provide students with a basic understanding and relevant skills in selected areas of inorganic chemistry.
Content: Co-ordination compounds, solvent extraction, kinetics of substitution. lonic solids, slags and mattes.
Descriptive chemistry of 3-d metals, platinum metals, uranium. Hydrometallurgy and pyrometallurgy: extraction
processes for copper, nickel cobalt, gold, platinum metals, uranium.

Practicals: Preparation and reactions of co-ordination complexes.
Assessment: Tests (11%), practicals (22%), 2 h exam (67%).

DP Requirement: Class mark 40%; 80% attendance at practicals.
For students in the Faculty of Engineering only.

Inorganic Chemistry

CHEM310 P2 W2 (27L-9T-36P-0S-44H-39R-0F-0G-5A-13W-16C)
Prerequisite Modules: CHEM210.

Aim: To build a strong theoretical and content base in inorganic chemistry, appropriate for an exit level module.
Content: Crystal field theory and molecular orbital theory of transition metal complexes. Transition metal chemistry:
variable oxidation states and solution chemistry. Sigma-donor and pi-acceptor ligands, focusing on coordinated CO
and its reactivity. Magnetic and electrical properties of transition metal oxides.

Practicals: Synthesis of transition metal and organometallic compounds: characterization and qualitative analysis.
Assessment: Tests (10%), practical reports (25%), 3h exam (65%).

DP Requirement: Class mark 40%; 80% at attendance at practicals.

Organic Chemistry

CHEM320 P2 W2 (27L-9T-36P-0S-43H-40R-0F-0G-5A-13W-16C)
Prerequisite Modules: CHEM220.

Aim: To introduce students to the structure and synthesis of carbocyclic and heterocyclic compounds as well as to
more advanced applications of carbonyl chemistry and spectroscopic analysis.

Content: Heterocyclic and carbocyclic chemistry. Selected topics from: conformational analysis, biological organic
molecules and spectroscopy.

Practicals: The preparation and characterisation of organic compounds.

Assessment: Tests (15%), practicals (18%), 3 h exam (67%).

DP Requirement: Class mark of 40%, 80% attendance at practicals.

Physical Chemistry

CHEM330 P1 W1 (27L-9T-36P-0S-66H-17R-0F-0G-5A-13W-16C)
Prerequisite Requirement: At least 24C PHYS at Level 1.

Prerequisite Modules: CHEM230.

Aim: To deepen knowledge and understanding of the underlying principles of physical chemistry and to develop skills
in their application.

Content: Advanced aspects of chemical thermodynamics and kinetics, surface chemistry, quantum chemistry and
molecular spectroscopy.

Practicals: Measurement of physicochemical properties; recording, calculation, manipulation and interpretation of
data; proper methodology in scientific report writing.

Assessment: Tests (8%), practical reports (25%), 3 h exam (67%).

DP Requirement: Class mark 40%, 80% attendance at practicals.

Instrumental Analysis

CHEM340 P1 W1 (27L-9T-36P-0S-66H-17R-0F-0G-5A-13W-16C)
Prerequisite Requirement: At least 24C PHYS at Level 1.

Prerequisite Modules: CHEM230.

Aim: To introduce students to instrumental methods of analysis.

Content: Atomic spectroscopy; chromatography; spectroscopic analysis; electroanalytical methods; solid-state analysis.

Practicals: Instrumental methods of qualitative and quantitative analysis.

Assessment: Tests (8%), practicals (25%), 3 h exam (67%).

DP Requirement: Class mark of 40%, 80% attendance at practicals.

Inorganic Chemistry

CHEM711 WA1 (23L-0T-45P-0S-66H-23R-0F-0G-3A-13W-16C)
Aim: To introduce students to advanced study in Inorganic and Bioinorganic chemistry.

Content: Inorganic and Organotransition Metal Chemistry: Transition metal carbonyl, alkyl, carbene and carbyne compounds. Characterization techniques. Applications. Bioinorganic Chemistry: Electron transfer theory in action, applications to supramolecular devices. The role of transition metals in enzymes. Materials Chemistry: Close packing; X-ray diffraction; ionic structures; defect solid state; electrical properties.

Practicals: Mini projects based on the above topics.

Assessment: Practical reports (20%), 3 h exam (80%).

DP Requirement: Class mark 50%; 80% attendance at practicals.

Organic Chemistry

CHEM721 W1 (23L-0T-45P-0S-66H-23R-0F-0G-3A-13W-16C)
Aim: To introduce students to advanced study in organic chemistry.

Content: Reactions and mechanisms of oxidation-reduction reactions commonly used in organic synthetic chemistry. Chirality and stereochemistry, analytical methods, determination of enantiomeric purity; asymmetric synthesis. The retrosynthetic approach to designing syntheses of organic molecules.

Practicals: Organic synthesis.

Assessment: Practical reports (20%), 3 h exam (80%).

DP Requirement: Class mark 50%; 80% attendance at practicals.

Physical Chemistry

CHEM731 W1 (23L-0T-45P-0S-66H-23R-0F-0G-3A-13W-16C)
Aim: To introduce students to molecular symmetry, photochemistry and advanced chemical kinetics.

Content: Symmetry elements and symmetry operations. Point groups, Schoenflies notation, character tables; vibrational spectroscopy; atomic and molecular orbitals. Basic concepts of photochemistry, principles of absorption and emission of radiation, experimental techniques, applications. Activated complex theory.

Practicals: Mini projects based on the above topics.

Assessment: Practical work (20%), 3 h exam (80%).

DP Requirement: Class mark 50%; 80% attendance at practicals.

Inorganic and Physical Chemistry

CHEM733 P1 (40L-10T-OP-0S-89H-16R-0F-0G-5A-13W-16C)
Aim: To introduce students to advanced studies in Inorganic and Physical Chemistry.

Content: Mechanisms and rates of inorganic reactions, organometallic chemistry and homogeneous catalysis, advanced chemical thermodynamics, surface chemistry and dynamic electrochemistry.

Assessment: Tests (10%), assignments (10%); 3 h exam (80%).

DP Requirement: Class mark 40%.

Offered in Semester 1.

Analytical Chemistry

CHEM741 W1 (23L-0T-45P-0S-66H-23R-0F-0G-3A-13W-16C)
Aim: To introduce students to advanced studies in analytical methods

Content: Sampling methodology. Chromatographic separation and measurement methods. Hyphenated techniques.
Structure elucidation using two-dimensional NMR techniques.

Practicals: Mini projects based on the above topics.

Assessment: Practical work (20%), 3 h exam (80%).

DP Requirement: Class mark 50%; 80% attendance at practicals.

Organic and Analytical Chemistry

CHEM743 P1 (40L-10T-0P-0S-89H-16R-0F-0G-5A-13W-16C)
Aim: To show how the principles of chemistry can be used in advanced applications of Organic and Analytical Chemistry.

Content: Use of advanced NMR, mass spectroscopy and other spectroscopic techniques for structural elucidation, pericyclic reactions, stereocontrol in organic synthesis, advanced synthetic organic chemistry and advanced instrumental analysis.

Assessment: Tests (10%), assignments (10%); 3 h exam (80%).

DP Requirement: Class mark 40%.

Group Theory & Spectroscopy

CHEM753 P1 (18L-2T-0P-0S-48H-8R-0F-0G-4A-13W-8C)
Aim: To provide students with a thorough but understandable introduction to molecular symmetry and group theory as applied to the spectroscopy of inorganic complexes.

Content: Identification of symmetry elements, point group identification, use of point group multiplication tables, application of group theory to spectroscopy, electronic states of atoms and molecules - term symbols, advanced crystal field theory.

Assessment: Test (10%), assignments (10%), 3 h exam (80%).

DP Requirement: Class mark 40%.

Special Topics in Chemistry

CHEM763 P2 (105L-18T-0P-0S-120H-67R-0F-0G-10A-13W-32C)
Aim: To allow students to specialize in their chosen areas of advanced chemistry.

Content: Topics selected from (amongst others) - bioinorganic chemistry; strategies in drug synthesis and design; symmetry in the solid state; natural products, isolation and characterisation; isolation and properties of the lanthanides and actinides; thermodynamics of reaction equilibria in solution; kinetic theory and its application to inorganic complexes.

Assessment: Tests (10%), assignments (20%), 2 x 3 h exams (70%).

DP Requirement: Class mark 40%.

Chemistry Electives

CHEM781 W2 (60L-0T-0P-0S-202H-52R-0F-0G-6A-13W-32C)
Aim: To enable students to specialise in various areas of Chemistry.

Content: Students select from a range of topics. Examples of topics offered are: waste disposal, environmental analysis, bioinorganic chemistry, catalysis, supramolecular chemistry, medicinal chemistry, solid phase peptide synthesis, synthesis and biosynthesis of natural products, molecular spectroscopy, statistical thermodynamics, photochemistry of nucleic acid bases and solution chemistry.

Assessment: Assignments (20%), 2 x 3 h exams (80%).

DP Requirement: Class mark 40%.

Chemistry Project |

CHEM791 W2 (OL-0T-0P-0S-320H-0R-0F-0G-0A-13W-32C)
Aim: To introduce students to the process of scientific research.

Content: Students will undertake a research project selected from a list proposed by member s of staff. Topics will change from year to year.

Assessment: Project execution (10%), written report (70%), oral presentation (20%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Chemistry Project

CHEM793 PY (OL-0T-320P-8S-132H-0R-0F-20G-0A-26W-48C)
Aim: To introduce students to the process of scientific research in Chemistry and communication of scientific information.

Content: Workshops on software for chemists, generic skills, structure elucidation techniques, advanced quantitative analysis, literature review essay, preparation of research proposal, laboratory work, preparation of project report, seminar presentations.

Practicals: Use of advanced instrumental techniques for structure elucidation and quantitative analysis.
Assessment: Workshop assignments (10%), literature review essay (10%), research proposal (5%), laboratory performance (10%), seminar presentations (15%), project report assessment (50%).

DP Requirement: Not applicable.

Year long module. This module has no supplementary exam.

Computational Physics

Offered in the School of Physics

Comp Mechanics & Symbolic Programming

CPHY212 P2 (36L-9T-36P-0S-50H-25R-0F-0G-4A-13W-16C)
Prerequisite Modules: PHYS211, 231.

Aim: To continue introducing general computational techniques and to model the behaviour of mechanical systems using computational techniques.

Content: Two-body problem, orbits in an inverse square force field, projectiles with friction. Variable mass systems, coupled oscillations, damped driven simple harmonic motion, nonlinear pendulums. Introduction to symbolic manipulation using Mathematica: the basics, performing algebraic and calculus manipulations, solving equations, graph plotting, application to physical problems.

Practicals: Computational exercises.

Assessment: Continuous: 10 practicals (60%), tests (40%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Computational Quantum Mechanics

CPHY311 P1 (18L-6T-18P-0S-28H-7R-0F-0G-3A-13W-8C)
Prerequisite Modules: CPHY231.

Corequisite: PHYS306.

Aim: This module introduces the field of quantum mechanics in a practical, problem-solving manner using the computer as a tool.

Content: Hamiltonians, Operators, Eigenvalues and Eigenfunctions; Orthonormality of energy eigenfunctions.
Expectation values of operators. Forms of wave equations for a range of simple systems. Quantum mechanics of the Hz molecule. Evaluation of overlap integrals. Computational techniques in Molecular Orbital theory; Variational Methods.

Practicals: Students are required to attend weekly practicals and to submit a mini-project.

Assessment: Continuous: 3 projects (60%), tests (40%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Random Systems

CPHY312 P2 (18L-6T-18P-0S-28H-7R-0F-0G-3A-13W-8C)
Prerequisite Requirement: At least 40% in PHYS306.

Prerequisite Modules: PHYS231.

Aim: This module introduces the student to physical systems governed by random processes and the use of random numbers in numerical techniques and simulations.

Content: Generation and transformation of uniform and non uniform random deviates; Monte Carlo integration; random walks, molecular dynamics, the diffusion equation; cluster growth models, percolation; the Ising model and the mean field approximation.

Practicals: 6 practicals.

Assessment: Continuous: 5 projects (60%), tests (40%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Comp Statistical Physics & Thermodynamics

CPHY321 P1 (18L-6T-18P-0S-28H-7R-0F-0G-3A-13W-8C)
Prerequisite Modules: CPHY211.

Corequisite: PHYS306.

Aim: To apply computational techniques to the study of statistical and thermodynamical systems.

Content: Enumeration of quantum states; spin 1 paramagnetic system; ideal gas in the canonical ensemble; kinetic theory of gases; and system of independent distinguishable harmonic oscillators.

Practicals: 6 practicals.

Assessment: Continuous: projects and tests (100%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Computational Solid State Physics

CPHY322 P2 (18L-6T-18P-0S-28H-7R-0F-0G-3A-13W-8C)
Prerequisite Requirement: At least 40% in PHYS306.

Prerequisite Modules: CPHY211,

Corequisite: PHYS305.

Aim: To study solid state systems using computational techniques.

Content: Crystal structure; energetics of solids; X-ray diffraction; lattice dynamics; and electronic structure.
Practicals: 6 practicals.

Assessment: Continuous: projects and tests (100%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Computer Science

Offered in the School of Computer Science

Introduction to Computer Science

COMP100 P1 W1 (39L-0T-36P-0S-63H-16R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Either Matric Maths HGD or SGA or NSC Maths at Level.5

Aim: To introduce students to the basics of computer science.

Content: Overview of computer science. Basic computer literacy. Problem solving and algorithm design. Numbers and their representation. Logic design (switching algebra, gates, synthesis of circuits). Simple machine architecture.
Simple programming in Java. Program debugging and testing.

Assessment: Continuous assessment 50% (at least 2 theory tests (25%), at least 1 practical test (10%), practicals/assignments/tests (15%)), 3 h exam (50%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Credit may not be obtained for both COMP100 and either of ISTN100 or ISTN101.

Computer Programming

COMP102 P2 W2 (39L-0T-36P-0S-63H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: COMP100.

Aim: To introduce students to programming in a high level language.

Content: Procedural programming in Java. Structured data types. Sorting. Searching. Recursion. Program testing.
Program documentation. Introduction to object oriented programming.

Assessment: Continuous assessment 50% (at least 2 theory tests (25%), at least 1 practical test (10%),
practicals/assignments/tests (15%)), 3 h exam (50%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Computer Literacy for the Humanities

COMP104 HB (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Aim: To provide non-science students with a basic knowledge of popular computer packages.

Content: Introduction to computers and operating systems. Word processing. Spreadsheets. Intemet and the world
wide web. Computers in society.

Assessment: Continuous assessment 50% (at least 3 theory tests (40%), at least 6 practicals/assignments (10%), 2
h exam (50%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Offered in both Semesters. Credit may not be obtained for COMP104 and any other COMP module or ISTN100
or ISTN101.

Computing Tools for Science

COMP105 P2 W2 (19L-0T-26P-0S-21H-8R-0F-0G-6A-13W-8C)
Aim: To enable Science students to make effective use of computers in communicating, researching information,
analysing data, and presenting their findings as reports or presentations.

Content: Introduction to computers, operating systems & application packages. Word processing including equations,
tables, footnotes, indexes and references. Spreadsheets including layout, formatting, functions, graphs, importing data
& exporting data. Presentation software including templates, screen design and presentation techniques. e-mail. The
Internet and the World Wide Web. Search engines. Computers in science.

Assessment: Continuous assessment 50% (at least 3 theory tests (40%), at least 6 practicals/assignments (10%), 2
h exam (50%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Credit may not be obtained for both COMP105 and either of ISTN100 or ISTN101.

Object-Oriented Programming

COMP200 P1 W1 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH130, MATH140 and COMP102.

Aim: To introduce students to the fundamentals of object-oriented programming.

Content: Object-oriented programming with Java: classes, inheritance and polymorphism. Object-oriented design methodology and notation. Introduction to abstract data types. Container classes and iterators. Advanced programming constructs. Object-oriented GUI.

Assessment: Continuous assessment 50% (at least 2 theory tests (25%), at least 1 practical test (20%), at least 1 assignment/quiz (5%)), 3 h exam (50%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%

Data Structures

COMP201 P2 W2 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Requirement: At least 40% in COMP200.

Aim: To introduce students to the fundamentals of data structures.

Content: Data abstraction and encapsulation. Specification and implementation of data structures. Linear structures. Order and iterators. Trees, sets and dictionaries. Graphs. Canned data structures. Introduction to algerithms and complexity.

Assessment: Continuous assessment 50% (at least 2 theory tests (25%), at least 1 practical test (20%), at least 1 assignment/quiz (5%)), 3 h exam (50%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Internet Technologies

COMP203 P2 W2 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH130, COMP102.

Aim: To introduce students to the fundamentals associated with the development of web-based client server systems.
Content: Scripting as a programming paradigm. Models for the implementation and interaction of clients and servers.
Security and performance issues in distributed systems. Persistence of user generated data.

Assessment: Continuous Assessment (A minimum of 2 tests, both theoretical and practical (30%), assessment of project work (15%), assignments/quizzes (5%)), 3 h exam (50%) with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, 80% attendance at practicals.

Comparative Programming Languages

COMP300 W1 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: COMP200 and COMP201.

Aim: To introduce students to various programming language paradigms.

Content: Historical survey. Imperative languages. Types, objects and declarations, expressions and statements, subprograms, data structures, modules. Object-oriented programming. Generic programming. Functional languages.
Declarative languages. Logic programming. SQL. Syntax and semantics. Current trends.

Assessment: Continuous assessment 30% (2 tests (20%), practicals/assignments/quizzes (10%)), 3 h exam (70%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Software Design

COMP301 P2 W2 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Competence in C++ .

Prerequisite Modules: COMP200, COMP201; (COMP300 or COMP302) or (competence determined by the Head of School).

Aim: To introduce students to the principles of software design.

Content: Advanced programming techniques. Software engineering. Major programming project. Associated tools & techniques. Advanced object-oriented programming, user interface design.

Assessmient: Continuous assessment 50% (at least 2 tests (25%), project(25%)), 3 h exam (50%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Operating Systems

COMP302 P1 W1 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: COMP200 and COMP201.

Aim: To introduce students to Operating Systems concepts.

Content: Unix, Introduction to C and C++ (in a Unix environment). File systems. Concurrent programming.
Synchronization, deadlock, scheduling. Memory management. Security.

Assessment: Continuous assessment 30% (2 tests (20%), practicals/assignments/quizzes (10%)), 3 h exam (70%),
with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Algorithms & Complexity Theory

COMP303 W1 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 16 credits of Mathematics at level 2.

Prerequisite Modules: COMP200 and COMP201

Aim: An introduction to algorithms and the complexity of algorithms.

Content: Algorithm design techniques. Greedy algorithms. Divide and conquer; dynamic programming. Recursion and
induction. Sorting and searching. Algorithms for sets and graphs. Numeric algorithms. String algorithms. Parallel
algorithms. Computational geometry. Introduction to complexity theory; P and NP classes, NP completeness.
Assessment: Continuous assessment 30% (2 tests (20%), practicals/assignments/quizzes (10%)), 3 h exam (70%),
with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Artificial Intelligence

COMP304 W2 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: COMP200 and COMP201.

Aim: To introduce students to Artificial Intelligence concepts.

Content: Problem & knowledge representation. Logic, search & heuristics. Applications from game-playing. Expert systems. Neural networks. Genetic algorithms. Automatic theorem proving.

Assessment: Continuous assessment 30% (2 tests (20%), practicals/assignments/quizzes (10%)), 3 h exam (70%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Translators, Compilers & Interpreters

COMP305 W2 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: COMP200 and COMP201.

Aim: To introduce students to Translators, Compilers & Interpreters.

Content: Compilers & interpreters. Compiler design. Parsing & lexicographic analysis. Low-level languages. RISC, grammars, applications.

Assessment: Continuous assessment 30% (2 tests (20%), practicals/assignments/quizzes (10%)), 3 h exam (70%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Database Systems

COMP306 W1 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: COMP200 and COMP201.

Aim: To make students familiar with Database concepts.

Content: Database models. Relational & object-oriented systems. Database programming languages: SQL, QBE & JDBC. Database architectures. Client-server, distributed & parallel, applications.

Assessment: Continuous assessment 30% (2 tests (20%), practicals/assignments/quizzes (10%)), 3 h exam (70%), with @ sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Graphics & Modelling

COMP307 W2 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: COMP200 and COMP201.

Aim: To introduce students to a modern 3D-modelling language.

Content: 3D modelling concepts. A modern 3D-modelling language. Scripting. Animation techniques.

Assessment: Class mark (30%) (2 tests (20%), practicals/assignments/quizzes (10%)), 3 h exam (70%) with a subminimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Data Communications and Networks

COMP308 P2 W2 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: COMP200 and COMP201.

Aim: To introduce students to data communications models and networking protocols.

Content: Data transmission and networks. Data communications models and protocols. The ISO model. LANS; routing. Network security & management; protocol suites. TCP/IP. The Internet.

Assessment: Continuous assessment 30% (2 tests (20%), practicals/assignments/quizzes (10%)), 3 h exam (70%), with a sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Computability and Automata

COMP309 P1 (29L-0T-36P-0S-73H-16R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 16 credits of Mathematics at level 2.

Prerequisite Modules: COMP200 and COMP201.

Aim: To introduce students to automata theory

Content: Theory of computation. Derivation and generation. Decidability and effective enume ration. languages.
Grammars. Automata. Turing machines.

Assessment: Continuous assessment 30% (2 tests (20%), practicals/assignments/quizzes (10%)) , 3 h exam (70%),
with @ sub minimum of 40% on both.

DP Requirement: At least 40% for continuous assessment, attendance at practicals 80%.

Honours Project

COMP700 PY WY (OL-0T-0P-0S-320H-0R-0F-0G-0A-26W-32C)
Aim: To get students to tackle a large programming project.

Content: Project topics from computer science.

Assessment: Proposal (5%), Design (10%), Oral presentation (10%), Mini-thesis & demo (75%).

DP Requirement: Not applicable.

Year Long Module. This module has no supplementary exam.

Image Processing and Computer Vision

COMP702 WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To introduce students to image processing and computer vision.

Content: Digital image fundamentals. Data structures for image processing. Pre-processing a nd image amelioration.
Mathematical morphology. Feature extraction. Segmentation. Transformation. Compression. Pat tern recognition.
Motion analysis.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based
tests) (50 %): Assignments (both written and practical) and project work (individual or gro upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Artificial Intelligence

COMP703 PC WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To give students an in-depth coverage of artificial intelligence.

Content: In-depth coverage of one or more areas of artificial intelligence such as expert s ystems, game-playing,
genetic algorithms, automated theorem proving, natural language processing.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based
tests) (50 %): Assignments (both written and practical) and project work (individual or gro upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Neural Networks

COMP704 PC WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To introduce students to neural networks.

Content: Principles of intelligent systems, focusing on neural networks.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based
tests) (50 %): Assignments (both written and practical) and project work (individual or gro upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Mathematical Modelling

COMP705 PC WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To introduce students to mathematical modelling.

Content: Use of the symbolic, numeric and graphical capabilities of the symbolic manipulati on package, Mathematica.
Various modelling problems.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based
tests) (50 %): Assignments (both written and practical) and project work (individual or gro upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Simulation Modelling

COMP706 WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To introduce students to simulation.

Content: Simulation strategies and applications. Simulation languages and tools. Model deve lopment, implementation
and validation. Simulation statistics.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based
tests) (50 %): Assignments (both written and practical) and project work (individual or gro upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Cryptography & Network Security

COMPT707 WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To introduce students to cryptography & network security.

Content: Topics from modem cryptography, including symmetric & public-key cryptosystems, di gital signature
schemes, information theory, principles of network security.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based
tests) (50 %): Assignments (both written and practical) and project work (individual or gro upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Advanced Operating Systems

COMP708 WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To give students access to advanced operating systems concepts.

Content: Real time issues in multi-user operating systems. Distributed operating systems in cluding cluster and grid
computing. Concurrency. Parallel machine models.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based

tests) (50 %): Assignments (both written and practical) and project work (individual or gro
upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Language Translation Systems

COMP709 PC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To introduce students to language translation systems.

Content: Syntax and semantics of languages. Levels of programming languages. Elements of fo
rmal grammars.
Lexical and syntactic analysis. Languages with rigid format and their translation. Translat
ion, compilation and
interpretation of high level programming languages.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming
and/or theory based
tests) (50 %): Assignments (both written and practical) and project work (individual or gro
upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Bioinformatics

COMP710 PC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To introduce students to bioinformatics.

Content: Basic genetic processes. Review of mathematical, computational and statistical background. Comparison of sequences. Multiple sequences alignment. Fragment reassembly. Protein structure prediction. Statistical processes in genetics. Project related to student background. Special topics.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based tests) (50 %): Assignments (both written and practical) and project work (individual or groupwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Medical Informatics

COMP711 WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To introduce students to medical informatics.

Content: Selected topics from Medical Informatics, Medical coding, image archiving, patient records, hospital networks.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based tests) (50 %): Assignments (both written and practical) and project work (individual or groupwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Computer Graphics

.COMP712 PC WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To introduce students to computer graphics.

Content: Graphic systems, fundamental techniques in graphics, basic rendering, basic geometric modelling, programming. Topics from visualization, virtual reality, computer animation, multimedia data technologies, compression and decompression. Multimedia applications and authoring, multimedia servers and file systems. Networked and distributed multimedia systems. Recent topics.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based tests) (50 %): Assignments (both written and practical) and project work (individual or groupwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Distributed Systems

COMP713 PC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To introduce students to distributed systems.

Content: Distributed computing fundamentals. Collaboration technology and groupware fundamentals. Distributed operating systems concepts. Modelling and analysis of distributed systems. Security issues in distributed systems.
Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based tests) (50 %): Assignments (both written and practical) and project work (individual or groupwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Distributed Databases

COMP714 WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Prerequisite Requirement: COMP306

Aim: To introduce students to distributed databases.

Content: Distributed database design. Concurrency control in distributed databases. Distributed transaction management, query processing and optimization in distributed databases. Data replication, reliability and fault tolerance in distributed database systems. Heterogeneous distributed databases, and introduction to parallel database systems.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based tests) (50 %): Assignments (both written and practical) and project work (individual or groupwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Advanced Networks

COMP716 WC (19L-0T-13P-08-106H-16R-0F-0G-6A-13W-16C)
Aim: To give students an advanced knowledge of networks.

Content: Selected topics from Computer Networks.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based
tests) (50 %): Assignments (both written and practical) and project work (individual or gro upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Contemporary Topics in Computer Science A

COMP717 PC WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To give students access to a current hot topic in Computer Science.

Content: Topics in computer science, dependent on staff expertise and availability.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based
tests) (50 %): Assignments (both written and practical) and project work (individual or gro upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Contemporary Topics in Computer Science B

COMP718 PC WC (19L-0T-13P-0S-106H-16R-0F-0G-6A-13W-16C)
Aim: To give students access to a current hot topic in Computer Science.

Content: Topics in computer science, dependent on staff expertise and availability.

Assessment: Continuous assessment (100%): At least 2 formal Tests (Practical / programming and/or theory based
tests) (50 %): Assignments (both written and practical) and project work (individual or gro upwork) (50%).

DP Requirement: Not applicable.

Offered in either Semester. This module has no supplementary exam.

Crop Science
Offered in the School of Agricultural Sciences & Agribusiness

FOR UNDERGRADUATE PROGRAMME IN CROP SCIENCE - See Rule SAg2 and
Agricultural Plant Sciences

Dietetics & Human Nutrition

Offered in the School of Agricultural Sciences & Agribusiness

DIET1:Weight,Diabetes,Heart disease

DIET237 P2 (39L-0T-39P-08-57H-20R-0F-0G-5A-13W-16C)

Prerequisite Modules: BIOC201, MPHY200, NUTR224.

Corequisite: BIOC212, HPHY200.

Aim: To develop an in-depth understanding of the causes, treatment and prevention of major lifestyle diseases.
Content: Obesity, underweight, diabetes, hypoglycaemia, coronary heart disease, hypertension.

Practicals: Problem solving.

Assessment: Tests (20%), prac evaluation (13%); 3h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Research Methods: Dietetics & Human Nutrition

DIET311 P1 (29L-0T-18P-0S-28H-4R-0F-0G-1A-13W-8C)
Prerequisite Modules: NUTR224.

Aim: To give students a further understanding of the research processes used in nutrition and dietetic research, and enable them to evaluate the literature and write a literature review.

Content: Reviewing the literature; the research process: research ethics; methodology available to determine dietary intakes; use of quantitative and qualitative research methods in nutrition and dietetics; how to plan and write analytical seminars.

Practicals: Research methods and process.

Assessment: Test (40%), assignments (60%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Diet 2: Diet Therapy - Medical

DIET350 P1 (59L-0T-57P-08-97H-22R-0F-0G-5A-13W-24C)
Prerequisite Modules: BIOC201, 212, DIET237, HPHY200.

Aim: To develop an understanding of assessment, consistency modifications, cystic fibrosis, gastrointestinal disease, food allergies, cancer, malnutrition and infections.

Content: Cystic fibrosis, assessment, consistency modifications, gastrointestinal disease, infections, cancer, food allergies, diarrhoea, TB, HIV/AIDS.

Practicals: Problem solving, visits to hospitals and clinics, case studies.

Assessment: Assessment: prac evaluation (17%), 2 tests (16%), 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Behavioural Science for Dietetics

DIET351 P2 (18L-0T-12P-0S-37H-10R-0F-0G-3A-13W-8C)
Prerequisite Modules: DIET237.

Aim: To introduce basic aspects of human science from the perspective of the discipline of psychology. These aspects, combined with the development of basic counselling skills, are intended to enhance the ability of the Dietetics graduate to function effectively across a range of professional seftings.

Content: Paradigms and their application to health and health care practice; health, illness and behaviour; Human development; Human behaviour and behaviour change; Psychiatric disorders; Professional development (e.g. dealing with death and dying, self care).

Practicals: Basic counselling skills. Group facilitation. Basic assessment skills.

Assessment: Assignments (23%), oral assessment (10%), 2 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Diet 3: Diet Therapy - Surgical

DIET360 P2 (89L-0T-57P-0S-97H-22R-0F-0G-5A-13W-24C)
Prerequisite Modules: DIET350.

Aim: To develop an understanding of hyperalimentation, renal disease, liver disease and hyp ermetabolic conditions
such as surgery, trauma, sepsis, bums.

Content: Renal disease, liver disease, gallbladder disease, pancreatic disease, hyperalimen tation, hypermetabolism,
surgery, trauma, sepsis, ARDS, bumns.

Practicals: Problem solving, visits to hospitals and clinics, case studies.

Assessment: Assessment: prac evaluation (17%), 2 tests (16%), 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Therapeutic Dietetics Internship

DIET711 PY (41L-0T-35P-78-40H-30R-482F-0G-5A-12W-64C)
Prerequisite Requirement: BSc(Diet) degree.

Aim: The purpose of the module is for the students to become competent in the therapeutic nutritional care of patients in a hospital setting.

Content: Medical, surgical and paediatric diseases and complications requiring dietary intervention.

Practicals: Students work in a hospital for the duration of the module.

Assessment: Minimum of 75% for multiple-choice questionnaire required before commencement of practice placement (0%). Professional competence during placement (14%, submin50%), case study (5%), assignments (8%), pharmacology test (2%), journal club presentation (2%), oral on experiential exposure (2%), 3h exam (67%, submin 40%).

DP Requirement: 40% Class mark.

12 week module offered during the course of the year.

Earth Science

Offered in the School of Environmental Sciences

Rocks Minerals & the Environment

EART122 P2 (18L-0T-21P-0S-23H-13R-0F-0G-5A-13W-8C)
Aim: To provide an understanding of the genesis and classification of rocks and minerals as they occur in southem Africa.

Content: Sedimentation and the formation of sedimentary rocks; processes involved in igneous rock formation; metamorphic rock formation; rocks as a soil forming factor; rocks and ground water.

Practicals: Laboratory and field identification of common rocks and minerals.

Assessment: 2 theory tests & laboratory prac reports (25%), 1.5 h theory exam (50%), 1.5 h prac exam (25%).

DP Requirement: 40% Class mark and attendance at all field practical work.

Economics

Offered in the School of Economics & Finance

Principles of Microeconomics

ECON101 P1 W1 H1 (39L-0T-0P-0S-75H-40R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Nil

Content: Introductory economic concepts including the principles of supply and demand, the efficient production of goods, market structures under perfect competition and monopoly. The markets for labour, capital and land are analysed and the manner in which income and wealth is distributed.

Assessment: 3 tests (40%), 1 three-hour examination (60%)

DP Requirement: Students must write all class tests and obtain a class record of at least 4
0%.

Principles of Macroeconomics

ECON102 P2 W2 H2 (39L-0T-0P-0S-75H-40R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Nil

Content: An introduction to macroeconomics. The operation of the money market is examined, and the main
components of expenditure (consumption, investment, government spending and net exports) ar
e used to build simple
macroeconomic models. Fiscal and monetary policy tools and their ability to influence key m
acrosconomics concems
of inflation, unemployment and growth are assessed.

Assessment: 3 tests (40%), 1 three-hour examination (60%)

DP Requirement: Students must write all class tests and obtain a class record of at least 4
0%.

Intermediate Macroeconomic & Applications

ECON201 P1 W1 H1 (39L-4T-0P-0S-61H-50R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Economics 102

Content: Intermediate macroeconomics and applications. This module covers theories of income determination and employment. These are examined in the context of the analysis of goods and money markets as well as in an aggregate demand/aggregate supply framework. Fiscal and monetary policies and their impact on output, employment and prices are analysed, as are trade-offs between inflation and unemployment. Key macroeconomic issues are assessed in the context of developed and developing economies.

Assessment: Tests/Assignments (40%), Examination (60%)

DP Requirement: Students must write all class tests and obtain a class record of at least 40%.

Intermediate Microeconomics & Applications

ECON202 P2 W2 H2 (39L-4T-0P-0S-61H-50R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Economics 101

Content: Intermediate microeconomics and applications. This module covers intermediate microeconomic theory, its application to solving real-world economic problems and the analysis of policy-related issues. Traditional theories of consumer (utility) behaviour and production (output and profit optimisation) behaviour are examined. In addition, students are exposed to modem theories - such as game theory and transaction cost theory. Applications include the analysis of risk in consumption, investment and insurance decisions and the efficient allocation of resources and output under welfare economics.

Assessment: Tests/assignments (40%), Examination (60%)

DP Requirement: Students must write all class tests and obtain a class record of at least 40%.

* Economics of Africa

ECON301 H1 (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 201

Content: This module in applied economics introduces students to the analysis of crucial issues in development in all African regions. It focuses on both the causes of the present economic crisis and on comparative studies of strategies of development. The potential major players in economic co-operation with South Africa are discussed in detail.
Assessment: Assignments/tests (40%), Examination (60%)

DP Requirement: Write all tests and submit all assignments

*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

Environmental Economics

ECON302 W1 (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 202

Content: This module addresses the nature and causes of modern environmental problems and the application of microeconomic analysis to these problems, with particular reference to natural resource depletion and pollution. Ecology and sustainable development are examined, while environmental issues in South Africa receive particular attention.

Assessment: Assignments/tests (40%), Examination (60%)

DP Requirement: Write all tests and submit all assignments

*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

Macroeconomics

ECON303 W1 (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 202

Content: The module covers a wide range of current economic issues and problems of relevance to South Africa. During any given year selected global economic issues will be analysed. Critical application of economic theory to key global issues is essential. Students will learn to analyse these issues and identify how they affect policy decisions.
Assessment: Assignments/tests (40%), Examination (60%)

DP Requirement: Write all tests and submit all assignments

*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

Industrial Organisation

ECON305 H1 (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 202

Content: This module studies the meaning, measurement and promotion of effective competition as it has been studied in the field of industrial organisation. This requires the study of competition and monopoly. The module therefore involves the concepts and analytical methods that clarify markets and assesses the data on markets. Market structure and competition policy as it is applied in South Africa forms the nucleus of this course.

Assessment: Assignments/tests (40%), Examination (60%)

DP Requirement: Write all tests and submit all assignments

*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

International Economics

ECON306 W1 (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 201 and 202

Content: The main focus of this module is on international trade theory and commercial policy, including tariff and non-tariff barriers. The module also includes a briefer coverage of international finance and exchange rate policy. Questions of economic integration are covered and a brief review of illegal international transactions is included.
Assessment: Assignments/tests (40%), Examination (60%)

DP Requirement: Write all tests and submit all assignments

*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

Maritime Transport Economics

ECON307 W1 (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 202

Content: This module will examine the organisation of the sea transport industry and the major factors affecting its demand, supply, price and cost in the context of the extreme volatility that has characterised this dominant international transport mode in recent decades. Maritime transport policies and their impact on markets are a particular focus of attention. The module is set in the context of Southern Africa and the Indian Ocean Rim.
Assessment: Assignments/tests (40%), Examination (60%)

DP Requirement: Write all tests and submit all assignments

*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

Public Economics

ECON308 W2 (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)

Prerequisite Requirement: Economics 202

Content: This module examines the broad role of the state in modem mixed economies. It addresses the theory and effects of government expenditure, taxes and transfer payments. Both efficiency and equity considerations of the public sector budgets are assessed.

Assessment: Assignments/tests (40%), Examination (60%)

DP Requirement: Write all tests and submit all assignments

*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

Macroeconomic Policy in SA

ECON309 W2 H2 (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 201

Content: The theoretical foundations of macroeconomics are used to understand the objectives of and conflicts in macroeconomic policy. The module will examine monetary policy and the S.A. financial system, as well as fiscal and budgetary policy. Open-economy macroeconomic issues will be analysed, as will the co-ordination between monetary, fiscal and balance of payments policies.

Assessment: Assignments/tests (40%), Examination (60%)
DP Requirement: Write all tests and submit all assignments
*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

Special Topics

ECON310 WB PB (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 201/202

Content: Topics of current interest from theoretical and policy perspectives may be offered.

Assessment: Assignments/tests (40%), Examination (60%)

DP Requirement: Write all tests and submit all assignments.

*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

Labour Economics
ECON311 PB (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 202
Content: Key issues in the SA labour market are addressed, including wage determination, inequality and discrimination, affirmative action, unemployment, labour relations and globalisation. The module examines critically the tools that economists have used to analyse these issues and explores current policy initiatives and policy debates in the SA economy.
Assessment: Assignments/tests (40%), Examination (60%)
DP Requirement: Write all tests and submit all assignments.
*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

History of Economic Thought

ECON312 W2 (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 201 and 202

Content: This module is a brief introduction to the evolution of the fundamental ideas, which have Scholastic origins all the way to the Marginalist Revolution of the latter 19th century. The student will also get exposure to alternative schools of thought, like the German Historical School and the American Institutional School. The module concludes by examining the impact of these ideas on twentieth century economic, political and social thought. The object of the module is to help students understand that nobody has a monopoly on the truth, and that dif

ferent groups contributed
to our rich intellectual, cultural and material heritage.

Assessment: Assignments/tests (40%), Examination (60%)

DP Requirement: Write all tests and submit all assignments

* options offered at various campuses will depend on staff availability and student numbers
. Details will be
given each semester by the Economics 3 co-ordinators.

Quantitative Economics

ECON314 W2 PB H2 (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)
Prerequisite Requirement: Economics 201 and 202

Content: This module will cover the essential elements of the application of economic theor y to real-world data using
the tools of mathematics and econometrics at a basic level. A brief introduction to the nec essary mathematical tools
lays the foundation for the estimation and interpretation of single-equation models with co ntinuous dependent
variables. The emphasis will be on practical application rather than theory.

Assessment: Assignments/tests (40%); Examination (60%)

DP Requirement: Students must attend 75% of practical sessions, write all tests and submit all assignments.

Core module

Applied Microeconomics

ECON330 PB W1 (30L-10T-0P-0S-76H-40R-0F-0G-4A-6W-16C)
Prerequisite Requirement: Economics 202

Aim: To develop the analytical skills of learners in the application of micro-economic theo ry using graphs, algebra and
elementary calculus.

Content: The theory of consumer behaviour and demand, the theory of production and cost, pr icing and market
structures, the theory of the firm, inter-temporal choice, asset markets and consumption un der uncertainty.
Assessment: Assignments/tests 40%; Exam 60%

DP Requirement: Write all tests and submit all assignments.

â\200\234options offered at various campuses will depend on staff availability and student numbers. Details will be
given each semester by the Economics 3 co-ordinators.

Monetary Economics

ECON340 PB (30L-10T-0P-0S-76H-40R-0F-0G-4A-6W-16C)
Prerequisite Requirement: Economics 201

Aim: To develop a conceptual framework which will enable leamers to critically analyse nati onal and intemational
monetary behaviour and markets.

Content: Demand for money, supply of money, level and structure of interest rates, inflatio n, balance of payments
and exchange rates, the transmission mechanism, South African monetary policy.

Assessment: 1 test; 1 essay; 40% 1 exam. 60%

DP Requirement: Write all tests and submit all assignments. e

*options offered at various campuses will depend on staff availability and student numbers. Details will be
given each semester by the Economics 3 co-ordinators.

International Trade

ECON360 PB (30L-10T-0P-0S-76H-40R-0F-0G-4A-13W-16C)

Prerequisite Requirement: Economics 102 and Economics 202

Aim: To enable leamers to understand why countries trade and the impact of international trade in the world economy. The nature and consequences of trade policies, the balance of payments and the operation of the foreign exchange are also examined.

Content: International Trade Theory and Policy, Exchange Rate Determination and Policy, South African Applications.

Assessment: Assignments/test 40%; Exam 60%

DP Requirement: Write all tests and submit all assignments.

*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

Development Economics

ECON370 PB W2 (30L-10T-0P-0S-76H-40R-0F-0G-4A-6W-16C)
Prerequisite Requirement: Economics 101 and Economics 102

Aim: To study the theory of economic development and growth, addressing issues specific to developing countries.
Content: Theories of development and globalization, population growth, the role of the state, foreign aid and investment, agriculture and industry.

Assessment: Assignments/tests 40%; exam 60%

DP Requirement: Write all tests and submit all assignments.

*options offered at various campuses will depend on staff availability and student numbers. Details will be given each semester by the Economics 3 co-ordinators.

Environment & Development

Offered in the School of Environmental Sciences

Research Design, Methods & Processes

EDEL802 P1 (40L-0T-46P-10S-54H-0R-0F-10G-0A-4W-16C)
Prerequisite Requirement: Acceptance into the programme in Environment and Development.

Aim: To provide research design concepts, techniques, methods & project processes to assess & analyse complex environmental & developmental problems.

Content: Developing research proposals, aims, specific objectives, reviewing literature; quantitative & qualitative design & methods; case study techniques; sampling & data gathering techniques; data analysis & interpretation of results; report writing; process & project management to support research; techniques to develop synergy & strategic alignment in environment & development research programmes; application of integrated systems thinking to the above.

Practicals: Seminars, group work, case studies, presentations.

Assessment: Assignments. Individual (100%).

DP Requirement: Not applicable.

This module has no supplementary exam. In 2010 this module is available only to continuing students.

Theory & Practice in Development

EDELS805 P1 (40L-0T-30P-10S-70H-0R-0F-10G-0A-4W-16C)
Prerequisite Requirement: Acceptance into the programme in Environment & Development.

Aim: To provide a thorough grounding in the theory and practice of development.

Content: Understanding the effects of history, world views, ethics, changing concepts & principles on perceptions of economic development & human needs; concepts of sustainability & indicators of sustainable development; industrial development & its environmental impact; environmental auditing of developments; environment al legal and policy frameworks; integrated environmental management linked to development; urban & transformational challenges in African contexts; application of integrated systems thinking to the above.

Assessment: Assignments. Individual (80%) & group work (20%); 50% is externally examined.

DP Requirement: Not applicable.

This module has no supplementary exam. In 2010 this module is available only to continuing students.

Biodiversity & Conservation in Development

EDEL851 P1 (40L-0T-46P-10S-50H-0R-0F-10G-4A-4W-16C)
Prerequisite Requirement: Acceptance into the programme in Environment & Development.

Aim: To provide a trans-disciplinary perspective on biodiversity conservation & its role in development.

Content: Biodiversity concepts, threats, policies, conventions, legislation, assessment & monitoring & integrated management of biodiversity in terrestrial & aquatic systems; urban biodiversity management & rehabilitation; global biodiversity & development initiatives; using resources sustainably in poverty relief; biodiversity-based businesses:. strengthening institutions, governance & community involvement; enhancing cooperative governance, application of integrated systems thinking to the above.

Practicals: Fieldwork.

Assessment: Individual assignments (50%), oral presentations (20%), group work (30%).

DP Requirement: Not applicable.

This module has no supplementary exam. In 2010 this module is available only to continuing students.

Sustainable Development Knowledge Management

EDEL860 P1 (40L-0T-30P-26S-54H-0R-0F-10G-0A-4W-16C)
Prerequisite Requirement: Acceptance into the programme in Environment and Development.

Aim: To understand the fundamentals of managing environmental and sustainable development knowledge.

Content: Understanding of socio-scientific processes & systems thinking; managing organisational change inherent in the complex dynamic challenges of joint socio-scientific action; managing different perceptions of information; facilitating scientific knowledge equity in collective endeavours; understanding the role of scientific co-operation, collaboration and integration in environmental & developmental challenges; application of integrated systems thinking to the above.

Practicals: Seminars, group work, case studies, presentations. Field trips.

Assessment: Assignments. Individual (80%) & group work (20%).

DP Requirement: Not applicable.

This module has no supplementary exam. In 2010 this module is available only to continuing students.

Environmental Management Mini-Dissertation

EDEL890 PB (OL-0T-0P-0S-640H-0R-0F-0G-0A-26W-64C)
Prerequisite Requirement: Successful completion of all prescribed modules for the course-work component of the Environmental Management Stream with a final mark of at least 50% in each module.

Aim: To undertake supervised research on a transdisciplinary theme of the student's choice.

Content: Decided upon by the student in consultation with his/her supervisor(s) and the related research panel.
Assessment: Examination of mini-dissertation (100%).

DP Requirement: Not applicable.

Offered in Semester 1 and 2. This module has no supplementary exam. In 2010 this module is available only to continuing students.

Environmental Sciences

Offered in the School of Environmental Sciences

Environmental Systems

ENVS120 H2 P2 W2 (39L-8T-30P-0S-66H-10R-0F-0G-7A-13W-16C)
Aim: To introduce basic concepts in Physical Geography & the functioning of Environmental S

ystems.

Content: An integrated, process-related, systems approach to studying the earth & its spatial variability. Atmosphere â\200\224 the structure & composition of the atmosphere & human influence on it; weather & climate. Biosphere â\200\224 basic ecological concepts pertinent to populations, communities & ecosystems. Hydrosphere â\200\224 the hydrological cycle, transport by running water, coastal processes. Lithosphere â\200\224 broad-scale lithospheric processes; the composition & dynamics of the earthâ\200\231s crustal system. Cartographic theory & map skills are taught as an integral component of the module.

Assessment: Assignment/essay (20%), Tests (10%), Practicals (20%); 3 h theory exam (50%).

DP Requirement: 80% attendance at practicals and tutorials; 40% Class mark.

Students may be required to contribute to costs of fieldwork.

Biophysical Environments of Southern Africa

ENVS210 H1 P1 W1 (39L-0T-40P-0S-54H-20R-0F-0G-7A-13W-16C)
Prerequisite Modules: ENVS120.

Aim: To introduce students to the physical processes that shape the biophysical environment in southern Africa.
Content: Weather producing systems and southern African climates and their variability; the biogeography: of the region in terms of the distribution of biota through climatic and other environmental factors; a discussion of biomes, biodiversity and conservation; the properties of geomorphic materials as well as erosion, transport and deposition processes that shape and modify the landscape.

Assessment: Assignments (15%), Tests (15%), Practicals (20%); 3 h theory exam (50%).

DP Requirement: 80% attendance at practicals and field work; 40% Class mark.

Students may be required to contribute to costs of fieldwork.

Geographic Information Systems

ENVS211 H2 P2 W2 (29L-0T-36P-0S-77H-10R-0F-0G-8A-13W-16C)
Prerequisite Requirement: 64C at Level 1.

Aim: To introduce students to the concepts, techniques and interdisciplinary application of GIS and remote sensing as environmental decision-making tools.

Content: Development, interdisciplinary nature and potential value of GIS; referencing the geographic location of data; technological environment of GIS, data sources, data models, entry and analysis; data quality, management & legal aspects; GPS, physical basis of remote sensing, sensors & platforms; basics of digital image processing.
Assessment: Practical reports (15%), practical test (15%), theory test (10%), assignment (10%); 3 h theory exam (50%).

DP Requirement: 80% attendance at practicals; 40% Class mark.

Biogeography and Climatic Change

ENVS314 P1 W1 (27L-5T-30P-6S-64H-24R-0F-0G-4A-13W-16C)
Prerequisite Requirement: 32C at Level 2.

Prerequisite Modules: ENVS210 or equivalent.

Aim: To provide students with a broad understanding of key biogeographical concepts.

Content: Process, pattern and scale in biogeography. Biogeographical regions. Distributional patterns and the roles of climate and evolution. Palago-climatic change. Biological processes in biogeography: adaptation; speciation; extinction; ecological interactions. Biogeographical reconstruction: refugia, evolutionary biogeography. Measures of range size. Species-area curves.

Assessment: Tests (20%), Seminar, essays, presentations (15%), Practicals (including a field trip) (25%); 3 h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Students may be required to contribute to costs of fieldwork.

Soil Erosion and Land Degradation

ENVS315 P1 W1 (27L-0T-46P-0S-73H-10R-0F-0G-4A-13W-16C)
Prerequisite Modules: ENVS210 or 230.

Aim: To introduce the processes, social & physical consequences of soil erosion & land degradation issues in Africa.
Content: Land degradation & sustainability; causes & consequences of degradation; risk assessment in relation to the sustainability of soil; food security & degradation; political & socio-economic aspects of soil erosion; physical & chemical erosion processes; human-environment processes & influences; conservation practices; magnitude-frequency considerations; desertification; land use systems in a historical context; soil conservation strategies; principles, planning & policy issues.

Practicals: Case studies & applications. Possible four day excursion

Assessment: Field report/Assignment (30%), Practicals (10%), Test (10%); 3 h exam (50%).

DP Requirement: 80% attendance at practicals; field trip compulsory; 40% Class mark.

Students may be required to contribute to costs of fieldwork.

GIS & Remote Sensing

ENVS316 H2 P2 W2 (27L-1T-36P-08-62H-27R-0F-0G-7A-16W-16C)
Prerequisite Modules: ENVS211 or equivalent knowledge.

Aim: This module is designed to provide further insight into GIS as a management tool for spatial data.

Content: Spatial data and modelling; Attribute data management; Analysis of remotely sensed GIS data and its classification; Data quality issues; GIS project management and design.

Assessment: Theory test (10%), assignment (10%), practical reports (15%), practical test (15%); 3h theory exam (50%).

DP Requirement: 80% attendance at practicals and tutorials; 40% Class mark.

Students may be required to contribute to costs of fieldwork.

Atmospheric Science

ENVS318 W1 (30L-0T-35P-0S-66H-25R-0F-0G-4A-13W-16C)
Prerequisite Modules: ENVS210, MATH133.

Aim: To provide an understanding of the basic concepts & theories pertaining to the behavior of the atmosphere and to introduce the causes & consequences of air pollution, with a focus on applications in a South African context.
Content: This module provides an understanding of meteorological theory & the study of weather and climate over South Africa, and to the study of air pollution. Topics include thermodynamics, adiabatic processes, pressure & hydrostatic equilibrium, radiative processes, divergence & vorticity, zonal and meridional airflow; local air circulations and boundary layer phenomena. Air pollution, fumigation, dispersion and its modeling.

Assessment: Practicals (10%), Practical Test (10%), Theory Test (30%); 3 h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Students may be required to contribute to the costs of the fieldtrip.

Environmental Management

ENVS322 H2 P2 W2 (27L-0T-36P-8S-65H-20R-0F-0G-4A-13W-16C)
Prerequisite Requirement: ENVS221 or ENVS224 or 64C at level 2 in the environmental science disciplines.

Aim: To develop an understanding of environmental management theory and practice.

Content: Theoretical and critical examination of the issues of environmental management by examining the history of environmentalism and mainstream approaches and their alternatives. The relationship between environment and planning; examination of the different tools and methods used in environmental management.

Practicals: Use of methods and techniques related to environmental management tools.

Assessment: Essays (20%), Tests (10%), Practicals (20%); 3 h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Students may be required to contribute to costs of fieldwork.

Research Methods in Environmental Sciences

ENVS700 P1 W1 (30L-0T-8P-0S-99H-20R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours programme.

Aim: To introduce students to the history and philosophy of science and to develop techniques and skills in scientific research methods in the environmental sciences, which are relevant to solving current and past the environmental problems.

Content: The history and philosophy of science; the production of knowledge in the environmental sciences, techniques and skills such as basic survey and measurement in the natural sciences; statistical analysis and procedures, and other vital natural science skills. The preparation of a scientific paper and its oral and written presentation.

Assessment: Term paper (25%), Essays, presentations, seminars (15%), assignment (10%); 3 h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Biogeography of Invasive Species

ENVS708 WC (20L-0T-14P-15S-78H-30R-0F-3G-0A-13W-16C)
Prerequisite Requirement: ENVS314 or a completed major in BIOL.

Aim: To provide a solid understanding of the biogeographical and ecological pattems and processes associated with invasive species.

Content: Definitions: naturalization, invasiveness, invisibility of species. Natural versus human-assisted changes in species distributions. Plant invasions and biological control. Freshwater animal invasions. Marine invasions. Island versus mainland invasions. Mapping and modeling the spread of invasive species. Invasion phylogenetics. Assessing invasive species as threats to indigenous biodiversity. :
Assessment: Seminars (30%), practicals (20%); 3h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Offered in either Semester 1 or 2. Students may be required to contribute to the costs of the fieldtrip.

Air Pollution

ENVS711 WC (30L-20T-0P-248-73H-10R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours programme.

Aim: To understand technical and social aspects that contribute to air pollution problems and to be able to apply this knowledge to air quality management.

Content: Sources and types of pollutants, air pollution chemistry, air pollution meteorology, dispersion modelling, impact and abatement strategies, air quality management, policy and legislation in South Africa, case studies of air pollution 'hotspots'.

Assessment: Essays (30%), Seminar presentation (20%), 3h Exam (50%); 3h theory exam (67%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Offered in either Semester 1 or Semester 2.

Analytical GIS & Advanced Spatial Modelling !

ENVS712 P1 W1 (20L-0T-32P-108-62H-30R-0F-0G-6A-13W-16C)
Prerequisite Requirement: At least 60% in ENVS316.

Aim: This module is designed to provide advanced insight into GIS and its applications. Emphasis is on understanding through an analytical modelling approach to spatial problems.

Content: Analytical modelling, techniques for spatial modelling, Statistical analysis and interpretation of geographic data, spatial database design and manipulation, Error assessment and management, GIS project design and management, Environmental GIS applications.

Practicals: GIS applications for environmental management.

Assessment: Assignment (20%), practical reports (15%), practical test (15%); 3h theory exam (50%).

DP Requirement: 80% attendance at lectures, practicals; 40% Class mark.

Students may be required to contribute to costs of fieldwork.

Advanced Remote Sensing

ENVS720 P2 W2 (20L-0T-22P-10S-72H-30R-0F-0G-6A-13W-16C)
Prerequisite Modules: ENVS316 or equivalent knowledge.

Aim: To provide students with an advanced instruction in Remote Sensing, coupled with the use of Geographic Information Systems (GIS) in environmental applications. Emphasis is on understanding through application of techniques.

Content: Image processing; Image restoration; Supervised and unsupervised classification; Quality Assessment, including replicability, positional accuracy and thematic accuracy; Vegetation Indices and their applications; Time series change and analysis using Remote Sensing with GIS; Decision making using Multiple Criteria Analysis.
Practicals: Application of advanced remote sensing techniques.

Assessment: Assignment (20%), practical reports (15%), practical test (15%); 3h theory exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Applied Geomorphology

ENVS722 PC (20L-0T-42P-5S-60H-30R-0F-0G-3A-13W-16C)
Prerequisite Modules: ENVS315.

Aim: To impart an understanding of process geomorphology based on the analysis of case studies.

Content: The application of Geomorphology to solving problems in natural and urban environments; Professional ethics; social and economic considerations; Risk assessment and hazard mitigation in geomorphic systems; Case studies to investigate the application of Geomorphology in the solution of environmental problems; The field based identification and remediation of degraded systems through careful process intervention.

Practicals: Field excursion (students to contribute to costs), laboratory work.

Assessment: Major project (25%), assignment (15%), seminars (10%); 3h Exam (50%).

DP Requirement: 80% attendance at lectures, practicals and field work; 40% Class mark.

Offered in either Semester 1 or 2. Students may be required to contribute to costs of field work.

Advanced Biogeography

ENVS723 PC (20L-0T-32P-15S-60H-30R-0F-0G-3A-13W-16C)
Prerequisite Modules: ENVS314.

Aim: To discuss, critically evaluate, synthesize and integrate the various approaches to modern biogeography.
Content: Vicariance biogeography; centres of origin; pan-biogeography; applied historical biogeography; techniques of historical biogeography - retrospection; experimental island biogeography; the man-land paradox and the depletion/conservation of resources; species diversity; modern environmetalism.

Practicals: A field excursion (students to contribute to costs), laboratory work.

Assessment: Practical assignments (20%); major project (20%); seminars (10%); 3 h exam (50%).

DP Requirement: 80% attendance at lectures, seminars and practicals, 40% Class mark.

Offered in either Semester 1 or 2. Students may be required to contribute to costs of field work.

Environmental Science Res Project

ENVS730 PY WY (OL-0T-0P-40S-440H-0R-0F-0G-0A-26W-48C)
Prerequisite Requirement: Entry into an appropriate Honours programme.

Aim: To introduce students to the research in the environmental sciences.

Content: A significant research project in the environmental sciences, dealing with an appropriate environmental problem and undertaken under the supervision of an academic member of the University staff. Students are expected to present written and oral project proposals and progress reports; and to submit the research dissertation by the set date.

Assessment: Assessment of dissertation (80%) and oral presentations (20%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam. Students may be required to contribute to the costs of the field trip.

Coastal Geomorphology

ENVS741 WC (20L-0T-14P-15S-78H-30R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an-appropriate Honours programme.

Aim: To develop an understanding of shoreline and off-shore geomorphological history and processes; to study the geomorphological link between catchments and shorelines and to emphasize the impacts of human utilization of the coastal zone.

Content: Geomorphological aspects of oceanic currents; offshore and shoreline processes; tectonics and coastlines; catchment and shoreline geomorphology; human interventions and impacts on coastal geomorphological systems.
Practicals: Field excursion; three afternoon practicals.

Assessment: Seminar presentation (20%), field report (20%), practicals (10%); 3 h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Offered in either semester 1 or 2. Students may be required to contribute to the costs of the fieldtrip.

Environmental Modelling

ENVS750 PC (20L-0T-42P-5S-60H-30R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours programme.

Aim: To gain insight into the complexities of deriving process-based models pertaining to particular aspects of the natural environment.

Content: Models, model building and the role of models in environmental science; model sensitivity and accuracy; environmental modelling and understanding in selected natural environmental systems; modelling and simulation.
Practicals: The module includes a field excursion to investigate case studies involving the environmental systems considered in the course, and one major assignment.

Assessment: Field excursion report (15%), assignment (15 %), practical reports (20%); 3h theory exam (50%).

DP Requirement: 80% attendance at lectures, practicals and field trip; 40% Class mark.

Offered in either Semester 1 or 2. Students may be required to contribute to costs of field work.

Contemporary Environmental Issues

ENVS751 PCWC (20L-0T-35P-10S-62H-30R-0F-0G-3A-13W-16C)
Prerequisite Modules: ENVS322.

Aim: To understand the complexity of contemporary environmental issues of applied environmental science in the southern African and global context.

Content: Hazard assessment in an environmental context; people-environment dependencies; sustainability and biodiversity; energy, fuel and pollution; conservation strategies and policies including Agenda 21, ISO and other international treaties and conventions; environmental ethics and sustainable development; environmental consequences of population movement.

Practicals: Workshops, a major independent assignment and limited fieldwork.

Assessment: Seminars (25%), essay (10%), assignments (15%); 3 h exam (50%).

DP Requirement: 80% attendance at practicals, seminars and fieldwork; 40% Class mark.

Offered in either Semester 1 or 2. Students may be required to contribute to costs of field work.

Coursework Masters Dissertation

ENVS800 HY PY WY (OL-0T-0P-0S-640H-0R-0F-0G-0A-26W-64C)
Aim: To expose students to completing a major piece of supervised, independent research.

Content: Undertaking a major research project on an approved topic of interest to the Environmental Sciences and writing a dissertation on this research under the supervision of a member of the academic staff.

Assessment: The dissertation will be assessed as the sole criterion for the module, in accordance with the standard rules of Faculty for coursework masters degrees.

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Applied Geographical Information Systems

ENVS810 PC WC (16L-0T-24P-108-77H-30R-0F-0G-3A-13W-16C)
Prerequisite Modules: ENVS316 or equivalent.

Aim: To provide insight into the applications of GIS in a southern African context.

Content: Analysis of spatially-related problems facing the modern world, in the southern African context in particular;
Advanced concepts of applied GIS; Concepts of geography as a spatial information technology; Use of case studies to
ilustrate different aspects of GIS theory; Use of GIS-software to acquire and apply analytical skills.

Practicals: Assignments, projects and a field excursion.

Assessment: Practical reports (25%), mini-project (25%), assignment (10%); 3 h theory exam (40%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Offered in either Semester 1 or 2. Students may be required to contribute to costs of field work.

Internship

ENVS813 HC WC (OL-0T-0P-0S-160H-0R-0F-0G-0A-13W-16C)
Aim: To gain practical experience in a working environment.

Content: Research project on an appropriate topic during placement, under guidance of School and workplace supervisor.

Assessment: Research report (50%); Work practice report (50%).

DP Requirement: Not applicable.

Offered in either Semester 1 or 2. This module has no supplementary exam.

Sustainable Development

ENVS814 WC (OL-0T-16P-30S-91H-20R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours or Coursework Mastersâ\200\231 programme.

Aim: To explore the relationship between people and Environment using sustainability as a conceptual framework.
Content: This module explores the concepts and principles of sustainability. It is divided into four main’ sections:
theory and philosophy of environmentalism; defining sustainability; principles and management tools for sustainability:
such as sustainability indicators, environmental economics, public participation, and policy processes and sustainability.

Practicals: Fieldwork project

Assessment: Theory assignment (25%), research report (25%); 3 h Exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Offered in either Semester 1 or Semester 2. Students may be required to contribute to the costs of the fieldtrip.

Tools of Environmental Management

ENVS815 WC (OL-0T-36P-39S-72H-10R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours or Coursework Mastersâ\200\231 programme.

Aim: To expose students to a wide range of tools, over and above traditional EIAâ\200\231s, that are used in environmental management and to facilitate critical engagement as to their applicability in different situations.

Content: Evaluating sustainability status of various land use categories, risk assessment, environmental management systems, strategic environmental assessment, rapid rural appraisal, ecological footprint analysis, co-management agreements, role of predictive modeling, and environmental ethics.

Assessment: Assignment (25%), research report (25%); 3 h theory exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Offered in either Semester 1 or Semester 2. Students may be required to contribute to the costs of the fieldtrip.

Water Resource Management

ENVS817 PC WC (28L-0T-28P-285-43H-30R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours or Coursework Mastersâ\200\231 programme.

Aim: To provide students with an understanding of the significance as a life-sustaining resource and techniques of managing this resource.

Content: Global water issues. Hydrological concepts. Water management institutions. Policies and Water Act. Water scarcity and management of supply and demand. Sustainability of water resources. Catchment Management.
Practicals: 3 day field excursion and site visits.

Assessment: Article review (20%), term paper (20%), oral presentation (10%); 3 h exam (50%).

DP Requirement: 80% attendance lectures, fieldwork and seminars; 40% Class mark.

Offered in either Semester 1 or Semester 2. Students may be required to contribute towards costs of fieldwork.

Food Science

Offered in the School of Agricultural Sciences & Agribusiness

Introduction to Food Science

FSCI120 P2 (39L-0T-36P-0S-50H-30R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 40% in CHEM110.

Aim: To develop Food Science knowledge and skills, in food preparation and processing; and the experimental study of food, its composition and quality.

Content: Measuring techniques. Water, structure, properties, functions, activity. Food systems. Properties of carbohydrates, proteins & lipids. Enzymes, artificial sweeteners, hydrocolloids, anti-oxidants. Low fat spreads. Minerals and Vitamins. Browning reactions (enzymatic & non-enzymatic). Cereals, types of flour, formation of dough & batter, leavening, gelatinisation.

Practicals: Experimentation and basic preparation of foods as listed above.

Assessment: Tests (15%), essay (5%), prac reports (5%), written practical test (8%); 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Further Concepts in Food Science

FSCI210 P1 (39L-0T-36P-0S-60H-20R-0F-0G-5A-13W-16C)
Prerequisite Modules: FSCI120.

Aim: To further develop Food Science knowledge, food preparation techniques & the experimental study of food.
Content: Beverages: chemical composition, types & origins, milk, milk products, milk as a food system, milk foams, cheese. Eggs, vegetables & fruit, alternative protein foods, herbs & spices. Meat structure, chemical composition, post-slaughter changes & processing. Poultry & fish. Storage of food. Herbs, spices, food additives & undesirables. Preservation, freezing, irradiation, Ohmic heating & modified atmosphere packaging. Sensory evaluation. Menus & menu terms.

Practicals: Advanced food preparation. Experimental study of the effect of all processes on food.

Assessment: Tests (15%), essay (5%), prac reports (5%), written prac test (8%); 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Food Security

Offered in the School of Agricultural Sciences & Agribusiness

Introduction to Food Security

FDSC350 P2 (10L-0T-0P-0S-45H-20R-0F-0G-5A-13W-8C)
Aim: To introduce students to the concept of food security, the food security situation in Africa and policy responses and explore possible solutions, types of interventions and food policy options.

Content: Conceptual framework for food security. Food Security (access, availability, vulnerability). Food security measurement. Policy context. Policy making. Food Security policy, program, project and intervention options.
Assessment: 1 test (10%), 4 assignments (40%), 1.5 h exam (50%).

DP Requirement: 40% Class mark.

Food Security Studies

FDSC700 P1 (OL-0T-14P-66S-80H-0R-0F-0G-0A-6W-16C)
Aim: The multi transdisciplinary exploration of food security issues.

Content: Introduction to food security systems and components. South African food security context. Food production, storage and access. Animal, plant, forest and food storage systems. Livelihoods, risk and vulnerability to food insecurity. Household coping strategies. Nutrition. Land reform. Environmental issues. HIV/AIDS, production and livelihoods. Food policy analysis. Food security measurement, management and interventions.

Practicals: Field trip case studies.

Assessment: Summative case study assessment (100%)

DP Requirement: Not applicable.

This module has no supplementary exam.

Food Security Internship

FDSC701 PB (OL-0T-0P-08-175H-0R-225F-0G-0A-13W-40C)
Corequisite: FDSC700, PODS601.

Aim: To give students practical experience dealing with food security issues in a community setting.

Content: An individual internship for which the student will prepare at several levels. The primary foci will be integration of disciplines, particularly the student's own discipline with food security, identification of food security issues and collection of data, evaluation of collected information and communication of results to others. This final step will include positive suggestions for dealing with food security issues in the community.

Assessment: Portfolio report (100%).

DP Requirement: Not applicable

Offered in both Semesters. This module has no supplementary exam.

Food Security Dissertation for Diploma

FDSC711 PB (OL-0T-0P-0S-400H-0R-0F-0G-0A-13W-40C)
Corequisite: FDSC700, 760.

Aim: For students to independently investigate a food security related issue and contribute to the knowledge in any areas/aspect of food security.

Content: Independent investigation of any food security related problem using qualitative or quantitative methodologies. Preparation of a research paper.

Assessment: Research paper (100%).

DP Requirement: Not applicable

Offered in both Semesters. Additional requirement: Access to a computer and the Internet. This module has no supplementary exam.

Food Security Communications

FDSC715 P1 (20L-0T-0P-0S-60H-0R-0F-0G-0A-4W-8C)
Corequisite: FDSC700, 760.

Aim: To develop capacity in academic writing and reporting.

Content: Requirements and technique for writing seminars, research papers and research briefs. Requirements for publishing research. Development of arguments. Writing literature reviews. Citing and referencing techniques. Desktop publishing techniques.

Assessment: Literature review (32%), Debate paper (29%), Abstract (10%), Critique of a research paper (29%).

DP Requirement: Not applicable.

Additional requirement: Access to a computer and the internet. This module has no supplementary exam.

Food Storage for Food Security

FDSC720 P1 (10L-0T-5P-0S-55H-10R-0F-0G-0A-10W-8C)
Aim: To explore foundational concepts of post-harvest crop storage, food preservation and food safety.

Content: Causes of primary crop and product losses. Micro-organisms responsible for food loss, food contamination,
toxin production. Pathological effects of contaminated water and food. Testing for water and food contamination.
Preservation methods for food storage: freezing, bottling, salt, sugar, acid, dehydration, pasteurisation, sterilisation,
UHT, sanitation, UV radiation.

Practicals: Demonstrations and hands-on participation in exercises, visits to local (university and/or industry) sites.
Assessment: 3 class assignments (33%), externally examined poster case study assignment (67%).

DP Requirement: Not applicable.

Additional requirement; Access to the Internet. This module has no supplementary exam.

Food Access for Food Security

FDSC730 P1 (20L-0T-0P-0S-60H-0R-0F-0G-0A-10W-8C)
Aim: To explore issues related to access to food or the means to purchase food and related nutrition and food utilisation issues.

Content: Issues relating to access to food and the means to purchase food, including gender dynamics, livelihoods, intra-household allocation, HIV, and food preferences. Nutrition requirements of various population groups, food utilisation and how food access affects nutritional status.

Assessment: 4 assignments (33%), poster (67%).

DP Requirement: Not applicable.

Additional requirement: Access to the Internet. This module has no supplementary exam.

Sustainable Livelihood Options

FDSC755 P1 (OL-0T-0P-40S-40H-0R-0F-0G-0A-4W-8C)
Aim: To investigate possibilities for promoting food security though strengthening and protecting household livelihoods.

Content: Sustainable Livelihood theories. Food security as one outcome of sustainable livelihoods. Livelihood analysis. Assets, vulnerability, shocks, stresses and trends. Policy and institutional roles. Opportunity assessment.
Assessment: Report on an independent field sustainable livelihood analysis and evaluation (100%).

DP Requirement: Not applicable.

Additional requirement: Access to the Internet. This module has no supplementary exam.

Introduction to Research Methods

FDSC760 P1 (10L-10T-0P-2S-53H-3R-0F-0G-2A-13W-8C)
Aim: For students to develop the necessary skills for writing a research proposal and method development.

Content: Scientific method of enquiry. Research question formulation, writing, selecting appropriate methodologies, sample design and selection, qualitative and quantitative methodologies, social statistics, data analysis and writing of research projects and criteria for evaluation. A

Practicals: None.

Assessment: 1 quiz (15%), assignment (15%), project proposal (70%).

DP Requirement: Not applicable.

Additional requirement: Access to the internet. This module has no supplementary exam.

Transdisciplinary Food Security

FDSC800 P1 (OL-0T-14P-66S-80H-0R-0F-0G-0A-6W-16C)
Aim: Transdisciplinary exploration of advanced food security issues.

Content: The interaction of food security systems and components. South African and regional food security context.
Food production, storage and access. Animal, plant, forest and food storage systems. Liveli

hoods, risk and
vulnerability to food insecurity. Household coping strategies. Nutrition. Land reform. Environmental issues. HIV/AIDS,
production and livelihoods. Food policy. Food security measurement, management and interventions.

Practicals: Field trip case studies.

Assessment: Summative critique of regional food security shocks and threats (100%).

DP Requirement: Not applicable.

This module has no supplementary exam.

C/W Masters Dissertation in Food Security

FDSC811 PY (0L-0T-0P-0S-640H-0R-0F-0G-0A-26W-64C)
Prerequisite Modules: FDSC840.

Aim: To equip students with knowledge and skills to: plan and implement qualitative and quantitative research related
to food security.

Content: Independent investigation of any food security related problem using qualitative and/or quantitative methods.
Preparation of mini-dissertation.

Assessment: Dissertation (100%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Research Methods for Food Security

FDSC840 P1 (50L-0T-0P-0S-110H-0R-0F-0G-0A-6W-16C)
Aim: To equip students with knowledge and skills to plan and implement transdisciplinary research.

Content: The scientific method. Types of research. Research design: Populations vs. Samples. Qualitative and quantitative data collection techniques and tools and analysis. Information retrieval. Statistical analysis. Scientific writing and reporting. Popular dissemination of research. Moral-ethical aspects of research and publication.
Assessment: Class quiz (10%), research proposal (90%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Food Security Modelling Systems

FDSC860 P1 (OL-0T-40P-40S-80H-0R-0F-0G-0A-6W-16C)
Aim: Exploration of modelling systems applicable to food security evaluation, assessment and projection.

Content: Spreadsheet programming. System analysis. Demographics. Simulations and population projections.
Practicals: Problem-solving exercises, simulation modelling using spreadsheet programming. Experimental design and evaluation.

Assessment: 5 class assignments (50%), externally examined simulation model (50%).

DP Requirement: Not applicable.

Offered in Semester 1.

Measuring and Monitoring

FDSC870 P1 (40L-0T-20P-0S-100H-0R-0F-0G-0A-10W-16C)
Aim: Comparison of international food security measurement and monitoring systems.

Content: Food Security indicators (regional, national, household levels). Agric-ecological monitoring systems. Vulnerability Assessments. Household Economy Approaches. Experiential measurements. Qualitative and quantitative measures. Examples of tools and techniques.

Practicals: Exploration of various international monitoring systems using the Internet.

Assessment: Summative assignment (100%).

DP Requirement: Not applicable.

Additional requirement: Access to the Internet. This module has no supplementary exam.

Essays in Food Security

FDSC880 PB (OL-0T-0P-0S-160H-0R-0F-0G-0A-13W-16C)
Aim: Individually designed curricula based on individual student requirements to build further knowledge and experience in food security related issues.

Content: Topics and assignments and their assessment to be decided on for each specific case. Modules may include seminars, literature reviews or parts of modules from various disciplines.

Assessment: 1 internally examined essay (33%), 2 externally examined essays (67%).

DP Requirement: 40% for internally examined essay.

Offered in Semester 1 and 2. This module has no supplementary exam.

Markets for Food Security

FDSC890 P1 (40L-0T-20P-0S-100H-0R-0F-0G-0A-13W-16C)
Aim: Basic market concepts, assessment, monitoring and analysis for food security analyses.

Content: Basic market concepts, identification and use of market indicators, assessment tools and basic market analysis (sub national, national and regional levels with links to household level). Relevance and application of markets to Vulnerability Assessments, food security analysis and early warning. Examples of tools and techniques; group and individual exercises.

Practicals: Exploration of various market related websites and intemational monitoring systems using the Internet.
Assessment: Summative assignment (100%).

DP Requirement: Not applicable.

Additional requirement: Access to the internet. This module has no supplementary exam.

Food Service Management

Offered in the School of Agricultural Sciences & Agribusiness

Food production,systems & plans

FSMT332 P1 (39L-0T-28P-0S-60H-24R-4F-0G-5A-13W-16C)
Prerequisite Modules: FSCI210, NUTR224.

Aim: To provide the student with knowledge and insight required of a competent foodservice manager.

Content: Trends in the foodservice industry; menu planning, development and implementation; production; systems approach to foodservice management; foodservice systems; sanitation and hygiene (HACCP); facility planning and design; dietary modification in FSMT.

Practicals: Finance practical (recipe adjustment, purchasing); managing a large-scale catering event (laboratory work); food presentation; menu modification for special diets.

Assessment: Practicals (6%), assignments (15%), tests (12%); 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Management Theory & Practice

FSMT333 P2 (49L-0T-27P-0S-60H-19R-0F-0G-5A-13W-16C)
Prerequisite Modules: FSMT332, MGNT102.

Aim: To provide the student with the knowledge and basic skills needed for managerial effectiveness in the Dietetics profession and in nutrition related areas.

Content: Management roles of dietetics and nutrition professionals; ethics and social responsibility; entrepreneurship; project management; financial management; marketing; business plans; report writing; human resource management; supervision; managing change.

Practicals: Managing a large-scale catering event (laboratory work) or management aspects of a nutrition intervention programme.

Assessment: Assignment (6%), management task evaluation (15%), tests (12%); 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Food Service Management Internship

FSMT711 PY (6L-0T-3P-6S-17H-20R-265F-0G-3A-8W-32C)
Prerequisite Requirement: BSc(Diet) or BSc(Human Nutrition) degree.

Aim: To enable the student to expand the ability to manage a food-service unit and to develop communication skills further.

Content: Large scale food preparation, kitchen administration and management, menu planning, kitchen layout evaluation, kitchen safety and hygiene.

Practicals: Students work in a food-service unit for the duration of the module.

Assessment: Professional evaluation (7%, submin 50%), FSMT prac assignments in the FSMT fac

ility (7%), FSMT
assignments (15%), business plan (2%), oral exam (2%); 3 h exam (67%, submin 40%).

DP Requirement: 40% Class mark.

8 week module offered during the course of the year.

Genetics

Offered in the School of Biochemistry, Genetics & Microbiology

Introductory Genetics

GENE240 P1 (36L-36T-0P-0S-53H-28R-0F-0G-7A-13W-16C)
Prerequisite Modules: BIOL101 or BIMI120, MATH133.

Aim: To attain an understanding of basic inheritance patterns, cell division and the structure & function of chromosomes.

Content: In depth study of prokaryotic & eukaryotic cellular division & reproduction, revision of inheritance principles.
Extensions of Mendelism in allelic variation, gene function & types of gene action, chromosomal basis of Mendelism, sex-determination & linkage. Cytogenetics: variation in chromosome number & structural rearrangements, linkage, crossing-over & mapping; evolutionary processes that modify genomes.

Practicals: Analysis of chromosome behaviour & karyotypes. Tutorial based exercises based on theory content.
Assessment: 2h theory & 2h tutorial test (50%), 3h exam (50%), 40% sub-minimum in exam.

DP Requirement: 40% Class mark. 80% attendance at tutorials and 100% at tests. Completion and submission of all assignments on time.

Population and Quantitative Genetics

GENE310 P1 (29L-12T-24P-0S-75H-16R-0F-0G-4A-13W-16C)
Prerequisite Modules: GENE240; BMET210 or BIOL200.

Aim: To attain insight into populations and quantitative genetics in the context of animal & plant breeding, conservation biology and evolution.

Content: Genetic basis of variation in natural populations: random mating, multiple alleles, sex-linked genes, linkage & linkage disequilibrium. Analysis of quantitative traits: genetic variation, heritability, natural selection, assortative mating, migration, drift, flow, inbreeding, genotype/environment interactions & artificial selection. Application to problems such as animal & plant breeding and conservation biology.

Practicals: Selected from the above. Tutorials. Problem solving exercises.

Assessment: Theory tests (25%), seminars (5%), tutorials & assignments (15%), practicals (5%), exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials & practicals. Completion & submission of all assignments on time.

Bioinformatics

GENE320 P2 (27L-10T-20P-08-73H-25R-0F-0G-5A-13W-16C)
Prerequisite Modules: GENE240 or RDNA202 or BIOL205.

Aim: To attain an understanding of the basic theory of bioinformatics and gain practical experience of DNA and protein sequence analysis.

Content: DNA and protein sequence alignment, sequence alignment algorithms, structure funct

ion prediction, the
organization and use of public domain sequence databases and public domain software, genome annotation and
systems biology.

Practicals: Hands-on experience with the retrieval and manipulation of data from online databases.

Assessment: 2 h theory tests (35%), practical reports and assignments (15%), 3 h exam (50%).

DP Requirement: 40% Class mark. 80% attendance at tutorials and practicals, 100% attendance at tests.

Genomics and Molecular Diagnostics

GENE330 P1 (27L-10T-27P-0S-70H-21R-0F-0G-5A-13W-16C)
Prerequisite Modules: GENE240, RDNA202.

Aim: To attain an understanding of the organization and analysis of eukaryotic genomes. Insight, skills and experience in recombinant molecular technologies.

Content: Eukaryotic genome organization, gene expression and gene control. The theory of cloning, manipulation and analysis of eukaryotic DNA, RNA and proteins. This includes providing a working knowledge of modern molecular and diagnostic technologies.

Practicals: Analysis of eukaryotic molecular and cellular systems.

Assessment: 2 h theory tests (20%), tutorial reports (10%), and practical reports (20 50%), 3 h exam (50%).

DP Requirement: 40% Class mark. 80% attendance at tutorials, practicals and 100% at tests. Completion and submission of all assignments on time.

Integrated Human Genetics

GENE340 P2 (36L-36T-0P-0S-53H-28R-0F-0G-7A-13W-16C)
Prerequisite Modules: GENE240.

Aim: To attain an understanding of the diverse nature of human genetics, competency-based skill development to allow future biomedical researchers to successfully integrate genetics, epidemiology & ethics into their practices.
Content: The organisation of the human genome & mapping; somatic cell genetics, identifying the genetics basis of disease; genetic screening & pre-natal diagnosis, treatment of genetic disease; genetic basis of cancer & the immune system; mitochondrial pathology; application of novel scientific discoveries to patient care; breakthroughs in the organisation of the human genome & mapping; contemporary ethical, social & moral issues pertaining to genetics.

* Assessment: 2 h theory tests (30%), tutorial reports (20%), 3 h exam (50%).

DP Requirement: DP Requirement: 40% in coursework. 100% attendance at practicals and tests. Completion and submission of all assignments on time.

Animal Genetics

GENE350 P2 (36L-36T-0P-34S-17H-30R-0F-0G-7A-13W-16C)
Prerequisite Modules: GENE240.

Aim: To attain insight into how genetic principles may be used to assess and predict, and thereby improve the genetic merit of animal populations.

Content: Aspects of cytogenetics, molecular genetics, population genetics, conservation genetics, quantitative genetics and biotechnology, with special reference to their application and use in animal populations.

Practicals: Tutorials. Problem solving exercises and field trips.

Assessment: Seminar (5%), term paper (5%), Class tests (20%),tutorials and assignments (15%

), practicals & field
visits (5%), exam (50%).

DP Requirement: 40% Class mark. 80% attendance at tutorials and practicals, 100% attendance at tests, Completion
and submission of all assignments on time.

Mini Research Project in Genetics

GENE701 PY (OL-20T-300P-1S-158H-0R-0F-0G-1A-26W-48C)
Prerequisite Requirement: 128C in Genetics, Biochemistry andfor Molecular Biology disciplines at Level 3, or
modules providing adequate background approved by the academic coordinator.

Aim: To provide insight to the principles of conducting research through laboratory based and/or computer based
research and developing the skills to analyze, interpret and present results.

Content: Research project which falls within the thrust of the school's research area. This includes a relevant
literature survey and the execution of research.

Practicals: Design and execution of a research project.

Assessment: Report (70%) & 1h oral presentations (30%).

DP Requirement: 50% Class mark. 80% attendance at lectures, tutorials, and practicals, 100% attendance at tests.
Completion and submission of all assignments on time.

Year-long Module.

Advanced Genomics and Bioinformatics

GENE703 P1 (OL-20T-44P-0S-96H-0R-0F-0G-0A-13W-16C)
Aim: To provide insight to the principles of conducting research through laboratory based and/or computer based research and developing the skills to analyze, interpret and present results.

Content: Topics chosen from, but not limited to, Comparative Genomics, Genome annotation, Genomic sequencing, Data management and mining, Genetic study design and analysis.

Assessment: Essay (27%), practical reports (40%); oral presentation (33%)(50% externally examined).

DP Requirement: Not applicable.

This module has no supplementary exam.

Molecular Diagnostics

GENE706 P2 (12L-12T-18P-0S-118H-0R-0F-0G-0A-13W-16C)
Aim: To provide students with a theoretical and practical understanding of modern molecular diagnostic technologies and their application in the plant, microbial and animal sciences.

Content: Sequence analysis, mutation scanning, single nucleotide polymorphisms, strain identification, forensic analysis, GMO detection, real-time PCR.

Assessment: Two practical reports (50%) and two written assignments (50%) (50% externally examined).

DP Requirement: Not applicable.

This module has no supplementary exam.

Genetics Research Skills

GENE714 P1 (4L-30T-0P-2S-117H-0R-0F-6G-1A-13W-16C)
Prerequisite Requirement: 128C at Level 3 from Genetics or modules providing adequate background approved by the Academic Coordinator.

Aim: To provide strategies to find, organise, & critically evaluate scientific literature in molecular and/or quantitative genetics with an emphasis on the manipulation & interpretation of in silico data. To teach students how to present scientific results orally % in essay and poster format.

Content: Scientific presentation skills, literature database searches, scientific standards and plagiarism, analyzing and evaluating scientific literature, planning and organising a essay and poster on a selected topic.

Assessment: Oral presentations (20%), tutorial exercises (10%), class test (20%), scientific essay and/or poster (50%) (50% externally examined).

DP Requirement: Completion and submission of all assignments on time. Attendance at 80% of all scheduled activities.

This module has no supplementary exam.

Advanced Population & Quantitative Genetics

GENE715 P1 (12L-10T-20P-4S-97H-0R-0F-12G-5A-13W-16C)
Aim: To advance and integrate knowledge of quantitative & population genetics with concepts of statistics and biology
in their application within populations and genomes. To familiarise students with the concepts, theories and
methodology involved in the application of genetic principles to populations and genomes.

Content: A selection of topics in Population & Quantitative Genetics including but not limited to: Measures of genetic
diversity, Allele frequencies & Hardy-Weinberg, Inbreeding & Kinship, Selection, Drift, Mutation, Migration, Neutral
theory, Population structure, QTL mapping, Estimation of genetic parameters, Selection index & Multivariate selection.
Assessment: Assignments (15%), practicals (10%), 2 h test (15%), seminar (10%), 3 h exam (50%).

DP Requirement: DP Requirement: Class mark of 40% and attendance of 80 % of practicals .

Advanced Seminar Topics in Genetics

GENE716 P1 (OL-12T-9P-3S-136H-0R-0F-0G-0A-12W-16C)
Aim: To conduct advanced and comprehensive reviews of selected topics in genetics and to present these in a written and oral format.

Content: Relevant highly contemporary topics from the sub-disciplines of Genetics, such as bacterial, plant, animal, human and medical Genetics, as well as genomics and bioinformatics.

Assessment: 2 oral article presentations (50%) and 1 specialist topic presentation and 1 written assignment (50%, externally examined).

DP Requirement: DP Requirement: Not applicable.

This module has no supplementary exam.

Advanced Animal Breeding & Genetics

GENE718 P2 (9L-30T-30P-2S-64H-20R-0F-0G-5A-13W-16C)
Prerequisite Modules: GENE350.

Aim: To increase understanding of genetic principles and their applications on genetic improvement of livestock and wild life populations.

Content: Brief revision of basic principle of inheritance, population genetics, genetic & phenotypic variation. Principles of selection applied to animal production & conservation. Industry programmes for genetic evaluation (BLUP), mating systems & modern techniques of animal breeding (Al, MOET, Gene mapping and QTL identification and gene transfer). Construction of breeding programmes. Breeding programmes for selected livestock species. Conservation genetics programmes.

Assessment: Problem solving exercises (10%), prac. reports (10%), written assignments (10%), oral presentation (10%), formal tests (10%), 3 h exam (50%).

DP Requirement: Class mark of 40%, including at least 80% attendance at practicals.

This module has no supplementary exam.

Geography

Offered in the School of Environmental Sciences

Human Environments

GEOG110 H1 P1 W1 (39L-8T-30P-0S-67H-10R-0F-0G-6A-13W-16C)
Aim: To introduce students to basic concepts in human geography.

Content: The central themes in this module are society-space and nature-society linkages. These are grounded in the African social, economic and political context and further explored in relation to processes of globalisation and uneven development. Fundamental concepts are: global/ local interactions at different scales; spatial variation and spatial interaction; individual agency in the face of larger economic and social structures; human-environment interactions at different scales. Practicals form an integral part of the theory and utilise map skills.

Assessment: Class essay (15%), Theory test (15%), Practical test (20%), 3 h theory exam (50%).

DP Requirement: 80% attendance at practicals and tutorials; 40% Class mark.

Geographies of Urban and Rural Change

GEO0G220 H2 P2 W2 (39L-5T-28P-0S-61H-20R-0F-0G-7A-13W-16C)
Prerequisite Modules: GEOG110.

Aim: To introduce students to spatial transformations in urban and rural contexts in southern Africa.

Content: Spatial transformations in urban and rural contexts are explored in light of appropriate theory drawn from urban, economic, cultural and political geography. Regional change is interpreted in the context of post-apartheid planning and development practice, as well as in the global economy. Particular attention is paid to contested urban landscapes and new urban forms; the impact of land reform initiatives & the spatial impacts of development theory and planning.

Assessment: Tests (20%), Assignments (20%), Practicals (10%), 3 h exam (50%).

DP Requirement: 80% attendance at practicals and tutorials; 40% Class mark.

Tourism Studies

GEOG301 H1 (27L-0T-48P-0S-63H-17R-0F-0G-5A-13W-16C)
Prerequisite Requirement: GEOG220 or at least 64C at level 2.

Aim: To introduce students to conceptual and theoretical aspects of leisure, recreation and tourism in the context of planning for sustainable tourism development.

Content: Conceptual and theoretical issues in leisure, recreation and tourism, historical development of tourism, the economics of tourism development, principles of sustainable tourism development, forms of tourism development, the sustainability of ecotourism, environmental policies and impact control measures, policy management and planning for tourism development in South Africa.

Practicals: Collection and analysis of data, report presentation and field excursion.

Assessment: Tests (25%), Assignments (5%), Practicals (20%), 3 h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Students may be required to contribute to the costs of field trips.

Land Issues and Rural Development in SA

GEOG314 H2 (27L-0T-36P-0S-72H-20R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 32C at Level 2.

Aim: To deepen understanding of land issues in the African context.

Content: Explanations of rural poverty (including globalization and HIV/AIDS), historical background to the land question in Southem Africa, land demand and use in Southern Africa, natural resources and rural development, rural livelihoods and food security, women/ gender and rural development, and enhancing conditions for the promotion of rural development.

Assessment: Assignments (15%), Tests (15%), Project (20%), 3 h theory exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Geography of Health

GEOG321 H2 (27L-0T-42P-08-66H-20R-0F-0G-5A-13W-16C)
Prerequisite Modules: GEOG220.

Aim: To introduce students to the spatial and social determinants of disease, health and medicine.

Content: Historical development of medicine, conceptual issues, biomedical perspective and criticisms, alternate forms of therapy, social and environmental change, rural-urban health care delivery, development and health, primary health care and disease ecology in developing countries.

Practicals: Collection and analysis of health related data and report.

Assessment: Class essay (15%), Theory test (15%), Practical test (20%), 3 h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Students may be required to contribute to the costs of field trips.

Geography of Development

GEOG325 P2 (18L-4T-26P-4S-80H-24R-0F-0G-4A-13W-16C)
Prerequisite Modules: GE0G220.

Aim: To highlight the shortcomings of mainstream models and theories of development, especi ally the inability to
address problems of poverty and environmental sustainability.

Content: The module will cover development debates; Agrarian change and rural development; Survival strategies of
the poor; Globalization and development; Gender and development; Alternative approaches to development for the
future.

Assessment: Assignments (30%), Practicals (20%); 3 h exam (50%).

DP Requirement: 80% attendance at practicals; 40% Class mark.

Sustainable Cities and Development

GEOG330 H2 P2 (26L-0T-36P-4S-69H-20R-0F-0G-5A-13W-16C)
Prerequisite Modules: GEOG220 or 224.

Aim: To develop an understanding of sustainable urban processes in Sub-Saharan Africa, and to appraise these in the context of development theory and practice.

Content: Contemporary transformation and urban change within cities; strategies for urban sustainability and growth. Urban policies, democratization, decentralization and social movements. People-land relationships and urban land use in Africa.

Assessment: Assignments (25%), Practicals (25%); 3 h exam (50%).

DP Requirement: 80% attendance at practicals and tutorials; 40% Class mark.

Concepts and Methods in Geography

GEOG700 H1 P1 (20L-0T-8P-30S-79H-20R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours programme.

Aim: To consolidate the principles, philosophy and methods of Geography as an holistic, applied environmental science, within a spatial and temporal context.

Content: Debates on philosophical and methodological theories, concepts and paradigms informing and contextualizing methods with an emphasis on a variety of quantitative and qualitative methods available to conduct geographical research.

Practicals: Workshops, presentations and assignments.

Assessment: Assignments (20%), Essay (15%), Term paper (15%); 3 h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Students may be required to contribute to the costs of the fieldtrip.

Urban governance:managing sustainable cities

GEOG726 PC (30L-0T-36P-9S-62H-20R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours programme.

Aim: This module examines the experience of urban planning and management in developing countries.

Content: Democratisation, neo-liberal growth strategies and globalisation in the context of cities. The reorientation of policies and instruments of city management in order to improve efficiency, social equity and sustainability. Urban policies; decentralisation and democratisation; public-private ˜partnerships; community participation; social movements; sustainable environments; poverty alleviation; case studies. Critical appraisal of urban reconstruction strategies in South Africa.

Practicals: Workshops/Projects

Assessment: Presentations (20%), assignments (30%); 3 h exam (50%).

DP Requirement: 80% attendance at lectures, practicals and seminars; 40% Class mark.

Offered in either Semester 1 or 2.

Urban Studies

GEOG727 H2 (20L-0T-8P-30S-79H-20R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours programme.

Aim: To develop a critical understanding of the nature of contemporary cities and the key theories used to examine urban processes.

Content: The key processes & types of development through which contemporary cities are evolving, reviewing issues in urban geographical literature from the developed and developing worlds. Urban competition, social upliftment, gentrification, the formation of spaces of the hyper-real and mechanisms for strengthening the position of cities in the global economy. The module interrogates the impacts on cities with special consideration of the nature of African and South African cities.

Practicals: Application of urban theory.

Assessment: Presentations (20%), assignments (30%), 3h Exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Geographical Sciences Research Project

GEOGT730 PY WY (OL-0T-0P-40S-440H-0R-0F-0G-0A-26W-48C)
Corequisite: GEOG700.

Aim: To gain experience in the formulation, planning and execution of a research project in the Geographical Sciences.

Content: To identify & execute a significant research project in one of the sub-disciplines of Geography within the natural sciences, requiring the student to collect, analyse and interpret data; integrate practical & theoretical knowledge; develop independent critical thought and communicate the results effectively in both written & oral reports.
The projects will be decided in discussion between the supervising staff & the individual student. The project must be submitted in the format as required by one of the journals of the discipline appropriate to the selected project.
Assessment: Oral presentations (20%), Dissertation (80%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam. Students may be required to contribute to the costs of the fieldtrip. For students in the Faculty of Science and Agriculture only.

Natural Resources & Sustainable Land Use

GEOG733 PC WC (20L-0T-38P-10S-62H-27R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours programme.

Aim: To examine NRM and SLU issues utilising problem-based, interdisciplinary and field-orientated approaches.
Content: Resource management theories and debates, ecosystem management, field-based methodologies, sustainable land use, natural resource management strategies, institutional dynamics, conflict resolution, policy aspects, constraints and capacities.

Practicals: Workshops, projects and fieldwork.

Assessment: Essays (30%); seminars (20%), presentations (10%); 3 h exam (40%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Offered in either Semester 1 or 2. Students may be required to contribute to costs of field work.

Rural Development & Land Reform

GEOG735 PC WC (OL-0T-26P-36S-68H-27R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours programme.

Aim: To examine rural change and challenges in developing contexts.

Content: Social differentiation in rural areas, rural govemance and political dynamics, knowledge systems and social capital, rural-urban linkages, food security and agricultural issues, off-farm income generating/ livelihood sustaining activities, rural service provision, appropriate technologies, review of relevant rural development policies, monitoring/ management and research issues in rural development.

Practicals: Workshops, projects and a field excursion.

Assessment: Assignments (25%), Research report (25%); 3 h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Offered in either Semester 1 or Semester 2. Students may be required to contribute to costs of fieldwork.

Geography Sciences Research Project 5

GEOG740 HY PY (OL-10T-0P-10S-300H-0R-0F-0G-0A-26W-32C)
Corequisite: GEOG700.

Aim: To gain experience in the formulation, planning and execution of a research project in Geography within the social and human sciences. {

Content: To identify & execute a significant research project in one of the sub-disciplines of Geography, requiring the student to collect, analyse, & interpret data; integrate practical & theoretical knowledge within the appropriate framework in the human sciences or at the interface between the natural & social sciences; to develop independent critical thought, and communicate the research results effectively in both written and oral reports. The research projects will be decided in discussion between the supervising staff and the individual student.

Assessment: Dissertation (80%) and oral presentations (20%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam. Students may be required to contribute to the costs of the fieldtrip. For students in the Faculty of Humanities, Development and Social Science only.

Advanced Tourism Studies

GEOG744 HC (0L-0T-38P-308-62H-27R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Entry into an appropriate Honours programme.

Aim: To develop critical expertise in the analysis of tourism issues in the developing worl d.

Content: Concepts and theoretical aspects of tourism, the production of tourism spaces, pla ces and forms,
globalization and tourism, trends in tourism development, tourism impacts, tourism and sust ainable development and
tourism in Southern Africa.

Practicals: Workshops, projects, and field excursions.

Assessment: Term paper (20%), Assignments (20%), Seminar presentations (10%); 3 h exam (50%).

DP Requirement: 80% attendance at all academic contact activities; 40% class mark.

Offered in either Semester 1 or 2. Students may be required to contribute to costs of field trips.

Geologicai Sciences

Offered in the School of Geological Sciences

Earth and its Materials

GEOL101 W1 (39L-0T-39P-0S-45H-32R-0F-0G-5A-13W-16C)
Aim: To introduce students to the Earth as a dynamic planet and to those processes which op erate within and on the
Earth’s surface.

Content: Introduction to geology; origin of the earth; agents which shaped the Earth’s surf ace; uniformitarianism;
geological time and its measurement; introduction to mineralogy and the rock forming minera ls; the major rock groups
and their characteristics; internal structure of the earth; deformation of rocks; introduct ion to Plate Tectonics.
Practicals: Exercises related to the earth’s tectonic domains; recognition and description of rocks and minerals. 2
days of field excursions may be included as part of practical work.

Assessment: Practical exercises (20%), tests (30%); 3 h exam (50%).

DP Requirement: 40% Class mark. 80% attendance at both lectures and practicals. Field excur sions are compulsory.
Students may be required to contribute to the cost of accommodation and transport related t o field work.

Earth’s Surface Processes

GEOL102 W2 (39L-0T-39P-0S-45H-32R-0F-0G-5A-13W-16C)
Aim: To introduce the processes which shape the surface of the earth.

Content: Introduction to chemical & mechanical weathering, regolith development; transporta tion of sedimentary
particles by various agents & the resultant landscapes; lithification processes, geologic t ime, relative & absolute age;
stratigraphic correlation; faunal succession; formation & use of fossils; the geological co lumn.

Practicals: Topographic & geological maps: contours & scale; relationship between topography & geology; basic outcrop pattems on geological maps; topographic & geological cross sections. 2 days of field excursions may be included as part of practical work.

Assessment: Practical exercises (20%), tests (30%); 3 h exam (50%).

DP Requirement: 40% class mark, including a minimum of 40% in practical work; 80% attendance at both lectures and practicals. Field excursions are compulsory.

Students may be required to contribute to the cost of accommodation and transport related to field work.

Geology Field Module

GEOL200 WV (OL-0T-97P-10S-50H-0R-0F-0G-3A-6W-16C)
Prerequisite Modules: GEOL101, 102.

Corequisite: GEOL201, 202.

Aim: To learn the basic skills and field techniques required in compiling a geological map and accompanying geological report on a field area.

Content: 7 to 10-day field trip in the university vacation. Recognition and description of different rock types and rock associations in the field; measuring structures in outcrop; field techniques and geological mapping; interpretation of field observations; geological synthesis of field area based on geological map and outcrop evidence; verbal presentation of findings.

Assessment: Field exercises, field map and cross section (40%), verbal presentations (10%), written report and final map (50%). No formal examination.

DP Requirement: Attendance on field trip and all pre-trip exercises.

Restricted to students registered for the Programme in Geological Sciences. In addition to tuition fees, each student will be required to purchase a field kit and to contribute to the cost of subsistence, accommodation and transport. This module has no supplementary exam.

Mineralogy

GEOL201 W1 (15L-0T-18P-0S-31H-12R-0F-0G-4A-6W-8C)
Prerequisite Modules: GEOL101, 102; CHEM110.

Aim: To understand the structural and chemical properties of minerals as well as their distribution and significance in solid earth and surface environments.

Content: Principles of crystallography and crystal chemistry; physical properties of minerals; classification of minerals, their composition, structure, occurrence, technical and economic significance; mineral stability; introduction to X-ray diffraction analysis.

Practicals: Crystallographic exercises; mineralogical calculations and plots, X-ray diffraction exercises.

Assessment: Practical exercises (20%), tests (30%); 2 h exam (50%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals.

Students may be required to attend a field excursion and contribute to the cost thereof.

Mineral Microscopy

GEOL202 W1 (15L-0T-18P-0S-31H-12R-0F-0G-4A-6W-8C)
Prerequisite Modules: GEOL101, 102; CHEM110.

Corequisite: GEOL201.

Aim: To acquire the essential skills for optical identification and analysis of minerals. To introduce thin section microscopy as a basic tool for understanding the petrography of sedimentary, igneous and metamorphic rocks.
Content: Principles of mineral optics; identification and description of non-opaque minerals using the polarized-light microscope.

Practicals: Examination of common rock-forming minerals under the microscope.

Assessment: Tests (50%); 2 h exam (50%).

DP Requirement: 40% minimum mark in the coursework; 80% attendance at both lectures and practicals.
Admission to this module is restricted to students registered for the Programmes in Geological Sciences.

Sedimentary Petrology

GEOL205 W2 (15L-0T-18P-0S-31H-12R-0F-0G-4A-6W-8C)
Prerequisite Modules: GEOL201, 202.

Aim: To gain an understanding of the concepts of grain size distribution, textures and structures of sedimentary rocks, and the characteristics of terrigenous, chemical and biochemical sedimentary rocks.

Content: Particles and grain size analysis; textures of sedimentary rocks, rudaceous rocks, arenaceous rocks, argillaceous rocks, limestone, dolomite, siliceous rocks, evaporites, iron-rich rocks and phosphorites, and their formation processes.

Practicals: Particles and grain-size analysis, identification of sediment and rock specimens, sedimentary structures, microscopic analysis of thin sections from sedimentary rocks.

Assessment: Practical exercises (20%), tests (30%); 2 h exam (50%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals.

Students may be required to participate in fieldwork and contribute to the cost thereof.

Principles of Igneous & Metamorphic Petrology

GEOL206 W2 (29L-0T-39P-0S-59H-25R-0F-0G-8A-13W-16C)
Prerequisite Modules: GEOL201, 202.

Aim: To introduce petrological concepts & tools required for the description, analysis & interpretation of igneous & metamorphic rocks.

Content: Systematic classification of igneous rocks; phase diagrams igneous textures structures & field relationships major trace element & isotope geochemistry; composition of the mantle & the origin of basalts; compositional & structural characteristics of metamorphic rocks physio-chemical controls on metamorphic rock formation; metamorphic phase equilibria.

Practicals: Advanced mineral microscopy; petrography of igneous & metamorphic rocks.

Assessment: Practical exercises (20%), tests (20%); 2 h theory exam (30%), 2 h practical exam (30%).

DP Requirement: 40% Class mark; 80% attendance at both lectures & practicals.

Geochemistry

GEOL211 W1 (15L-0T-18P-0S-31H-12R-0F-0G-4A-6W-8C)
Prerequisite Modules: GEOL101, 102, CHEM110.

Aim: Introduction to the principles of geochemistry, the geochemical structure of the Earth and marine geochemistry.
Content: Distribution of elements in the Solar System, the solid Earth and the oceans; the Periodic Table; analytical methods; geochemical characterization of rocks, sediments and water; introduction to environmental and biogeochemistry; geochemical exploration.

Practicals: Familiarization with the Periodic Table; analytical methods; how to use and interpret geochemical data; geochemical characterization of rocks, sediments and water.

Assessment: Practical exercises (20%), tests (30%); 2 h exam (50%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals.

Palaeontology

GEOL214 W2 (15L-0T-18P-0S-31H-12R-0F-0G-4A-6W-8C)
Prerequisite Modules: GEOL101, 102.

Aim: To introduce students to the broad concepts of Palaeontology with the focus on Invertebrate Palaeontology.
Content: Fossils and fossilization; palagoecology; evidence in the fossil record for evolution and extinction; invertebrate palaeontology; microfossils; biostratigraphy.

Practicals: Recognition and description of fossilised: Bivalves, Gastropods, Cephalopods, Brachiopods, Trilobites, Corals, Echinoderms and selected microfossils.

Assessment: Practical exercises (20%), tests (30%); 2 h exam (50%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals.

Module may not be offered in 2010.

Elements of Geology for Civil Engineers

GEOL215 H2 (39L-0T-45P-0S-47H-20R-0F-0G-9A-13W-16C)
Aim: Introduction to geology for Civil Engineers.

Content: Elements of petrography, geomorphology and structural geology. Aspects of engineering geology including soil types, open and subsurface excavations, foundations, dams and reservoirs, building materials. Construction and interpretation of geological maps and profiles.

Practicals: Solving engineering geological problems, map interpretation, mineral and rock identification Jdiscontinuity analysis.

Assessment: Practical exercises (15%), tests (25%); 3 h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at both lectures and practicals.

For students in the Faculty of Engineering only.

Brittle Deformation of Rocks

GEOL220 W1 (15L-0T-18P-0S-31H-12R-0F-0G-4A-6W-8C)
Prerequisite Modules: GEOL101, 102.

Aim: To introduce students to the structures produced by the deformation of rock material and the factors that influence the formation of these structures.

Content: Definition of deformation, recognition of deformation in rock material, brittle and ductile deformation, fault geometry and nomenclature, linked fault systems, fault rocks, joints, fold geometry and nomenclature, mechanisms of igneous intrusion.

Practicals: Geological map exercises, stereographic projection problems, Mohr diagrams.

Assessment: Practical exercises (20%), tests (30%); 2 h exam (50%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals. Attendance on and completion of field trips.

Students may be required to participate in fieldwork and contribute to the cost thereof.

Igneous and Metamorphic Processes

GEOL301 W1 (29L-0T-39P-08-63H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: GEOL206.

Aim: Using mineralogical, chemical and textural information from igneous and metamorphic rocks to understand the processes and conditions of rock formation.

Content: Quantitative assessment and modelling of major, trace and isotope geochemical data; melt petrogenesis and differentiation processes within classical petro-tectonic settings. Analysis and interpretation of metamorphic rocks and terrains; phase equilibria in simple and complex systems: metamorphism of ultramafic, mafic and pelitic rocks; prograde and retrograde processes.

Practicals: Appropriate to the above.

Assessment: Practical exercises (25%), tests (25%); 3 h exam (50%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals.

Ductile Deformation of Rocks

GEOL303 W1 (15L-0T-18P-0S-31H-12R-0F-0G-4A-6W-8C)
Prerequisite Modules: GEOL203 or 220.

Aim: To build on the knowledge contained within GEOL220 with emphasis on structures produced by ductile deformation of rocks & the factors that influence their formation.

Content: Strain in a geological context, principals of analysing ductile deformation in complexly deformed terrains, factors controlling ductile deformation, structures developed during ductile deformation (e.g. folds, shear zones, boudins, cusps), deformation fabrics, introduction to strain analysis.

Practicals: Geological map exercises, stereographic projection problems, fold analysis, analysis of ductile shears.

Fieldwork: a 3-day excursion.

Assessment: Practical exercises (20%), tests (30%); 2 h exam (50%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals. Attendance on and completion of field trip.

Students will be required to participate in fieldwork and to contribute to the cost thereof.

Advanced Field Mapping Skills

GEOL304 WV (OL-0T-97P-10S-50H-0R-0F-0G-3A-6W-16C)
Prerequisite Requirement: GEOL200, 205, 206.

Aim: To build on the knowledge & skills acquired in GEOL200 by introducing established & new mapping techniques as applied to complex geological terrains.

Content: 7-10 day field trip in the winter vacation. Literature, map & aerial photograph search. Field & map skills, including GPS & related GIS skills. Identification, measurement & interpretation of rocks, their relationships & structures. Interpolation of geological data in areas of incomplete outcrop to produce reliable geological maps & cross-sections. Report writing & verbal presentations.

Practicals: Incorporated within content.

Assessment: Field assessment (10%), field map & cross section (30%), verbal presentations (10%), written report
and final map, externally examined (50%).

DP Requirement: Attendance on and completion of field trip and all pre-trip exercises.

Offered in the winter vacation. In addition to tuition fees, each student will be required to contribute towards
the cost of subsistence, accommodation and transport. This module has no formal examination and no
supplementary exam.

Geological Evolution of Southern Africa

GEOL306 W2 (15L-0T-18P-0S-31H-12R-0F-0G-4A-6W-8C)
Prerequisite Requirement: 32 credits of Level-2 Geology modules.

Prerequisite Modules: GEOL101, 102.

Aim: To provide an insight into the geological evolution of the southem African sub-continent by studying the entire
geological record of the region.

Content: The crustal evolution in Southem Africa; 3.5 billion years of earth history.

Practicals: Description and interpretation of geological maps from the aspects of processes and geological evolution.
Assessment: Practical exercises (25%), tests (35%); 2 h exam (50%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals.

Geology of Ore Deposits

GEOL308 W2 (29L-0T-39P-0S-62H-24R-0F-0G-6A-13W-16C)
Prerequisite Modules: GEOL205, 206, 217.

-Aim: To build on the knowledge introduced in GEOL217 by providing an understanding of the processes and
conditions of ore deposit formation.

Content: Ore deposits formed by igneous, sedimentary/surficial and hydrothermal processes; mineral paragenesis,
role of stable isotope and fluid inclusion studies in understanding ore deposits. Plate tectonics and ore deposits.
Practicals: Ore mineralogy and ore petrography.

Assessment: Practical exercises (20%), tests (20%); 3 h theory exam (30%), 3 h practical exam (30%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals.

Sedimentary Facies and Environments

GEOL310 W1 (15L-0T-18P-0S-31H-12R-0F-0G-4A-6W-8C)
Prerequisite Modules: GEOL205 or GEOL219.

Aim: To gain an understanding of the concepts of sedimentary facies and depositional environments.

Content: Concept of sedimentary facies and depositional environments, facies controlling factors, facies change in
space and time, facies sequences and cyclicity. Depositional models for fluviatile, aeolian, littoral and deltaic

sedimentary sequences.

Practicals: Facies columns and Facies maps. Palaeocurrent analysis, reconstruction of palaeographic maps. Field excursion to study sedimentary facies and palaeodepositional environments.

Assessment: Practical exercises (20%), field report (10%), tests (20%); 2 h exam (50%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals. Attendance on and completion of all field trips.

Students will be required to participate in fieldwork and contribute to the cost thereof.

Mining and Evaluation

GEOL312 W1 (29L-0T-39P-0S-75H-12R-0F-0G-5A-13W-16C)
Prerequisite Modules: GEOL208.

Aim: To introduce the concepts of geological controls over mineralisation and methods of assessing the resource from a statistical, economic and practical point of view.

Content: Surface and underground mining methods. Sampling methodology. Statistical concepts in mineral evaluation. Spatial analysis. Mineral appraisal and resource evaluation.

Practicals: Feasibility Studies. Case Histories. Geostatistical calculations.

Assessment: Practical exercises (12%), assignments (12%), tests (16%); 3 h exam (60%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals.

Module may not be offered in 2010.

Environmental Geology

GEOL313 W1 (29L-0T-39P-0S-75H-12R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 32 credits from Level-2 modules in Geology.

Aim: To provide insight into man's interaction with the geological environment.

Content: Earth systems and cycles. Hazardous geological processes. Landfill waste design, siting and management including disposal of nuclear waste. Water pollution. Geomaterials. Impact of mining and mineral processing. Impact of man on the geological environment.

Practicals: Evaluation of Earth hazards to man, his environment and planning processes

Assessment: Practical exercises (16%), assignments (8%), tests (16%); 3 h exam (60%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals.

Rock Mechanics

GEOL314 W1 (29L-0T-39P-0S-75H-12R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 32 credits from Level-2 modules in Geology including GEOL220 or 203.

Prerequisite Modules: MATH133.

Aim: An introduction to rock mechanics.

Content: Rock behaviour, properties and testing. Deformation and failure of rocks. Assessment of rock strength, hardness and elasticity. Weathering and its influence on rock behaviour. Discontinuities. Rock mass classification.
Practicals: Laboratory testing of rocks and discontinuities.

Assessment: Practical exercises (14%), assignments (10%), tests (16%); 3 h exam (60%).

DP Requirement: 40% Class mark; 80% attendance at both lectures and practicals.

Hydrogeology

GEOL321 W2 (29L-0T-39P-0S-60H-24R-0F-0G-8A-13W-16C)
Prerequisite Modules: GEOL210.

Aim: To provide a qualitative & quantitative understanding of groundwater, its occurrence, composition, exploration & development.

Content: Nature of groundwater & aquifers. Principles of groundwater flow. Flow to wells. The geology of groundwater occurrence. Hydro-geochemistry & introduction to isotope hydrology. Groundwater & wells. Groundwater exploration, development & management. Introduction to hydro-geologic & groundwater flow modeling.

Practicals: Darcy's experiment, Estimation of aquifer parameters, pumping test data analysis, analysis of Hydrochemical & water isotope data, hydrogeological mapping, development of a conceptual hydrogeological & groundwater flow model.

Assessment: Practical exercises (20%), assignments (5%), tests (15%); 3 h exam (60%).

DP Requirement: 40% class mark; 80% attendance at both lectures and practicals.

Geological Field Mapping Techniques

GEOL322 WV (OL-0T-97P-10S-50H-0R-0F-0G-3A-6W-16C)
Prerequisite Modules: GEOL219.

Aim: To provide instruction in the basic skills required to compile a geological map, cross section and accompanying report on the geology of a field area.

Content: 7-10 day field trip in the University vacation. Recognition, description and interpretation of rock types, rock associations and geological structures based on field observations, field mapping techniques, measurement and recording of field data; verbal presentations of findings; synthesis of field observations, data and relevant literature in field report.

Assessment: Field assessment (10%), field map and cross section (30%), verbal presentations (10%), written report and final map externally examined (50%). No formal examination.

DP Requirement: Attendance on and completion of field trip and all pre-trip exercises. Submission of report and final map by due date.

Restricted to students registered for the major in Geoscience. In addition to tuition fees each student will be required to purchase a field kit and to contribute to the cost of subsistence, accommodation and transport.
This module has no supplementary examination.

Igneous Petrology & Geochemistry

GEOL701 W1 (OL-57T-36P-0S-59H-5R-0F-0G-3A-4W-16C)
Aim: To acquire a high level of knowledge and practical experience in the processes that gave rise to magmas and the crystallized products of those magmas in different tectonic and regional settings.

Content: Advanced aspects of igneous petrology and geochemistry relating to specific areas in southern Africa.
These may relate to some or all of the following: continental flood basalts, granite, komatite, and layered intrusions.
Case studies will relate to crustal evolution, magma genesis and mineralization processes. Field studies and sampling, data acquisition and handling, and interpretation are integral parts of the course.

Practicals: Practical applications as applied to the above.

Assessment: Class mark (50%); 3 h exam (50%);

DP Requirement: 40% Class mark.

Students may be required to participate in fieldwork and to contribute to the cost.

Sedimentology and Basin Analysis

GEOL702 W1 (OL-57T-36P-0S-52H-12R-0F-0G-3A-4W-16C)
Aim: To provide in-depth knowledge of the processes that produce sediments and sedimentary rocks and the analysis of these rocks as sedimentary basin fill.

Content: Subsidence, denudation, flux rates and sediment budget. Classification of sedimentary basins, depositional style of the basin-fill, evolution of the basin-fill, sequence stratigraphy, sedimentary basins in South and southern Africa.

Assessment: Class mark (50%); 3 h exam (50%).

DP Requirement: 40% Class mark.

Students may be required to participate in fieldwork and to contribute to the cost thereof.

Metamorphic Petrology

GEOL703 W1 (OL-57T-36P-0S-52H-12R-0F-0G-3A-4W-16C)
Aim: To understand the processes of metamorphic rock formation in the framework of lithosphere dynamics, and to be able to recognise and utilise the geological record of metamorphic rocks and terrains in order to reconstruct their geological histories.

Content: Advanced aspects of metamorphic petrology, such as geothermobarometry, pressure-temperature histories of metamorphic rocks, tectonic settings and heat sources of metamorphism, thermal modelling, metamorphic fluids, reaction- and deformation-related microstructures, geochronology.

Practicals: Practical applications as applied to the above

Assessment: Class mark (50%); 3 h exam (50%).

DP Requirement: 40% Class mark.

Students may be required to participate in fieldwork and to contribute to the cost thereof.

Ore Deposits

GEOL705 W2 (OL-54T-36P-0S-55H-12R-0F-0G-3A-4W-16C)
Aim: To provide an understanding of the modem techniques of ore genesis studies and an introduction to ore processing techniques.

Content: Advanced ore deposit genesis studies, hydrothermal deposits, volcanic-hosted sulphide deposits, sediment-hosted sulphide deposits, carbonate-hosted deposits and structural controls on mineralisation. The fundamentals of mineral processing technology and the application of mineralogy to ore processing techniques.

Practicals: Ore petrography, fluid inclusion and cathodoluminescence studies

Assessment: Class mark (50%); 3 h exam (50%).

DP Requirement: 40% Class mark.

Mines Field Class

GEOL706 WV (OL-0T-0P-0S-160H-0R-0F-0G-0A-2W-16C)
Aim: To provide an insight into geological and engineering aspects of the South African min ing industry.

Content: Site visits to study geological, environmental and engineering aspects of the mini ng industry. No formal lectures.

Assessment: Written report (67%); field assessment (33%).

DP Requirement: Not applicable. 2

Offered in the Winter vacation. In addition to tuition fees, each student will be required to contribute towards the cost of subsistence, accommodation and transport. This module has no supplementary exam .

Research Project

GEOL707 W2 (OL-105T-0P-0S-209H-0R-0F-0G-6A-13W-32C)
Aim: To demonstrate the ability, knowledge background and skills to carry out an independen t research project which involves a literature survey and the possibility of generating and assessing new data.

Content: No formal instruction.

Practicals: No formal practicals.

Assessment: Project presentations (20%), Final report (80%). No supplementary examination.

DP Requirement: Submission of project report by set date.

Precambrian Tectonics

GEOL708 W2 (OL-57T-36P-0S-52H-12R-0F-0G-3A-4W-16C)
Aim: To investigate the evidence for tectonic processes operating in the early and mid Prec ambrian. The principle of Uniformitarianism will be applied to the Precambrian through a study of the tectonic framew ork of southern Africa.
Content: Techniques of analysing Precambrian terrains. General characteristics of the Archa ean era and Archaean terrains worldwide; Archaean terrains of southem Africa; the evidence for plate tectonics i n the Archaean; Proterozoic crustal evolution in southern Africa.

Assessment: Class mark (50%); 3 h exam (50%).

DP Requirement: 40% Class mark.

Students may be required to participate in fieldwork and contribute to the cost thereof.

Structural Geology

GEOL710 W2 (OL-57T-36P-0S-52H-12R-0F-0G-3A-4W-16C)
Aim: To analyse complexly deformed rocks and relate the deformation history to appropriate tectonic processes and regimes.

Content: Advanced aspects of structural geology, understanding brittle and ductile deformat ion in extensional and compressional environments; analysis of structures in Phanerozoic and Precambrian terrains. Techniques of analyzing complexly deformed terrains.

Assessment: Class mark (50%); 3 h exam (50%).

DP Requirement: 40% Class mark.

Students may be required to participate in fieldwork and to contribute to the cost thereof.

Engineering Geology

GEOL711 W2 (39L-9T-39P-0S-58H-12R-0F-0G-3A-13W-16C)
Aim: To provide insights into specialist aspects of engineering geology.

Content: Clays and clay mineralogy, problem soils, dolomitic land, site investigations, con struction materials,
foundations, engineering geological problems, reservoirs and dams.

Practicals: Geotechnical core logging and soil profiling, physical properties of problem so ils. Site visits.

Assessment: Class mark (33%), 3 h exam (67%).

DP Requirement: 40% Class mark.

Pollution Studies

GEOL712 W2 (39L-9T-39P-0S-58H-12R-0F-0G-3A-13W-16C)
Aim: To provide a qualitative and quantitative understanding of the type, behaviour and movement of pollutants in the soil and water environment.

Content: Geochemical control on the hydrochemistry of natural water. Sampling methods. Inverse and forward hydrogeochemical modelling. Sources and types of contaminant. Mass transport of solutes. Contaminant plumes.
Practicals: Modelling exercises using the software package PHREEQC. Case studies of water quality problems in South Africa.

Assessment: Class mark (50%); 3 h exam (50%).

DP Requirement: 40% Class mark.

Special Topics

GEOL713WC (OL-24T-0P-6S-127H-0R-0F-0G-3A-13W-16C)
Aim: To provide an insight into specialized topics within the sub-disciplines of geology.

Content: Special topics in Environmental Geology, Engineering Geology, Sedimentary, Igneous and Metamorphic Petrology, Structural Geology and Tectonics, Geochemistry, Mineralogy, Ore Deposit Geology and Marine Geosciences.

Practicals: Appropriate practicals will be offered for the topic.

Assessment: Continuous (100%); tests and assignments comprising at least 50% of the final mark externally examined. No formal examination and no supplementary examination.

DP Requirement: 40% Class mark.

Offered in either Semester 1 or 2.

Rock Engineering

GEOL714 W1 (39L-9T-39P-0S-58H-12R-0F-0G-3A-13W-16C)
Aim: To give an understanding of the way rock behaves on the surface and underground and to provide tools for quantifying its properties and variability.

Content: Strength of rock masses. Empirical failure criteria. Rock slope failure mechanisms and analysis. Rockfall hazard. Stresses around underground excavations. Support of underground excavations.

Practicals: Analysis of rock engineering problems. Familiarisation with specialised rock engineering packages.
Assessment: Class mark (33%), 3 h exam (67%).

DP Requirement: 40% Class mark.

Analytical Techniques in Earth Science

GEOL715 W1 (OL-57T-36P-0S-52H-12R-0F-0G-3A-4W-16C)
Aim: To provide a detailed understanding of the theory, practice & application of analytical techniques relevant to [Earth Sciences.

â\200\230Content: An overview of analytical instruments & techniques commonly used to chara

cterize the composition,
structure & texture of Earth materials, including, but not limited to, X-ray analysis, electron beam imaging & analysis,
and mass spectrometry. Underlying physico-chemical principles, instrumentation, sample preparation & applications in
geosciences are covered for each technique. Topics also include sampling techniques, precision & accuracy,
_ contamination, calibration techniques, presentation & interpretation of analytical results.

Practicals: Practical applications as applied to the above

Assessment: Class mark (50%); 3 h exam (50%).

DP Requirement: 40% Class mark.

Geotechnical Engineering

GEOL716 W1 (OL-57T-36P-0S-52H-12R-0F-0G-3A-4W-16C)
Prerequisite Requirement: Entrance to the Honours programme in Geological Sciences.

Aim: To provide students with the basic information and skills required to undertake geotechnical investigations, the
analysis of physical and geotechnical properties of soils in relation to the stability of slopes and the estimation of
settliement of structures on sands and clays.

Content: Geotechnical investigation techniques. Sampling techniques including trial pits and boreholes. Description of the soil profile. In situ testing including SPT and CPT tests, laboratory testing and analysis of settlement. Slope stability analysis.

Practicals: Practical applications as applied to the above.

Assessment: Class mark (33%); 3 h exam (67%).

DP Requirement: 40% Class mark.

Advanced Coastal and Marine Geology

GEOL717 W1 (OL-57T-36P-08-52H-12R-0F-0G-3A-4W-16C)
Aim: To assess selected models of coastal and marine environments and apply these to examples found within southern African waters.

Content: Distribution, characteristics.and development of Cretaceous and Tertiary ocean basins in southern Africa; sedimentological, statistical and geomorphological models of continental shelf, slope and deep water environments.
Assessment: Class mark (50%); 3 h exam (50%).

DP Requirement: 40% Class Mark.

Horticultural Science
Offered in the School of Agricultural Sciences & Agribusiness

FOR UNDERGRADUATE PROGRAMME IN HORTICULTURAL SCIENCE â\200\224 See Rule SAg2 and Agricultural Plant Sciences

Human Physiology

Offered in the School of Agricultural Sciences & Agribusiness

Advanced Human Physiology

HPHY200 P2 (39L-0T-20P-0S-76H-15R-0F-5G-5A-13W-16C)
Prerequisite Modules: BIOL101, CHEM110, CHEM120, MPHY200.

Aim: To give the student an overview of human anatomy and a thorough knowledge of the physiology of the various systems covered, in order to provide a background to therapeutic nutrition modules.

Content: Content: Bone, muscle, the heart, circulation, blood, immune and lymphatic system, digestive, reproductive physiology.

Assessment: 2 tests (18%), assignment, practicals (15%), 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Only for students registered in the Faculty of Science and Agriculture.

Hydrology

Offered in the School of Bioresources Engineering & Environmental Hydrology

Introduction to Physical Hydrology

HYDR210 P1 (26L-7T-40P-0S-64H-15R-0F-0G-8A-13W-16C)
Prerequisite Modules: CHEM110, COMP105, MATH133, PHYS131, or equivalent modules acceptable to the Dean.
Aim: To develop an understanding of the fundamentals of major components making up the hydrological cycle and human interaction with it.

Content: The key concepts underlying the science of hydrology including studies of rainfall, interception, evaporation, runoff, soil water, systems and anthropogenic impacts on the hydrological cycle.

Practicals: 12 - covering various basic hydrological concepts.

Assessment: 2 tests (15%), tutorials, practicals and other assessments (8%), 3h practical exam (10%), 3 h theory exam (67%).

DP Requirement: 40% Class mark, Attendance at 80% of practicals.

Environmental Aspects of Hydrology

HYDR220 P2 (26L-7T-40P-0S-65H-15R-0F-0G-7A-13W-16C)
Prerequisite Modules: HYDR210.

Aim: This module provides students taking agriculture and environmental science options with an understanding of current topics in environmental hydrology and anthropogenic impacts on the hydrological cycle.

Content: Natural and anthropogenic impacts on the hydrological cycle, including climate change impacts and the impacts of forestry; networks and instrumentation; morphometry; and an introduction to soil loss.

Practicals: 12 - covering the subjects above. 1 field trip to a research catchment.

Assessment: 3 class tests (24%), class tutorials & pracs (9%), 1 prac exam (11%), 3 h exam (67%).

DP Requirement: 40% Class mark, Attendance at 80% of practicals.

Modelling for Hydrological Design

HYDR310 P1 (24L.-8T-40P-0S-51H-20R-8F-0G-9A-13W-16C)
Prerequisite Modules: HYDR210.

Aim: To understand hydrological simulation models commonly used in South Africa and their application to design and water conflict problems.

Content: Application of hydrological models to sustainable integrated water resources management and planning, under varying environmental conditions. Understanding theoretical concepts of hydrological simulation; ability to select appropriate models for particular problems; application of hydrological models to obtain water resources design and planning information; ability to set up and run hydrological models.

Practicals: 12 Practicals. Compulsory 3 day field trip.

Assessment: 3 tests (20%), tutorials, practicals and other assessments (10%), 3h practical exam (10%), 3 h theory exam (60%).

DP Requirement: 40% Class mark, Attendance at 80% of practicals.

Students must contribute to costs of field trip.

Agrohydrological Simulation Modelling

HYDR311 P1 (16L-6T-20P-0S-24H-8R-0F-0G-6A-13W-8C)
Prerequisite Requirement: At least 32C from level 1 courses in Mathematics, Physics, Statistics or Computer Science.

Aim: To provide students not majoring in Hydrology with an understanding and appreciation of the role of simulation models in hydrological science.

Content: Development philosophies of hydrological modelling systems and ability to operate selected models.
Specific outcomes: an understanding of theoretical concepts of hydrological simulation; ability to select appropriate models for particular problems; ability to configure and run hydrological models.

Practicals: 6 - covering the subjects above. 1 field trip to a nearby research catchment.

Assessment: Class work (15%), 1 class test (15%), 1 prac exam (10%), 2 h exam (60%).

DP Requirement: 40% Class mark, Attendance at 80% of practicals.

Irrigation Design & Management for Hydrology

HYDR313 P1 (18L-3T-18P-0S-24.5H-12R-0F-0G-4.5A-4W-8C)
Corequisite: HYDR310.

Aim: To teach the principles of irrigation design and management to students majoring in Hydrology.

Content: Design of irrigation systems including; the link to crop water requirements, sprinkler, micro and flood irrigation, centre pivot and moving systems, pumps scheduling and maintenance and the flow of water in pipes and channels.

Assessment: 1 class test (10%), class tutorials, pracs and assignments (30%); 2 h exam (60%).

DP Requirement: 40% Class mark, Attendance at 80% of practicals.

Students will be required to contribute to costs of field trips. Credit may not be obtained for both HYDR313 and AGPS301.

Hydrology Project -

HYDR321 P1 (2L-1T-3P-9S-65H-0R-0F-0G-0A-13W-8C)
Prerequisite Modules: HYDR210, HYDR220.

Corequisite: HYDR310.

Aim: To provide the ability to study in some detail a particular topic of contemporary hydrological concem, by way of literature review and practical application of hydrological knowledge leamed in preceding modules and to present this as a formal document to laid down specifications.

Content: Detailed self-study by way of literature review, interview, etc regarding a particular topic of contemporary hydrological concem.

Practicals: Application of a document to formal scientific specifications.

Assessment: Completed document in terms of content, adherence to specifications (80%). Oral presentation of topic as well as participation in peer presentations (20%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Environmental Water Quality

HYDR322 P2 (15L-4T-18P-0S-30H-8R-0F-0G-5A-13W-8C)
Prerequisite Modules: HYDR210.

Aim: To provide an intermediate level of understanding and appreciation of water quality issues in hydrology especially those relevant to southern African conditions, such as eutrophication and E.coli problems.

Content: The causes and effects of water quality problems and the potential for simulation modelling thereof, with particular reference to South African conditions.

Practicals: Exercises covering the subjects above, as well as monitoring of a local river.

Assessment: Class tutorials & pracs (20%), 2 class tests (20%), 2 h exam (60%).

DP Requirement: 40% Class mark, Attendance at 80% of practicals.

Applied Hydrology

HYDR324 P2 (24L-8T-54P-6S-50H-10R-0F-0G-8A-13W-16C)
Prerequisite Modules: HYDR310.

Aim: To provide an understanding of applied aspects of hydrology and the ability to solve applied problems.

Content: Interrelationships between principles & theories; applied issues & problem solving, including: Planning for water resources, water resources yield & planning model, legal aspects of dam design, safety evaluation, basic hydraulic principles, techniques for design flood estimation including probability plotting & distribution fitting, unit hydrographs. Rational method, application of SCS techniques, flood routing, the Muskingum & storage indication methods; grassed spillway design; reservoir yield analyses to optimize dam & irrigable area capacity.

Assessment: Tests (20%), Practicals or Assignments (5%), Dam Design Report (25%), 3 h exam (50%).

DP Requirement: 40% Class mark, Attendance at 80% of practicals.

Water Resources Policy, Laws and Institutions

HYDR330 P2 (19L-3T-18P-3S-15H-15R-0F-3G-4A-13W-8C)
Prerequisite Modules: HYDR210.

Aim: To equip students with knowledge regarding the evolution of SA water law and the scientific underpinnings of key aspects thereof.

Content: Principles of Integrated Water Resources Management with specific focus on integrated land and water management and climate change in a South African context. Other foci include South African Water Law, organizational arrangements, institutions, rules and policies for water resources management and contemporary topics based on current case studies.

Assessment: Class Mark (30%), Project (30%), 3 h Theory Exam (40%).

DP Requirement: 40% Class mark, Attendance at 80% of practicals.

Current Issues in Hydrology

HYDR710 P1 (16L-16T-0P-8S-95H-20R-0F-0G-5A-13W-16C)
Aim: To provide honours level students with an understanding of current and topical issues of importance in hydrological sciences. Specific outcomes include: the ability to understand and synthesis particular topics from scientific literature; an understanding of the philosophy of hydrological science; and understanding of the dynamic nature of the science of hydrology; an awareness of the external forces driving the science.

Content: The study of topical and relevant issues pertaining to the science of hydrology.

Practicals: Exercises covering the subjects above, as well as monitoring of a local river.

Assessment: Class assignments (40%), 3 h exam (60%).

DP Requirement: Attendance at all class meetings. Completion of all assignments

Integrated Water Resources Management

HYDR720 P2 (24L-18T-8P-0S-85H-20R-0F-0G-5A-13W-16C)
Aim: To provide an integrated understanding of hydrological sciences and an ability to solve applied hydrological problems in an interdisciplinary environment.

Content: The interrelationships between principles and theories learned in preceding courses and the processes they represent. In particular, students should be aware of the integrating nature of the hydrological catchment. Topics include: environmental impact assessment; integrated catchment management; environmental water requirements; water quality issues.

Practicals: Practicals covering the subjects above as well as visits to sites of relevance.

Assessment: Class assignments (40%), 3 h exam (60%).

DP Requirement: Attendance at all class meetings. Completion of all assignments

Advanced Hydrological Processes

HYDR725 P2 (16L-16T-8P-8S-87H-20R-0F-0G-5A-13W-16C)

Aim: This module is designed to provide honours level students with an in depth understanding of fundamental
hydrological processes.

Content: After successful completion this module students should have an in-depth understanding of specific
hydrological processes. These include: design flood estimation; soil water and hillslope processes; groundwater
modelling; forest hydrology.

Practicals: Practicals covering the subjects above as well as visits to sites of relevance.

Assessment: Class assignments (40%), 3 h exam (60%).

DP Requirement: Attendance at all class meetings. Completion of all assignments

Hydrology Honours Project

HYDR790 PY (OL-4T-0P-08-311H-0R-0F-0G-5A-26W-32C)
Aim: This module is designed to train hydrology honours level students to conduct an approved research project and
prepare and present a scientific report on the results.

Content: Access and review scientific documentation. Conduct a small research project, analyse results. Presentation
by way of written report to specified scientific format as well as orally to a group of academic staff and peers.

Practicals: All work is conducted under supervision and will be assessed by internal and exteral reviewers.
Assessment: Written report (80%), oral presentation (20%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Advanced Hydrological Modelling Skills

HYDR795 PY (30L-12T-40P-08-203H-30R-0F-0G-5A-26W-32C)
Aim: To apply advanced hydrological skills to water resources problems by simulation modelling.

Content: Collection of data, configuration and application of a model to a specific water resources problem providing
skills in: GIS applications; catchment delineation; rainfall surfaces; landuse and soils information; irrigation; crop yield;
results analysis; planning scenarios. Progress reports handed in during the year; also, full final project report on the
project in full, as if to a client.

Practicals: Site visits, analysis of field data; use of GIS.

Assessment: Work is supervised. Progress & final reports assessed by 3 reviewers (50%), 3 h exam (50%).

DP Requirement: Attendance at all class meetings. Completion of all assignments

Year-long Module.

Spatial Analysis for Water Resources Mngt

HYDR820 PC (20L-6T-20P-12S-62H-15R-0F-20G-5A-13W-16C)
Prerequisite Modules: ENVS810, 817

Aim: To enable students to apply advanced spatial modelling skills used in water resources assessment, planning
and management

Content: The application of spatial decision support systems in water resources management, with foci on linkages
between GIS and decision support systems and spatial analysis for water resources management including both
surface and groundwater. The use of multicriteria decision analysis techniques rounds off the module.

Assessment: Class Mark (30%), Project (30%); 3 h Theory Exam (40%).

DP Requirement: 80% attendance at all academic contact activities, 50% Class mark.

Offered in either Semester 1 or 2.

Earth Observation for Water Resources Mngt.

HYDR825 PC (20L-6T-20P-12S-62H-15R-0F-20G-5A-13W-16C)
Prerequisite Modules: ENVS810.

Aim: To enable students to identify and utilise sources of earth observation data and information available for
hydrological analyses.

Content: The use of satellite based Earth Observation techniques for the Identification of sources of rainfall, soil
moisture, evaporation, surface and groundwater fluxes and other water resources related dat

a and information. The
application of these in hydrological analyses and water resources management.

Assessment: Class Mark (30%), Project (30%); 3 h Theory Exam (40%).

DP Requirement: 80% attendance at all academic contact activities, 50% Class mark.

Offered in either Semester 1 or 2.

Information Systems & Technology

Offered in the School of Information Systems & Technology

End User Computing

ISTN100 WB PB (29L-8T-20P-0S-26H-72R-0F-0G-5A-13W-16C)
Prerequisite Requirement: None

Aim: To emphasise the use of computers as integrated productivity tools and introduce end-user computing definitions and concepts.

Content: Basic end-user computing concepts. Computer hardware (input, processing, output and storage). Theory and application of systems software (operating systems) and applications software (word processing, spreadsheets, presentation graphics, database, internet and email). Information networks and data communications. Databases and database management systems.

Practicals: Computer-based exercises on the above topics.

Assessment: 2 h exam (50%), tests / assignments (50%).

DP Requirement: Students must obtain a class record of at least 40%.

Information Systems & Technology 1A

ISTN101 W1 P1 (29L-8T-19P-0S-55H-44R-0F-0G-5A-13W-16C)
Prerequisite Requirement: None

Aim: To provide an understanding of organisational systems, planning, and decision processes, and how information and systems are used in organisations.

Content: Organisational Systems (business processes, management levels, business decisions); Systems theory and concepts, including systems components and relationships; Information systems in organisations (decision-support, roles of people using, developing and managing systems, societal and ethical issues relating to IS & T use, business applications of spreadsheets and databases, types of information systems in business); The Systems Development Life Cycle, Information system security; E-Business.

Practicals: Computer-based exercises on the above topics.

Assessment: 2 h exam (50%), tests / assignments (50%).

DP Requirement: Students must obtain a class record of at least 40%.

Information Systems & Technology 1B

ISTN102 W2 P2 (29L-8T-19P-0S-26H-72R-0F-0G-6A-13W-16C)
Prerequisite Requirement: None (Note that 101 and 102 are prerequisites for IST 200 level modules)

Aim: To provide an introduction to Systems Analysis & Design, Web Page Design and Programming in a business context.

Content: Information Systems management; Systems Anaiysis and Design; Human-Computer Interaction; Web page design; Hypertext Markup Language (HTML) and Web Page creation; Programming fundamentals.

Practicals: Computer-based exercises on the above topics.

Assessment: 2 h exam (50%), tests / assignments (50%).

DP Requirement: Students must obtain a class record of at least 40%.

Development and Applications Fundamentals

ISTN103 W2 P2 (29L-8T-19P-0S-68H-30R-0F-0G-6A-13W-16C)
Prerequisite Requirement: None (Note that 101 and 102 are pre-requisites for level 2 IST modules - credit for
ISTN103 may be converted into credit for ISTN102 by writing a special exam covering specific topics from ISTN102,
including programme application).

Aim: To provide an introduction to Systems Analysis and Design, Web Page Design and Business Applications.
Content: Information Systems Management; Systems Analysis and Design; Human-Computer Interaction; Web-Page
Design, Web-Page Creation; Business Applications for packaged software, Systems Auditing.

Practicals: Computer-based exercises on the above topics.

Assessment: 2 hour examination (50%), tests / assignments (50%).

DP Requirement: Students must obtain a class record of at least 40%.

Systems Analysis and Design

ISTN211 W1, P1 (39L-10T-3P-0S-41H-62R-0F-0G-5A-13W-16C)
Prerequisite Requirement: (ISTN101 or COMP100) and (ISTN102 or COMP102)

Aim: To provide students with the knowledge and skills to apply the methods, tools and techniques of analysis and design to business and information technology problems. The module provides the foundation for the major project in the next level of study.

Content: Approaches to systems development (Structured and Object-Oriented); Systems Analysis (Requirements discovery, Modelling systems requirements, Feasibility analysis); Systems Design (Application architecture, output, input and user interface design).

Practicals: Computer-based exercises on the above topics.

Assessment: 3 h exam (60%), tests / assignments (40%). Students must obtain at least 40% in the examination paper.

DP Requirement: Students must obtain a class record of at least 40%.

Databases and Programming

ISTN212 W2, P2 (39L-10T-16P-0S-30H-60R-0F-0G-5A-13W-16C)
Prerequisite Requirement: (ISTN101 or COMP100) and (ISTN102 or COMP102)

Aim: To enable students to develop skills in modelling, designing and implementing databases, designing, developing, testing and implementing programs and using databases in application programs. A foundation for the major project in Year 3 is provided.

Content: Databases (Models and concepts, Normalization, Design, Queries and Reports, Features and capabilities, Implementation). Programming (Fundamentals, Algorithms, Control structures, Traditional, Event Driven and OO, Implementation including DB connectivity, Verification and validation).

Practicals: Computer-based exercises on the above topics.

Assessment: 3 h exam (60%), tests / assignments (40%). Students must obtain at least 40% in the examination paper.

DP Requirement: Students must obtain a class record of at least 40%.

Advanced Systems Analysis

ISTN31A W1 P1 (15L-5T-0P-0S-47H-10R-0F-0G-3A-13W-8C)
Prerequisite Requirement: ISTN211 and ISTN212

Aim: To enable students to be proficient at the specification of user requirements of business information and technology systems.

Content: Topics include Advanced methods in Information Systems Analysis, Requirements Analysis & Specifications, Software Quality Requirements and Feasibility.

Practicals: Exercises on the above topics.

Assessment: 1.5 hour examination (60%), tests/assignments (40%). Students must obtain at least 40% for the examination.

DP Requirement: Students must obtain a class record mark of at least 40%.

Applied Systems Analysis

ISTN31B W1 P1 (6L-0T-18P-0S-43H-10R-0F-0G-3A-13W-8C)
Prerequisite Requirement: ISTN211 and ISTN212

Corequisite: ISTN31A

Aim: To provide students with direct experience of the analysis and specification of a live system (major project).
Content: Topics include application of Advanced Methods in Information Systems Analysis, Requirements Analysis & Specification, Software Quality Requirements and Feasibility

Practicals: Project work.

Assessment: Group Project and individual assignments (100%)

DP Requirement: As per faculty rules.

Advanced Systems Design

ISTN31D W1 P1 (15L-5T-0P-0S-47H-10R-0F-0G-3A-13W-8C)
Prerequisite Requirement: ISTN211 and ISTN212

Aim: To enable students to be proficient at the design of business information and technolo gy systems.

Content: Topics include Advanced Methods and Principles in Information Systems Design and S oftware Quality Assurance.

Practicals: Exercises on the above topics.

Assessment: 1.5 hour examination (60%), tests/assignments (40%). Students must obtain at le ast 40% for the examination.

DP Requirement: Students must obtain a class record mark of at least 40%.

Project Management

ISTN31E W1 P1 (15L-5T-18P-0S-29H-10R-0F-0G-3A-13W-8C)
Prerequisite Requirement: ISTN211 and ISTN212

Aim: To enable students to manage information systems projects.

Content: Topics include Project Management Life Cycle; Teams; Scope; Scheduling; Quality; R isk; Resources; Procurement; Execution and Closure.

Practicals: Exercises on the above topics.

Assessment: 1.5 hour examination (60%), tests/ assignments (40%). Students must obtain at l east 40% for the examination.

DP Requirement: Students must obtain a class mark of at least 40%.

Advanced Systems Implementation

ISTN32A W2 P2 (15L-5T-12P-0S-35H-10R-0F-0G-3A-13W-8C)
Prerequisite Requirement: ISTN211 and ISTN212

Aim: To enable students to be proficient at the design and implementation of business infor mation and technology systems.

Content: Topics include Advanced Design; Database Connectivity; Server-side Scripting.

Practicals: Computer-based exercises on the above topics.

Assessment: 1.5 hour examination (60%), tests/assignments (40%). Students must obtain at le ast 40% for the examination.

DP Requirement: Students must obtain a class record mark of at least 40%.

Applied Systems Implementation

ISTN32B W2 P2 (15L-5T-18P-0S-29H-10R-0F-0G-3A-13W-8C)
Prerequisite Requirement: ISTN31B

Corequisite: ISTN32A

Aim: To provide students with direct experience of the design and implementation of a live system (major project).
Content: Topics include the design and implementation of a live system.

Practicals: Project work.

Assessment: Project work and assignments (100%).

DP Requirement: As per faculty rules.

Security

ISTN32D W2 P2 (15L-5T-0P-0S-47H-10R-0F-0G-3A-13W-8C)
Prerequisite Requirement: ISTN211 and ISTN212

Aim: To enable students to manage the high level information protection function in an enterprise by ensuring that suitable security controls are implemented throughout the organisation.

Content: Topics include: Security Risk Analysis, Disaster Recovery and Business Continuity Planning, Information Security Systems Design and Architecture, Cryptography, History of Encryption, Network Security, Desktop Security.
Practicals: Computer-based exercises on the above topics.

Assessment: 1.5 hour examination (55%), tests/assignments (45%). Students must obtain at least 40% for the examination.

DP Requirement: Students must obtain a class record mark of at least 40%.

Database Management

ISTN32F W2 P2 (15L-5T-0P-08-47H-10R-0F-0G-3A-13W-8C)
Prerequisite Requirement: ISTN211 and ISTN212

Aim: To enable students to design and manage databases in a business context.

Content: Topics include Database Design, Transaction Management and Concurrency Control, Distributed Database Management Systems, Data Warehouses, Databases and the Intemet, and Database Administration.

Practicals: Computer-based exercises on the above topics.

Assessment: 1.5 hour examination (60%), tests/assignments (40%). Students must obtain at least 40% for the examination.

DP Requirement: Students must obtain a class mark of at least 40%.

Mathematics

Offered in the School of Mathematical Sciences

Foundation Mathematics

MATHO099 PY WY (107L-65T-0P-0S-135H-74R-0F-0G-19A-26W-40FC-0DC)
Prerequisite Requirement: Any pass symbol on Standard or Higher Grade Matric or NSC Mathematics.
Corequisite: BIOL099, CHEM099, PHYS0099, (SCOM103 or 113).

Aim: MATH099 forms part of a package of modules the Science Foundation Programme. It provides a foundation for all first year mathematics modules.

Content: Numerical and algebraic skills. Set theory. Equations and inequalities. Perimeter, area and volume. Numbers. Proportional reasoning. Functions: Linear, quadratic, semi-circles, rectangular hyperbola, piecewise functions, absolute values, circular (trigonometry), exponential, logarithmic. Introduction to differential calculus and word problems.

Assessment: Class mark (Assignments, Class tests, 3 h June test, and tutorial tests)(50%) , 3 h November exam (50%).

DP Requirement: 40% Class mark, 80% attendance at lectures & tutorials.

This module is only for students in the Science Foundation Programme and carries 40 Foundational credits only.

Augmented Quantitative Methods 1

MATH105 P1 WA1 (78L-78T-0P-0S-99H-54R-0F-0G-11A-13W-16FC-16DC)
Prerequisite Requirement: HG E or SG D Matric Maths or Level 3 NSC Maths: acceptance into the BCom-4 programme.

Aim: To introduce mathematical techniques for business mathematics and to develop problem solving skills.

Content: This module covers the syllabus of MATH134 and, in addition, supplementary material designed for students who are under-prepared for University-level Mathematics. Students are expected to attend additional lectures, tutorials & undergo additional assessment to a maximum of 160 hours (39L-39T-0P-0S-49.5H-27R-0F-0G-5.5A-13W).

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 35% class mark, 80% attendance at lectures and tutorials.

Credits may not be obtained for MATH105 and any of MATH130, 131, 133, 134 or 195. This module is worth 16 degree credits and 16 foundation credits.

Introduction to Calculus

MATH130 W1 P1 (49L-39T-0P-0S-51H-15R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Higher Grade D or Standard Grade A for Matric Mathematics or NSC Level 5 Maths.
Aim: To introduce and develop the Differential Calculus as well as the fundamentals of proof technique and rudimentary logic.

Content: Fundamental Concepts - elementary logic, proof techniques. Differential Calculus - Functions, graphs and inverse functions, limits and continuity, the derivative, techniques of differentiation, applications of derivatives, antiderivatives.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH130 and any of MATH104, 131, 133, 134, 137, 195 or 197.

Mathematics 1A Eng

MATH131 H1 P1 (39L-39T-0P-0S-56H-20R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Higher Grade C or Standard Grade A for Matric Mathematics or NSC Level 6 Maths.
Aim: To introduce basic mathematical concepts of differential and integral calculus.

Content: Elements of logic and set theory. Functions and their graphs, limits and continuity. Differentiation.
Application of derivatives to optimisation and curve sketching, linear and quadratic approximation, Newtonâ\200\231s method.
Indeterminate forms. Inverse trigonometric and other transcendental functions. Indefinite integrals, basic techniques of integration. Definite integrals. Approximate integration. Applications in geometry, physics and engineering.
Assessment: Class tests and/or assignments (20%), 3 h exam (80%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

For students in the Faculty of Engineering. Credit may not be obtained for MATH131 and any of MATH104, 130, 133, 134, 137, 195 or 197.

Applied Mathematics 1A (Eng)

MATH132 H1 P1 (39L-39T-0P-0S-56H-20R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Higher Grade C or Standard Grade A for Matric Mathematics or NSC Level 6 Maths.
Aim: To introduce basic methods of vector and matrix algebra, statics and kinematics.

Content: Vectors and matrices, determinants, dot and cross products, solving simultaneous systems of linear equations. Force vectors in 2D and 3D. Plane statics, kinematics, simple harmonic motion.

Assessment: Class tests and/or assignments (20%), 3 h exam (80%). -

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

For students in the Faculty of Engineering.

Mathematics & Statistics for Natural Sciences -

MATH133 P1 W1 Â§ (49L-39T-0P-0S-51H-15R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Higher Grade E or Standard Grade B for Matric Mathematics or NSC

Level 4 Maths.
Aim: To introduce students to the fundamental principles, methods, procedures and techniques of mathematics and statistics as the language of Science.

Content: Mathematics (2/3): Basic functions. Solving equations and inequalities. Curve sketching. Binomial theorem.
Definition and techniques of differentiation; concavity; the second derivative test; maxima, minima. Matrices. Solving systems of equations. Statistics (1/3): Problem solving using descriptive statistics and probability concepts.
Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH133 and any of MATH104, 130,131, 134, 137, 195 or 197.

Quantitative Methods 1

MATH134 P1 W1 H1 (39L-39T-0P-0S-56H-20R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Higher Grade E or Standard Grade B for Matric Mathematics or NSC Level 4 Maths.
Aim: To introduce mathematical techniques for business mathematics and to develop problem solving skills.

Content: Matrices and matrix models. Solution of systems of linear equations and simple linear programming problems. Elements of the mathematics of finance. Differential calculus in one and several variables, applications, partial differentiation, maxima and minima. Exponential and logarithmic functions. Integral calculus with applications. Elementary differential equations.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH134 and any of MATH104, 130, 131, 133, 137, 195 or 197.

Calculus and Linear Algebra

MATH140 W2 P2 (49L-39T-0P-0S-51H-15R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in MATH130.

Aim: To develop the Integral Calculus and to introduce elementary Linear Algebra.

Content: Integral Calculus - the definite integral, techniques of integration, applications of integrals, Taylor series, polar coordinates, complex numbers. Introduction to Linear Algebra - vectors, lines and planes in space, matrices, systems of linear equations, determinants.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH140 and any of MATH141, 143, 145 or 196.

Mathematics 1B (Eng)

MATH141 H2 P2 (39L-39T-0P-0S-56H-20R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in MATH131.

Aim: To develop concepts of differential and integral calculus and introduce elements of differential equations and complex numbers theory.

Content: Further techniques of integration. Improper integrals. Further applications of integration. Sequences and series. Taylor expansion. Conic sections. Polar coordinates. Basic differential equations. Complex numbers, basic complex functions.

Assessment: Class tests and/or assignments (20%), 3 h exam (80%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH141 and any of MATH140, 143, 145 or 196. Offered to students in the Faculty of Engineering.

Applied Mathematics 1B (Eng)

MATH142 H2 P2 (39L-39T-0P-0S-56H-20R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in (MATH131 and MATH132).

Aim: To provide knowledge about the fundamentals of engineering dynamics.

Content: Further kinematics of a particle: Curvilinear motion, normal and tangential acceleration. Newton's 2nd law, motion of body in a 3D space. Friction, impulse and conservation of momentum, collisions. Work, energy, power, conservation of energy, applications. Centre of mass, moments of inertia. Plane rotation of rigid bodies. Collisions of rigid bodies.

Assessment: Class tests and/or assignments (20%), 3h exam (80%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Offered to students in the Faculty of Engineering.

Further Mathematics for Natural Sciences

MATH143 P2 (19L-19T-0P-0S-26H-12R-0F-0G-4A-13W-8C)
Prerequisite Requirement: 40% in MATH133.

Aim: To equip students with basic mathematical tools needed especially in the life sciences.

Content: Elementary indefinite integrals; differential equations; definite integrals; areas and numerical integration;
partial derivatives; linear programming.

Assessment: Class tests and/or assignments (33%), 2 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH143 and any of MATH140, 141, 145 or 196.

Operations Research

MATH144 W2 (39L-39T-0P-0S-50H-26R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in MATH130.

Corequisite: MATH140.

Aim: To introduce and develop the fundamentals of operations research.

Content: Linear programming, game theory, difference equations, elementary graph theory.

Assessment: Class tests and/or assignments (33%); 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Further Topics in Mathematics

MATH145 W2 (39L-39T-0P-0S-50H-26R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in MATH133.

Aim: To equip students with basic mathematical tools needed especially in the life sciences.

Content: Antiderivatives and elementary indefinite integrals. Definite integrals and areas. Techniques of integration
and Simpson's rule. Differential equations and applications to discrete growth processes and exponential growth.
Functions of several variables; partial derivatives, maxima and minima. Lagrange multipliers, least squares
approximation and applications.

Assessment: Class tests & assignments (33%), 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH145 and any of MATH140, 141, 143 or 196.

Introduction to Calculus (Augmented)

MATH195 P1 W1 (78L-78T-0P-0S-99H-54R-0F-0G-11A-13W-16FC-16DC)
Prerequisite Requirement: Higher Grade E or Standard Grade B for Matric Mathematics or NSC Level 3 Maths;
acceptance into BSc4(Augmented).

Aim: To introduce and develop the Differential Calculus as well as the fundamentals of proof technique and
rudimentary logic.

Content: This module covers the syllabus of MATH130 and, in addition, supplementary materia
l designed for
students who are under-prepared for university-level Mathematics. Students are expected to attend additional
lectures, tutorials and undergo additional assessment to a maximum of 160 hours.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH195 and any of MATH104, 130, 131, 133, 134, 137 or 197. This module is
worth 16 degree credits and 16 foundational credits.

Calculus and Linear Algebra (Augmented)

MATH196 P2 W2 (78L-78T-0P-0S-99H-54R-0F-0G-11A-13W-16FC-16DC)
Prerequisite Requirement: 40% in MATH195.

Aim: To develop the Integral Calculus and to introduce elementary Linear Algebra.

Content: This module covers the syllabus of MATH140 and, in addition, supplementary materia
l designed for
students who are under-prepared for university-level Mathematics. Students are expected to attend additional
lectures, tutorials and undergo additional assessment to a maximum of 160 hours.

Assessment: Class tests and assignments (33%), 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH196 and any of MATH140, 141, 143 or 145. This module is worth 16
degree credits and 16 foundational credits.

Maths & Stats for Natural Sciences (Aug)

MATH197 P1 WA1 (78L-78T-0P-0S-99H-54R-0F-0G-11A-13W-16FC-16DC)
Prerequisite Requirement: Higher Grade E or Standard Grade B for Matric Mathematics or NSC Level 3 Maths;
acceptance into BSc4(Augmented).

Aim: To introduce students to the fundamental principles, methods, procedures and techniques of mathematics and
statistics as the language of Science. i

Content: This module covers the syllabus of MATH133 and, in addition, supplementary material designed for
students who are under-prepared for university-level Mathematics. Students are expected to attend additional
lectures, tutorials and undergo additional assessment to a maximum of 160 hours.

Assessment: Assessment: Class tests and assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH197 and any of MATH104, 130, 131, 133, 134, or 137. This module is
worth 16 degree credits and 16 foundation credits.

Foundation Mathematics

MATH199 PY WY (107L-65T-0P-0S-135H-74R-0F-0G-19A-26W-36FC-4DC)
Prerequisite Requirement: Any pass symbol on Standard or Higher Grade Matric Maths or NSC Maths.
Corequisite: BIOL199, CHEM199, PHYS199, (SCOM103 or 113).

Aim: MATH199 forms part of a package of modules the Science Foundation Programme. It provides a foundation for
all first year mathematics modules.

Content: Numerical and algebraic skills. Set theory. Equations and inequalities. Perimeter, area and volume.
Numbers. Proportional reasoning. Functions: Linear, quadratic, semi-circles, rectangular hyperbola, piecewise
functions, absolute values, circular (trigonometry), exponential, logarithmic. Introduction to differential calculus and
word problems.

Assessment: (50%) Class mark (Assignments, Class tests, 3 h June test, and tutorial tests), (50%) 3 h November
exam.

DP Requirement: 40% Class mark, plus 80% attendance at all lectures and tutorials.

Year-long Module. This module is only for students in the Foundation Stream of the BSc4. It carries 36
Foundational credits and 4 degree credits.

Advanced Calculus & Linear Algebra

MATH212 P1 W1 (39L-39T-0P-0S-52H-24R-0F-0G-6A-13W-16C)

Prerequisite Modules: MATH130, 140.

Aim: To give a coherent treatment of basic theories & problem solving techniques from Advanced Calculus and Linear Algebra and their applications.

Content: Advanced Calculus: functions of several variables, partial derivatives, chain rules, implicit differentiation, extrema and Lagrange multipliers, multiple integrals, change of variables, line integrals with Greenâ\200\231s theorem. Linear Algebra: axioms of vector spaces, linear independence, bases and dimension, matrices and linear transformations, eigenvectors and eigenvalues, diagonalization, inner product spaces, Gram-Schmidt process, orthogonal matrices, linear differential equations, quadratic surfaces.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: Class record 35%. 80% attendance at lectures and tutorials.

Credit may not be obtained for MATH212 and MATH238.

Introduction to Algebra & Analysis

MATH220 P2 W2 (39L-39T-0P-0S-52H-24R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH212.

Aim: This module introduces basic concepts from Set Theory, elementary Number Theory, Modem Algebra and Mathematical Analysis which are fundamental to Pure Mathematics.

Content: Algebra: sets, mappings, equivalence relations and classes, partitions, integers, prime factorization, integers modulo n, binary operations, algebraic systems, groups and examples of groups. Analysis: Completeness Axiom, sequences and series of numbers, tests for convergence of series, limits of functions, continuity, differentiability, Mean Value Theorems, properties of continuous and differentiable functions.

Assessment: Class tests and/or assignments (33%), 3h exam (67%).

DP Requirement: Class record 40%. 80% attendance at lectures and tutorials.

Mechanics

MATH235 W1 (39L-39T-0P-0S-52H-24R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH130, 140.

Aim: To provide the student with a systematic development of advanced applications in mechanics.

Content: Newtonâ\200\231s laws of motion and conservation laws. Kepler’s laws, central forces and planetary motion. Moving frames and Coriolis forces. Motion of a rigid body and Euler’s equations. Lagrangeâ\200\231s equations. Introduction to mechanics of continuous media.

Assessment: Class tests and/or assignments (33%); 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Discrete Mathematics with Applications

MATH236 P1 W1 (39L-39T-0P-0S-52H-24R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH130, 140.

Aim: To study basic concepts of Discrete Mathematics & applications to Cryptology and Graph Theory.

Content: Basic set theory. Relations & functions, equivalence relations. Counting principles, inclusion-exclusion & pigeonhole principles, combinations, identities with binomial coefficients. Modular arithmetic, basic number theory: GCD, extended Euclidean algorithm, Eulerâ\200\231s totient function, basic group theory, Fermat’s Little Theorem, Euler’s Theorem. Cryptology: encryption, decryption of well known private-key cryptosystems, cryptanalysis of shit, substitution & VigenÃ©re ciphers, stream ciphers, Shannon theory, public key cryptography, product cryptosystems.
Recursions & generating functions.

Assessment: Class mark (33%), 3h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Mathematics 2A (Eng)

MATH238 H1 i1 (39L-39T-0P-0S-52H-24R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in MATH141.

Prerequisite Modules: MATH131.

Aim: To exhaustively cover the methods & applications of multivariable calculus.

Content: Functions of several variables: level curves and surfaces, limits, continuity. Partial derivatives, gradient.
Tangent planes and normal lines. Maxima and minima. Constrained functions, Lagrange multipliers. Parametric
representation of fines & surfaces; curvature, torsion. Cylindrical & spherical coordinates. Multiple integrals. Line &
surface integrals. Applications: centres of mass, moments & products of inertia. The operators grad, div and curl
Green's theorem; divergence theorem; Stokes' theorem. Applications: work, potential energy, conservative fields; flux
and diffusion.

Assessment: Class tests and/or assignments (20%), 3 h exam (80%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Offered to students in the Faculty of Engineering. Credit may not be obtained for MATH212 and MATH238.

Applied Finite Mathematics

MATH239 H1 (20L-20T-0P-0S-26H-10R-0F-0G-4A-13W-8C)
Prerequisite Requirement: 40% in MATH131, 141.

Aim: To introduce the student to the theory and methods of finite mathematics.

Content: Logic, Boolean algebra. Set Theory. Difference Equations. Graph Theory. Linear Programming.
Assessment: Class tests and/or assignments (20%), 2 h exam (80%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Offered to students in the Faculty of Engineering.

Further Calculus & Differential Equations

MATH241 P2 W2 (39L-39T-0P-0S-52H-24R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH212.

Aim: To provide a foundation in the theory and methods of Applied Mathematics.

Content: Further multiple integrals, vector functions and fields. Line and surface integrals in higher dimensions.
Divergence and Stokesâ\200\231 theorems. Series and tests of convergence. Linear differential equations, and their solution.
First order and higher order equations, undetermined coefficients, variation of parameters. Boundary value and Sturm-
Liouville problems.

Assessment: Class tests and/or assignments (33%); 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Credit may not be obtained for MATH241 and MATH248.

Intro to Numerical Mathematics

MATH243 W2 (39L-39T-0P-0S-52H-24R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH130, 140.

Aim: To provide the student with a knowledge and understanding of fundamental material in numerical methods.
Content: Error analysis, interpolation and polynomial approximation, numerical differentiation and integration,
numerical linear algebra. . Basic numerical methods in differential equations.

Assessment: Class tests and/or assignments (33%); 3 h exam (67%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Recommended co-requisite: MATH 241.

Mathematical Modelling

MATH246 P2 W2 (39L-39T-0P-0S-52H-24R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH130, 140.

Aim: To develop skills to construct and analyse mathematical models of real world situations.

Content: Formulation and construction of mathematical models for real world problems in terms of difference and
differential equations. Case studies from finance, population theory, mathematical biology, epidemiology, geometry

and mechanics. Relevant properties of difference and differential equations and systems. Basic methods of analysing
these models.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: Class record 35%. 80% attendance at lectures and tutorials.

Recommended co-requisite: MATH 241.

Mathematics 2B (Eng)

MATH248 H2 (39L-39T-0P-0S-56H-20R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in MATH238.

Prerequisite Modules: MATH141.

Aim: To exhaustively cover linear differential equations, eigenvalue theory, & prepare students for more advanced
methods.

Content: Laplace transforms. Inversion by partial fractions and basic manipulations. Linear ODE's with constant coefficients, use of Laplace transforms in solving equations & systems. Vector spaces, dimension, basis, linear transformations. Eigenvalues & eigenvectors. Diagonalization. Inner product, projections, orthogonal transformations. Applications. Functions of a complex variable, analytic functions, Cauchy-Riemann equations. Integration. Path independence of integrals, Cauchy-Goursat theorem. Cauchy integral formula; simple applications.

Assessment: Class tests and/or assignments (20%), 3 h exam (80%).

DP Requirement: 35% Class mark, 80% attendance at lectures & tutorials.

Offered to students in the Faculty of Engineering. Credit may not be obtained for MATH241 and MATH248.

Optimisation & Optimal Control Theory

MATH301 P2 W2 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH 212 and 241.

Aim: To provide the student with a knowledge and understanding of the theory and tools of optimisation and their applications to optimal control.

Content: The mathematics of control theory focusing on a selection of topics from: n-dimensional unconstrained optimization; n-dimensional constrained optimization & the Kuhn-Tucker conditions. Calculus of variations. Linear-quadratic control theory, controllability, observability & stability. Hamiltonian formulation & Pontryagin's principle.
Assessment: Class Tests (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Real Analysis

MATH310 P1 W1 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH212, 220.

Aim: To introduce and develop in a mathematically rigorous manner, the Riemann integral, sequences and series of functions, and metric spaces.

Content: Upper and lower Riemann integrals, Riemann integrability, properties of the Riemann integral, the fundamental theorem of integral calculus, improper integrals, sequences and series of functions, uniform convergence, the interchange of limiting processes, power series, Taylor's theorem, sets, functions and countability, metric spaces, continuity and convergence, completions, fixed point theorems and applications, compactness
Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Networks & Graph Theory

MATH322 PC (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 16 credits of Mathematics at Level 2.

Aim: To explore proof techniques and algorithms and to acquire problem solving skills in discrete mathematics.

Content: Introductory concepts, isomorphic graphs, connectivity, shortest path algorithms, distance in graphs, trees and the minimum spanning tree problem, networks, maximum flow problems, Eulerian graphs and the Chinese postman problem, Hamiltonian graphs. Planar graphs and colouring problems.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Offered in either Semester 1 or 2.

Complex Analysis

MATH323 PC (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH212.

Aim: This module discusses basic theories and techniques from Complex Analysis, including methods of solving classical problems relevant to Applied Sciences.

Content: Complex Plane and Riemann Sphere; elementary complex functions; complex differentiation; Cauchy-Riemann equations; contour integral and Cauchy Theorem for analytic functions; Cauchy Integral Formula; harmonic functions; Taylor's Theorem; Laurent Series; isolated singularities and residues; conformal mappings; linear fractional transformation; either Riemann surfaces of elementary functions or application to Laplace equations.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Offered in either Semester 1 or 2.

Numerical Methods

MATH324 P2 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH212.

Aim: To give students a solid foundation in the theory and techniques of numerical methods and skills in solving mathematical problems numerically.

Content: Computer arithmetic, roots of nonlinear equations, systems of linear equations, systems of nonlinear equations. Curve fitting, numerical differentiation and integration, numerical methods for ordinary differential equations.

Assessment: Class Tests (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Numerical Analysis .

MATH327 W2 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 32C of MATH at Level 2 including MATH212.

Aim: To provide students with a solid foundation in the theory and techniques of Numerical Analysis.

Content: Integration, Orthogonal polynomials and approximation theory. Ordinary differential equations, Partial differential equations and boundary value problems. Convergence and stability analysis.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Offered in either Semester 1 or 2.

Operations Research Methods

MATH331 P1 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH212.

Aim: To acquire knowledge of the theory behind optimisation algorithms and to acquire skills in solving optimisation problems.

Content: Formulation of problems, simplex method, duality, integer programming, heuristics, introduction to nonlinear programming.

Assessment: Tutorial & project work (10%), Class tests (30%), 3 h exam (60%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Advanced Differential Equations

MATH334 P1 W1 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH212, 241.

Aim: To acquire knowledge of the underlying mathematical theory to solve advanced problems in differential equations.

Content: Phase plane and stability, Poincare-Bendixon theorem, limit cycles, Lyapunov functions. Basic PDEâ\200\231s: the

Laplace equation, the wave equation and the heat equation. Canonical forms of PDEâ\200\231s. Methods of solutions: basic separation of variables, method of characteristics, Greenâ\200\231s function. Application to problems arising in mathematical physics.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Linear Algebra & Coding Theory

MATH338 W1 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH212 plus (MATH220 or 241).

Aim: To develop advanced techniques in linear algebra and introduce the student to the fundamentals of coding.
Content: Topics from Advanced Linear Algebra and an introduction to Coding Theory.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Algebraic Structures

MATH340 P2 W2 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH212, 220.

Aim: To investigate properties of groups, rings, polynomial rings and fields which are fundamental to Modern Algebra.
Content: Groups, subgroups, cyclic groups, normal subgroups, quotient groups, isomorphism theorems for groups,
permutation groups, groups of small order. Rings, polynomial rings, ideals, prime and maximal ideals. Fields, field of
fractions, finite fields, extension fields.

Assessment: Class Tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Graph Theory

MATH342 W2 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 32C of MATH at Level 2 including MATH212.

Aim: To explore techniques and algorithms in graph theory.

Content: Aspects of Graph Theory and its applications: Distance, connectivity, matchings, hamiltonicity, eulerian
graphs, vertex and edge colourings, network flows.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Advanced Mechanics

MATH343 W2 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH212 plus (MATH220 or 241).

Aim: To consider the mathematical formulation of problems arising in mechanics.

Content: The dynamics of mechanical systems. Hamiltonian mechanics. Hilbert spaces, bases. Operator
representation of quantum mechanics, change of representation. Factorization. Symmetries and algebras.
Perturbation methods. Introduction to chaos.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Tensor Analysis

MATH344 W2 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH212 plus (MATH220 or 241).

Aim: To develop the basic theory of tensors and to study applications in physical theories.

Content: Basic tensor theory with applications to a selection of topics from special relativity, electromagnetic theory,
mechanics and thermodynamics.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Introduction to Financial Mathematics

MATH346 W2 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 32C of MATH at Level 2 including MATH212.

Aim: To develop the mathematics and techniques relevant to finance.

Content: Deterministic cash flow streams, single-period random cash flows. An introduction to the derivatives market.
Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Topics in Analysis

MATH347 W2 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 40% in MATH310.

Aim: To introduce the student to the theory of Hilbert spaces and basic Lebesgue integration.

Content: Inner product spaces and their completion. Geometric theory of Hilbert spaces. Orthonormal basis.
Orthogonal polynomials. Standard classes of linear operators in Hilbert spaces. Unbounded operators. Lebesgue
integral on the real line. Basic properties of the Lebesgue integral. Lebesgue spaces.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Discrete Mathematics

MATH349 H2 (20L-20T-0P-0S-26H-10R-0F-0G-4A-13W-8C)
Prerequisite Requirement: 40 % in MATH239.

Prerequisite Modules: MATH248.

Aim: To provide the students with a knowledge and understanding of discrete mathematics.

Content: Groups, semigroups, finite fields. Finite state machines, linear codes. Further graph theory, Boolean algebra with applications.

Assessment: Class tests and/or assignments (20%), 2 h exam (80%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Offered to students in the Faculty of Engineering.

Mathematics 3A (Eng)

MATH354 H1 (20L-20T-0P-0S-26H-10R-0F-0G-4A-13W-8C)
Prerequisite Requirement: MATH238, 40% in MATH248.

Aim: To provide the student with essential tools of advanced applied mathematics.

Content: Fourier series, application to boundary value problems for ordinary differential equations (Sturm-Liouville problem). Series solution of ordinary differential equations, basic special functions. Separation of variables for one and two dimensional PDE's. Fourier transform, applications to PDE's. Further complex variable theory, Laurentâ\200\231s and Taylor's theorem, isolated singularities and residues, evaluation of integrals by residues. Applications.

Assessment: Class tests and/or assignments (20%), 2 h exam (80%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Offered to students in the Faculty of Engineering.

Methods of Applied Mathematics

MATH356 W1 (29L-20T-0P-0S-80H-26R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH212 plus (MATH220 or 241).

Aim: This module discusses techniques and methods necessary for problem solving.

Content: Complex functions and the Cauchy-Riemann conditions. Contour integrals and the Cauchy integral formula. Taylorâ\200\231s theorem, Laurent series and residue theory. Special functions. Theory of Fourier series, applications to series solutions of ordinary differential equations. Integral transform theory, Fourier analysis and applications to partial differential equations.

Assessment: Class tests and/or assignments (33%), 3 h exam (67%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Numerical Methods

MATH360 H2 (20L-20T-0P-0S-26H-10R-0F-0G-4A-13W-8C)
Prerequisite Requirement: 40% in MATH248.

Aim: To provide the student with a knowledge and understanding of basic approximate methods for solving
mathematical problems in engineering.

Content: Interpolation, approximate integration, numerical solution to algebraic, ordinary and partial differential
equations.

Assessment: Class tests and/or assignments (20%), 2 h exam (80%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Offered to students in the Faculty of Engineering.

Partial Differential Equations

MATH438 H1 (20L-20T-0P-0S-26H-10R-0F-0G-4A-13W-8C)
Prerequisite Modules: MATH354.

Aim: To provide students with a knowledge and understanding of the theory and methods of solution of partial
differential equations.

Content: First order partial differential equations and systems. Shock waves. Classification and fundamental
properties of second order equations. Method of characteristics. Engineering applications.

Assessment: Class tests and/or assignments (20%), 3 h exam (80%).

DP Requirement: 30% Class mark, 80% attendance at lectures & tutorials.

Offered to students in the Faculty of Engineering.

Classical Algebra

MATH701 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To provide develop basic aspects of the theory of classical algebra.

Content: Further group theory; Galois theory; ring theory.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Honours Project in Applied Mathematics

MATH702 P2 W2 (OL-10T-0P-4S-146H-0R-0F-0G-0A-13W-16C)
Aim: To acquire experience and skills in the problem-solving process from problem formulation through to policy formulation.

Content: Some aspect of applied mathematics is considered under the guidance of a "supervisor", a report is written and an oral presentation given, both of which are graded. It could be a survey, a synthesis or an application of a known method to a new problem. Original research is not expected but the appropriate research methodology is demanded.

Assessment: Report (80%), Oral presentation (20%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Cosmology

MATH703 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire knowledge of the theory and techniques used in Cosmology.

Content: Robertson-Walker solution and Friedman models; inflation; gravitational waves.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Differential Geometry

MATH704 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To develop basic aspects of the modem theory of Differential Geometry.

Content: Structure of manifolds; Lie algebras; symmetries and application to physics.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Graph Theory 1

MATH707 W1 (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To develop basic aspects of the modern Graph Theory.

Content: Digraphs, tournaments, Ramsey theory, graph matchings.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Graph Theory 2

MATH708 W2 (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH707.

Aim: To further develop Graph Theory.

Content: Distances, vulnerability, colouring and domination in graphs.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Industrial Mathematics

MATH709 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To study mathematical models applied to industry.

Content: Selected case studies from industrial practice involving precipitation of crystals, electron beam lithography, pollution spreading, photocopier machine and others. Modelling from first principles, theoretical analysis of models, basic numerical procedures.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Set Theory & Logic

MATH710 PC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Prerequisite Requirement: Any Level 3 Mathematics module.

Prerequisite Modules: MATH212.

Aim: This module provides mathematical treatment of the basic ideas and results from Set Theory and Logic. It places emphasis on Axiomatic Approach to Set Theory, the Semantic and Syntactic interaction in Mathematical Languages. It is suitable for students registered in Mathematics Honours programmes and those from Computer Sciences.

Content: Propositional Logic; First Order Logic; Zermelo-Fraenkel Set Theory with Axiom of Choice; Cardinal Arithmetic; Godel's Completeness and Incompleteness Theorem; Compactness Theorem; Undecidability; beginning Model Theory.

Assessment: Assignments (33%), 3 h exam (67%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Classical Mechanics

MATH712 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire knowledge of the theory and techniques used in Classical Mechanics.

Content: Calculus of variations; Lagrangian and Hamiltonian mechanics; canonical transformations and Hamilton-Jacobi theory; conservation laws; Lie algebras; Liouville's theorem and integrable systems; configurational invariants and almost complete integrability.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Number Theory

MATH713 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To develop basic aspects of Number Theory.

Content: Introduction to algebraic number theory, quadratic residues, quadratic and cyclotomic fields, factorization, geometric methods, applications.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Ordinary Differential Equations

MATH714 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To develop basic aspects of the modemn theory of Ordinary Differential Equations.

Content: Historical introduction; symmetry; Lie symmetries; differential equations and symmetry; classification of equations; solution of equations; algebras of integrals; partial differential equations; systems of equations; generalized symmetries; Noether’s theorem.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Partial Differential Equations

MATH716 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire knowledge of the theory and techniques used in Partial Differential Equations.

Content: First order equations, classification and solutions of second order equations, Cauchy-Kovalevskaya
theorem, systems of equations, shocks.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Honours Project in Mathematics

MATH717 P2 W2 (OL-10T-0P-4S-146H-0R-0F-0G-0A-13W-16C)
Aim: To gain an ability to read and understand modern mathematical texts; to study in depth a topic in Mathematics.
Content: Some aspect of mathematics is considered under the guidance of a "supervisorâ\200\235, a report is written and an
oral presentation given, both of which are graded. It could be a survey, a synthesis or an application of a known
method to a new problem. Original research is not expected but the appropriate research methodology is demanded.
Assessment: Report (80%), Oral presentation (20%).

DP Requirement: Not applicable.

This module has no supplementary exam.

General Relativity

MATH718 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire knowledge of the theory and techniques used in General Relativity.

Content: Curvature and Einstein field equations; Schwarzschild solution and black holes.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Set Theory & Ordered Sets

MATH719 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To develop basic aspects of the Axiomatic Set Theory and related topics.

Content: Axiomatic set theory, ordinal and cardinal arithmetic, axiom of choice. Order, lattices, closure systems.
Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Topology

MATH721 PC WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To develop basic aspects of the theory of topology.

Content: An introduction to general topology: separation, countability, metrizability. A se

lection of topics from general
and algebraic topology.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Foundations

MATH722 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To provide and develop the foundations of mathematics.

Content: Propositional and first order logic; completeness, compactness.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Universal Algebra

MATH723 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To provide and develop basic theory of Universal Algebra.

Content: Algebras, congruences, varieties and quasivarieties, congruence modularity and distributivity, axiomatization.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Cryptography

MATH724 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To develop basic aspects of the modem theory of Cryptography.

Content: Entropy, block ciphers, stream ciphers, public key systems, signature schemes, key management.
Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Coding Theory

MATH726 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To develop basic aspects of modern Coding Theory.

Content: Introduction to field theory and design theory. Linear, cyclic, Hamming, Hadamard, Golay and BCH codes.
Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Special Topics A

MATH727 PC WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire knowledge of and skills in a recent topic in Pure or Applied Mathematics.

Content: Topics in mathematics or applied mathematics, not included in the list of specified modules or additional aspects of the listed modules may be offered.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Applied Analysis

MATH728 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To introduce an up-to-date mathematical theory of the applications of abstract analysis.

Content: Basic topological and metric notions, uniform convergence and interchangeability of limiting processes,
Banach fixed point theorem with applications, implicit and inverse function theorems.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Special Topics B

MATH729 PC WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire further knowledge of and skills in a recent topic in Pure or Applied Mathematics.

Content: Further topics in mathematics or applied mathematics, not included in the list of specified modules or
additional aspects of the listed modules may be offered.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Computability Theory
MATH730 PC (27L-0T-0P-0S-103H-25R-0F-0G-5A-13W-16C)
Prerequisite Requirement: Any Level 3 Mathematics module. MATH710 is recommended.

Prerequisite Modules: MATH212.

Aim: To introduce an up-to-date mathematical theory of Computable Functions and Computability.

Content: Basic logic; Turing machines; Church's Thesis; Computability; Universal Machines; Lambda Calculus; the Halting Problem; Gadel's Incompleteness Theorem; Undefinability of Truth; Recursion Theorem; Recursively Enumerable Sets; Simple Sets; and two of the following topics: Turing Degree and Jump Operator; Avrithmetical Hierarchy; Recursive Ordinals; Hilbert's Tenth Problem.

Assessment: Assignments (33%), 3 h exam (67%). %

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Mathematical Biology

MATH731 PC WC (29L-10T-0P-0S-97H-18R-0F-0G-6A-13W-16C)

Aim: To provide an introduction to Mathematical Biology with an emphasis on applications.

Content: Continuous and discrete models for single and interacting species. Mathematical bioeconomics. A selection of topics chosen from pattem formation, nerve impulses, epidemiology, heartbeat dynamics, tumour growth.
Assessment: Tests and assignments (30%), 3 h exam (70%).

DP Requirement: 80% attendance, 40% coursework.

Offered in either Semester 1 or 2.

Fluid Dynamics

MATH732 PC WC (29L-10T-0P-0S-97H-18R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH334.

Aim: To provide students with a first introduction to theoretical fluid mechanics and its applications.

Content: The continuum approach. Modelling of fluids; Eulerian and Lagrangian approaches. The material derivative and equations of motion of inviscid fluids Vorticity, circulation and irrotational flows. The complex potential, Kutta condition, lift and drag. Introduction to viscous fluid flows; Navier-Stokes equations.

Assessment: Tests and assignments (30%), 3 h exam (70%).

DP Requirement: 80% attendance, 40% Class mark.

Offered in either Semester 1 or 2.

Applied Numerical Analysis

MATH733 PC (29L-10T-0P-0S-97H-18R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH324.

Aim: To provide numerical techniques and analysis for methods applied in some practical pro blems.

Content: Iterative techniques for large systems of linear equations; relaxation methods, cg - method, Krylov-space methods, convergence. Eigenvalue problems. Numerical techniques for Stiff and non-stiff systems of ordinary differential equations; explicit schemes, implicit schemes, sensitivity analysis. Numerical methods for boundary value problems.

Assessment: Tests and assignments (30%), 3 h exam (70%).

DP Requirement: 80% attendance, 40% Class mark.

Offered in either Semester 1 or 2.

Analytic Methods in Partial Differential Eqns

MATH734 PC (29L-10T-0P-0S-97H-18R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH334.

Aim: To acquire knowledge of techniques used in partial differential equations and their applications.

Content: Modelling with partial differential equations. Hyperbolic problems; conservation laws, wave equations in general domains, systems of equations. Laplace Equations; maximum/minimum principle, variational formulation, Greenâ\200\231s function for different domains. Parabolic Equations; initial boundary value problems.

Assessment: Tests and assignments (30%), 3 h exam (70%).

DP Requirement: 80% attendance, 40% Class mark.

Offered in either Semester.

Further Graph Theory

MATH740 PC WC (27L-0T-0P-0S-108H-22R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH322.

Aim: To further develop Graph Theory.

Content: Colourings; connectivity; domination in graphs; extemal graph theory: graph algorithms and complexity theory; Hamiltonicity; matchings; vertex covers; planar graphs; probabilistic methods in graph theory; graph Ramsey theory.

Assessment: Assignments (33%), 3 h exam (67%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Financial Mathematics

MATH741 PC WC : (29L-10T-0P-0S-97H-18R-0F-0G-6A-13W-16C)
Aim: To acquire knowledge of Markowitz mean variance portfolio theory and its implementation.

Content: Mean variance portfolio theory; Efficient portfolios; Efficient Frontier, Single and multiple index models. International diversification; Capital asset pricing models; Arbitrage pricing model; Efficient markets; Evaluation of portfolio performance. Options and futures.

Assessment: 2 projects (50%), 3 h exam (50%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Algorithms & Complexity

MATH745 PC WC (30L-0T-0P-0S-111H-14R-0F-0G-5A-13W-16C)
Prerequisite Requirement: A degree in a mathematical science.

Prerequisite Modules: MATH212, MATH220.

Aim: Advanced understanding of and facility in the correctness and complexity of algorithms.

Content: Basic algorithmic analysis techniques; Algorithmic strategies; Graph Algorithms; Complexity classes, P and NP; A miscellany of advanced topics.

Assessment: Test & assignments (30%), 3 h exam (70%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Further Group Theory

MATH751 PC WC (27L-0T-0P-0S-108H-22R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH340.

Aim: To develop further the Theory of Groups.

Content: Permutation groups, simplicity of As, groups of small order, permutation represent

ations, p-groups, Sylow
theorems, normal series, solvable and nilpotent groups, finite direct products, basis theorem, fundamental theorem of
finite abelian groups, general linear group, some simple groups.

Assessment: Assignments (33%), 3 h exam (67%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Recent Topics in Mathematics |

MATH753 PC WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire knowledge of and skills in a recent topic in Mathematics.

Content: Will vary according to the most recent developments in Mathematics.

Assessment: Project (30%), 3 h exam (70%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Applied Optimal Control Theory

MATH755 PC WC (29L-10T-0P-0S-97H-18R-0F-0G-6A-13W-16C)
Aim: To provide an introduction to optimal control with an emphasis on applications.

Content: Basic concepts. Controllability, observability, stability. Variational methods. Bang-bang control. Maximum principle. Dynamic programming. Numerical techniques

Assessment: Tests and assignments (30%), 3 h exam (70%).

DP Requirement: 80% attendance, 40% Class mark.

Offered in either Semester 1 or 2.

Recent Topics in Mathematics Il

MATH761 P2 (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire knowledge of and skills in a recent topic in Mathematics.

Content: Will vary according to the most recent developments in Mathematics.

Assessment: Project (30%), 3 h exam (70%).

DP Requirement: 80% attendance.

Representation Theory

MATH762 PC WC (27L-0T-0P-0S-108H-22R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH340.

Corequisite: MATH751.

Aim: To introduce and develop the Theory of Group Representations.

Content: Basic concepts of representation theory, characters, Maschke's theorem, Schur's lemma, ordinary characters of finite groups, regular representation, algebraic integers, group algebras, orthogonality relations, character tables, tensor products and product of characters, restriction and induction of representations and characters, the Frobenius reciprocity law, normal subgroups and lifted characters, Clifford theorem, inertia subgroups, Burnside's pagb theorem.

Assessment: Assignments (33%), 3 h exam (67%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Further Ring Theory

MATH763 PC WC (27L-0T-0P-0S-108H-22R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH340.

Corequisite: MATH771.

Aim: To develop further the Theory of Rings and Modules.

Content: Ordered structures, one-sided and two-sided ideals, modules and submodules, Isomorphism Theorems, composition series and chain conditions, simple primitive and prime rings, the prime and Jacobson radicals, semisimple modules and the Wedderburn-Artin Theorem, artinian and noetherian rings, injecti

ve and projective
modules, localization and rings of quotients.

Assessment: Assignments (33%), 3 h exam (67%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Advanced Optimisation

MATH765 PC WC (29L-10T-0P-0S-97H-18R-0F-0G-6A-13W-16C)
Prerequisite Requirement: Programming skills.

Prerequisite Modules: MATH331.

Corequisite: MATH324.

Aim: To acquire knowledge of advanced techniques in Optimisation.

Content: Advanced topics in linear programming, mixed integer programming and nonlinear pro gramming.
Assessment: Tests and assignments (30%), 3 h exam (70%).

DP Requirement: 80% attendance, 40% Class mark.

Offered in either Semester 1 or 2.

Rings & Fields

MATH771 PC WC (27L-0T-0P-0S-108H-22R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH340.

Aim: To develop basic aspects of the theory of rings, fields and other algebraic structures .

Content: Topics will be chosen from: Ideals, localization, polynomial rings, basic module theory, field extensions and Galois theory.

Assessment: Assignments (33%), 3 h exam (67%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Topics in Topology

MATH777 W2 – (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH721.

Aim: To develop further topics in Topology.

Content: Depending on interest, topics will be chosen from advanced general topology, theory of locales or algebraic topology.

Assessment: Tests (33%), 3 h exam (67%).

DP Requirement: 80% attendance.

Numerical Analysis |

MATH778 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire knowledge of the theory and techniques used in basic Numerical Analysis.

Content: Review of functional analysis, the matrix eigenvalue problem, the linear inverse problem, advanced methods on numerical solutions of differential equations.

Assessment: Tests (33%), 3 h exam (67%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Measure and Integration |

MATH783 PC WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To develop basic aspects of the modem theory of Measure and Integration.

Content: Lebesgue measure, Lebesgue integral, convergence theorems, Lebesgue’s differentiation theorem.
Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Measure and Integration Il

MATH784 P2 W2 (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH783.

Aim: To further develop the modem theory of Measure and Integration.

Content: Abstract measure spaces, Lp spaces, convergence, the Radon-Nikodym theorem, Fubini's theorem, other special topics.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in Semester 2 provided MATH783 has been offered in Semester 1.

Functional Analysis |

MATH785 PC WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)

Aim: To develop basic aspects of the modern theory of Functional Analysis.

Content: Normed spaces and Banach spaces, linear operators, Hilbert spaces, fundamental theorems for normed and Banach spaces.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Functional Analysis Il

MATH786 W2 (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH785.

Aim: To further develop the concepts of Functional Analysis.

Content: Compact linear operators, Banach algebras, spectral theory for bounded self-adjoin t operators, other special topics.

Assessment: 3 h exam (100%)

DP Requirement: 80% attendance.

Offered in Semester 2 provided MATH785 has been offered in Semester 1.

Numerical Analysis II

MATH792 W2 (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH778.

Aim: To develop further topics in Numerical Analysis.

Content: The non-linear inverse problem, approximation theory, other topics.

Assessment: 3 h exam (100%)

DP Requirement: 80% attendance.

Offered in Semester 2 provided MATH778 has been offered in Semester 1.

Optimisation |

MATH793 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire knowledge of the theory and techniques used in basic Optimization.

Content: A selection of topics in linear and non-linear optimisation.

Assessment: 3 h exam (100%)

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Optimisation Il

MATH794 W2 (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH793.

Aim: To develop further topics in Optimization.

Content: A selection of advanced topics in linear and non-linear optimisation.

Assessment: 3 h exam (100%)

DP Requirement: 80% attendance.

Offered in Semester 2.

Financial Mathematics |

MATH795 WC (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Aim: To acquire basic knowledge of the theory and techniques used in Financial Mathematics.

Content: Introduction to forward, futures, and options. Modelling of stock prices, Ito’s lemma, the Black-Scholes equation and pricing derivatives.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Financial Mathematics Il

MATH796 W2 (29L-10T-0P-0S-100H-18R-0F-0G-3A-13W-16C)
Prerequisite Modules: MATH795.

Aim: To acquire further knowledge of the theory and techniques used in Financial Mathematics.

Content: Review of stochastic calculus, further option theory, Interest rates derivatives.

Assessment: 3 h exam (100%).

DP Requirement: 80% attendance.

Offered in Semester 2 provided MATH795 has been offered in Semester 1.

Microbiology

Offered in the School of Biochemistry, Genetics & Microbiology

Microbiology

MICR182 W2 (39L-6T-6P-0S-23H-0R-0F-0G-6A-13W-8C)
Prerequisite Modules: CHEM110, BIOL101.

Corequisite: CHEM120.

Aim: To provide an overview of the basic concepts of microbiology and the role of microbes in ocular disease.
Content: History of microbiology. Infection and prevention of infection. Basic characteristics of bacteria, fungi, viruses and protozoa. Bacterial cell structure and function. Bacterial growth, nutrition and control. Bacterial, viral, fungal, protozoan and helminth infections of the eye. Basic immunology and immunological disorders of the eye.

Practicals: Ubiquity of Microbes. Microscopic observation of bacteria and fungi. Aseptic Technique. Skin disinfection. Antibiotic sensitivity. Sterilisation and disinfection.

Assessment: Theory test (50%), 2 h exam (50%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Bacteriology

MICR213 P1 W1 (36L-6T-36P-0S-53H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: CHEM110, BIMI120 or BIOL101.

Aim: To provide a strong foundation in the field of bacteriology.

Content: Morphology and ultra-structure of bacteria; relationship of cellular structure to function. Physiological nutritional groups among the bacteria. Cultivation of bacteria and elementary aspects of control of microorganisms. Introduction to microbial ecology and habitat specific species. Basic aspects of environmental microbiology. Metabolic pathways of industrial importance. Introduction to classification of bacteria.

Practicals: Handling bacteria; aseptic technique; cultural practices; staining procedures; microscopy.

Assessment: Theory tests (10%), assignments and practical tests (10%), laboratory and practical reports (20%), 3 h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Introductory Food Microbiology

MICR214 P2 (18L-6T-18P-0S-22H-12R-0F-0G-4A-13W-8C)
Prerequisite Modules: BIOL101 or BIMI120, CHEM110.

Aim: To provide concepts and applications in food microbiology.

Content: The morphology, physiology and classification of microorganisms. Aspects of food, dairy and water microbiology including food safety and preservation as well as aspects of production hygiene and disinfection. Use of microorganisms in the production of selected fermented food and dairy products and their nutritional enhancement.

Methods of preventing food spoilage and food poisoning as well as principles of food safety are discussed. Selected topics in food-orientated industrial microbiology applications.

Practicals: Laboratory exercises in selected topics.

Assessment: Tests and assignments (20%), prac reports (20%), 2h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Mycology

MICR216 W1 (39L-9T-39P-0S-54H-6R-6F-0G-7A-13W-16C)
Prerequisite Modules: CHEM110, BIMI120 or BIOL101.

Aim: To introduce students to fungi and their importance.

Content: General characteristics of fungi. Principles and practice of fungal taxonomy. Importance of fungi. Fungal diseases of plants and humans. Symbiotic relationships - mycorrhizae and lichens.

Practicals: Microscopy. Fungal succession. Isolation, purification and identification of fungal cultures.

Assessment: Theory tests and assignments (20%), practical tests, laboratory and practical reports (20%), 3 h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Microbial Metabolism and Ecology

MICR218 W2 (39L-9T-39P-0S-61H-6R-0F-0G-6A-13W-16C)
Prerequisite Modules: CHEM110, BIMI120 or BIOL101.

Aim: To introduce the fundamentals of microbial ecology & metabolism.

Content: Energy needs for microbial cells, energy yielding sources for micro-organisms. Energy utilization for biosynthetic processes. Bacterial enzymes & their regulation. Biogeochemical cycling of elements. Microbe & microbe-host interactions. Micro-organisms in their natural habitat. Techniques for the study of microbial ecosystems.
Practicals: Winogradski column. Sauerkraut fermentation. Bacterial associations. Viscometric determination of enzyme activity. Protein determination; Folin-Lowry method. Manometry. Determination of cellulase, dehydrogenase & protease activities.

Assessment: Theory tests & assignments (20%), prac tests, lab & prac reports (20%), 3 h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Introductory Microbial Ecology

MICR220 P2 (18L-6T-18P-0S-22H-12R-0F-4G-0A-6W-8C)
Prerequisite Modules: BIOL101 or BIMI120, CHEM110.

Aim: To provide key concepts and application in the area of microbial ecology.

Content: Introduction to basic microbial ecology principles: microorganisms in their natural habitats; the microhabitat concept; microbe-microbe and microbe-host interactions; parasitism and symbiosis. Selected topics in applied environmental microbiology including: biogeochemical cycling of elements; bioremediation of polluted soils; eutrophication and microbiological treatment of polluted water; microbiological aspects of composting and silage making; mycorrhizal associations; and, rumen microbiology.

Practicals: Laboratory exercises in selected topics from the above.

Assessment: Tests and assignments (20%), prac reports (20%), 2 h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Environmental Biotechnology

MICR303 W2 (29L-7T-42P-0S-53H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: MICR213 and MICR218.

Aim: To introduce students to the fundamental aspects of environmental biotechnology.

Content: The need for the protection of the environment. Sources and consequences of pollution. Strategies for the treatment of solid and liquid wastes. Application of biosensors for environmental biotechnology. Bioremediation of xenobiotic and inorganic pollutants: Approaches and evaluation.

Practicals: Determination of the sanitary quality of water from various sources. Bioremediation. Use of biosensors for detecting pollutants. Field trips.

Assessment: Theory tests and assignments (20%), practical tests, laboratory reports and rep

ort writing performance
(20%), 3 h exam (60%). :
DP Requirement: 40% Class mark, 80% attendance at practicals.

Microbial Processing

MICR304 P2 W2 (29L-7T-42P-0S-53H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: MICR213.

Aim: To introduce the key concepts & applications in microbial bioprocessing.

Content: Range and scope of microbial bioprocessing. Growth of microbes in a controlled environment; including nutrient requirements, kinetics, environmental parameters, and monitoring. Batch & continuous bioprocesses. Aspects of upstream and downstream processing. Examples of major fermentation processes. Current trends and applications in industrial biotechnology. Regulatory, safety (Hazard Analysis Critical Control Point) and socio-economic consideration of Biotechnology.

Practicals: Related laboratory work. Field trips to facilities employing microbiological processes.

Assessment: Theory tests and assignments (20%), practical tests and laboratory reports (20%); 3 h exam (60%).

DP Requirement: 40% in Class Mark, 80% attendance at practicals.

Introduction to Viruses

MICR305 P1 W1 (29L-7T-42P-0S-53H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: RDNA202.

Aim: This module introduces viruses, the diseases they cause, control and applications.

Content: General characteristics of viruses, viroids, virusoids, mycoplasmas and prions. Taxonomy, identification, transmission, epidemiology, identification, characterization, control and applications.

Practicals: An introduction to the techniques used to detect and characterize plant and animal viruses.

Assessment: Theory tests and assignments (20%), practical tests and laboratory reports (20%), 3 h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Soil Microbiology

MICR310 P1 4 (29L-7T-48P-0S-47H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: MICR213 or MICR220.

Aim: To provide a knowledge of the role of micro-organisms in agricultural and other soils.

Content: Microbiota found in soil; range and scope. Physical and chemical aspects of soil structure and its influence on micro-organisms. Environmental variables influencing microbial activity. Introduction to microbial interactions, development of microbial communities and ecosystems. Introduction to biochemical cycling. Microbial participation in C, N, S and P cycles. Introduction to environmental biotechnology.

Practicals: An introduction to techniques used in microbial ecology. Excursions to facilities employing environmental biotechnological methods.

Assessment: Tests (20%), prac reports, essays, assignments (20%), 3 h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Advanced Bacteriology

MICR311 W1 (29L-7T-42P-0S-53H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: MICR213, 218.

Aim: To introduce students to advanced topics in bacteriology.

Content: Study of bacterial prokaryotic diversity and techniques involved in elucidating their diversity. Bacterial genetic variation and horizontal gene transfer. Bacterial taxonomy and the principles and practice of bacterial classification. Selected topics in sociomicrobiology, biofilms, and antimicrobial resistance.

Practicals: Identification of unknown bacterial cultures using phenotypic, biochemical and molecular techniques, dichotomous keys and commercial identification kits.

Assessment: Theory tests (20%), essay assignment, practical test, project report, poster presentation (20%), 3 h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Advanced Mycology

MICR313 W2 (29L-7T-42P-0S-53H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: MICR216.

Aim: To introduce advanced topics in mycology.

Content: Fungal taxonomy & classification. Physiology & biochemistry of fungal cells. Environmental factors in growth & reproduction. Fungal ecology. Fungal genetics: mechanisms of variability, gene-for-gene hypothesis. Applied mycology: field fungi, storage fungi, mycotoxins, fungal diseases, biological control strategies.

Practicals: Colonisation of buried cellophane, environmental factors in fungal growth; Mycostasis; Isolation, identification of fungal cultures from seeds.

Assessment: Theory tests and assignments (20%), practical tests, laboratory and practical reports (20%), 3 h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Role of Microorganisms in the Soil

MICR316 P1 (18L-0T-24P-0S-23H-12R-0F-0G-3A-13W-8C)
Prerequisite Modules: MICR213 or PPTH214.

Aim: To provide a knowledge of the role of micro-organisms in agricultural sois.

Content: Microbiota found in soil; range and scope. Physical and chemical aspects of soil structure and its influence on micro-organisms. Environmental variables influencing microbial activity. Introduction to microbial interactions, development of microbial communities and ecosystems. Introduction to biochemical cycling. Microbial participation in C, N, Sand P cycles.

Practicals: Mini-research project and excursions to facilities employing environmental biotechnological methods.
Assessment: Tests and assignments (20%), prac reports (20%), 2 h exam (60%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Students may not obtain credit for both MICR310 and MICR316.

Advanced Microbial Metabolism & Ecophysiology

MICR320 P1 (29L-7T-40P-0S-55H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: MICR213; BIOC201 or CHEM220.

Aim: To study microbial physiology and metabolism in natural ecosystems and industrial environments.

Content: Review of microbial metabolism and energy generation under aerobic and anaerobic conditions.
Ecophysiological versatility of eu- and archaebacteria and environmental impact of microbial activity. Thermodynamic aspects and regulation of microbial catabolism and biotechnological applications thereof.

Practicals: Experiments on microbial metabolism (e-donors, e-acceptors, regulation, secondary metabolites) and ecophysiology. Laboratory-scale industrial microbiology processes. Excursions.

Assessment: Tests and assignments (20%), prac reports (20%), 3h exam (60%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Death & Control of Micro-organisms

MICR360 P2 (29L-7T-36P-0S-59H-24R-0F-0G-5A-13W-16C)
Prerequisite Modules: MICR213.

Aim: To study the procedures available to kill or control undesirable microbes.

Content: Death and decline in microbial populations. Enzymes in cellular defence mechanisms. Structure of cells in relation to resistance. Methods of removing undesirable micro-organisms. Applications of chemotherapeutic compounds, disinfectants and germicides. Plasmids in microbial drug resistance. Recovery mechanisms in chemically- and UV-damaged bacteria.

Practicals: Assessing various physical and chemical antimicrobial agents, the effect of environmental factors on the killing/inhibitory activity of selected antimicrobials.

Assessment: 2 Tests (20%), prac reports and performance in tutorials (20%), 3 h exam (60%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Research Project

MICR710 PY WY (OL-45T-200P-30S-205H-0R-0F-0G-0A-26W-48C)
Aim: To provide a grounding in research techniques & procedures in Microbiology.

Content: Students have an opportunity to obtain some degree of specialization in: Agricultural Biotechnology, Medical Biotechnology or Industrial and Environmental Microbiology & Biotechnology. In addition to the above, seminars and a research proposal, relevant to the Research Project are presented to the Staff and Students. The findings of the Research Project are submitted in the form of a bound mini-dissertation and also presented at a scientific forum.
Assessment: Project Report (70%), literature review, proposal presentation and research paper (20%), conference presentation (10%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Bacteriology

MICR711 W1 (24L-24T-0P-108-66H-30R-0F-0G-6A-13W-16C)
Aim: To train students to critically evaluate recent peer-reviewed publications in Bacterio logy.

Content: Topics pertinent to the ever expanding field of Bacteriology.

Assessment: Test (25%), performance in tutorials (15%), seminars (10%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Mycology

MICR712 W1 (24L-24T-0P-10S-66H-30R-0F-0G-6A-13W-16C)
Aim: To train students to critically evaluate recent peer-reviewed publications in Mycology .

Content: Topics pertinent to latest developments in Mycology.

Assessment: Test (25%), performance in tutorials (15%), seminars (10%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Molecular Genetics

MICR713 W2 (241-24T-0P-10S-66H-30R-0F-0G-6A-13W-16C)
Aim: To train students to critically evaluate recent peer-reviewed publications in Molecula r Genetics.

Content: Coverage of current publications in molecular genetics.

Assessment: Test (25%), performance in tutorials (15%), seminars (10%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Biotechnology

MICR719 W2 (24L.-24T-0P-10S-68H-30R-0F-0G-4A-13W-16C)
Aim: To train students to critically evaluate recent peer-reviewed publications in Biotechn ology.

Content: Advances in biotechnology principles and biotechnological applications.

Assessment: Test (25%), performance in tutorials (15%), seminars (10%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Microbiology Research Skills

MICR721 P1 (5L-5T-80P-0S-50H-0R-0F-10G-10A-13W-16C)
Aim: To introduce students to a laboratory research environment and to provide skills for p lanning, implementing,
analysing and interpreting research in Microbiology.

Content: Good laboratory practice. Experimental design, Selection and evaluation of researc h methods. Hands-on
exposure to a range of standard and sophisticated techniques pertinent to the discipline of Microbiology. Qualitative
and quantitative analysis, and, interpretation of experimental data.

Practicals: Mini-projects, workshops.

Assessment: Assignments and (1h) oral presentation (100%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Fermentation Microbiology

MICR722 P2 (29L-10T-24P-2S-65H-15R-0F-10G-5A-13W-16C)
Aim: To provide the skills required in establishing and maintaining an industrial microbiological process.

Content: Screening and selection procedures for strain improvement. Scale-up; maintenance of sterility and foam control. Bioreactor design - production methods; batch, fed-batch and continuous culture processes. Immobilisation of whole cells. Selection, preparation and pre-treatment of feedstocks. Product recovery, downstream processing and waste treatment.

Practicals: Field trips to facilities employing biotechnological processes.

Assessment: Performance in tests, tutorials, assignments & presentations (40%), 3 h exam (60%).

DP Requirement: mark of 40%, attendance at 80% of lectures and tutorials, and 100% attendance of field trips.

Environmental Biotechnology

MICR723 P2 (OL-36T-0P-2S-84H-20R-0F-15G-3A-13W-16C)
Aim: To introduce advanced aspects of environmental biotechnology. To expose students to the application: of microbial processes in addressing environmental issues such as pollution, waste-treatment and energy generation.
Content: Selected topics highlighting current advances, analytical techniques and applications in the field of environmental biotechnology. These topics may change from year to year. Examples include: type sources of pollutants; microbial responses to anthropogenic stress; anaerobic digestion; biofuels; biosorption; biofiltration; bioleaching; bioremediation (in situ and ex situ); composting; phytoremediation; solid waste treatment; and, wastewater treatment.

Assessment: Assignments and presentations (40%), 1 h oral exam (60%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Advanced Environmental Microbiology .

MICR724 P2 (OL-36T-0P-2S-84H-20R-0F-15G-3A-13W-16C)
Aim: To introduce advanced aspects of environmental microbiology and microbial ecology.

Content: Selected topics highlighting current advances and the latest developments in environmental microbiology and microbial ecology. These topics may change from year to year. Examples include: phylogenetically based methods in microbial ecology; biodiversity mining and metagenomics; biogeochemical cycling and microbial role in biodeterioration and biodegradation processes; microbial biocatalysis; microbial biofilms; microbial interactions with plants, animals and other microbes.

Assessment: Assignments and presentations (40%), 3 h exam (60%).

DP Requirement: DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Nutrition

Offered in the School of Agricultural Sciences & Agribusiness

Introductory Nutrition & Community Resources

NUTR114 P1 (39L-10T-18P-0S-62H-25R-0F-0G-6A-13W-16C)
Aim: To enable students to develop an understanding of: the link between health and nutrition, various factors affecting eating behaviour, what causes malnutrition, the guidelines for healthy eating, and food purchasing & food safety issues.

Content: Introduction to nutrition; nutrients (overview); factors affecting eating behaviour; public health nutrition; planning a healthy diet; procuring and using food.

Practicals: Referencing, plagiarism and nutrition topics related to the module content.

Assessment: Assignment/practical and test for each section of the module (33%), 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Human Nutrition 1: Lifecycle & Macronutrients

NUTR124 P2 (39L-10T-24P-0S-62H-20R-0F-0G-5A-13W-16C)
Prerequisite Requirement: At least 40% in BIOL101, CHEM110 and NUTR114.

Corequisite: CHEM120.

Aim: To give an understanding of nutrition in the lifecycle, energy and macronutrients and the roles of Dieticians & Nutritionists.

Content: Energy; protein; carbohydrate; fibre; fats; alcohol; pregnancy & lactation; nutrition during infancy, childhood, adolescence & aging; human development; skills, capabilities & job opportunities for the Dietician and Nutritionist.
Practicals: Nutrition websites. Pregnancy: Plan diet/advise. HIV & breastfeeding: Counselling plan Assess & plan diet for child with PEM. Vegetarianism. Food Composition Tables & Exchanges: analyse diets & compare methods.
Assessment: 2 tests (20%), prac/assignments (13%), 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Micronutrients, Nutritional Assessment,SA

NUTR224 P1 (39L-10T-33P-0S-53H-20R-0F-0G-5A-13W-16C)
Prerequisite Modules: NUTR114, NUTR124.

Corequisite: BIOC201, MPHY200.

Aim: To provide an understanding of micronutrients, assessment of nutritional status, the nutrition situation in South Africa and a brief introduction to research.

Content: Fat & water soluble vitamins. Water. Minerals. Nutritional Assessment. Nutrition status of South Africans, with introduction to concepts & importance of research. Case studies.

Practicals: Introduction to academic writing, critical evaluation of micronutrient supplement, case studies, assessment of micronutrient intake, seminar writing, oral presentations, taking anthropometric measurements.

Assessment: 2 tests (20%), pracs/assignments (13%), 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Nutrition & Communication

NUTR342 P2 (89L-0T-39P-08-62H-15R-0F-0G-5A-13W-16C)
Prerequisite Modules: NUTR224.

Aim: To equip students to plan, conduct and evaluate effective nutrition education programmes.

Content: What is nutrition and nutrition education? Why educate in food and nutrition? Learning and influences on the learning process; Defining needs; Setting goals and objectives; Defining the destination; The communicator/educator? Selecting the code and formats; Using teaching aids; Programme evaluation; Communication problems; Adult education.

Practicals: Visual and hands-on participation in exercises and preparation for a nutrition education episode.
Assessment: Assignments (23%), Tests (10%), 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Community Nutrition Level3

NUTR343 P1 (39L-0T-39P-0S-53H-20R-5F-0G-4A-13W-16C)
Prerequisite Modules: NUTR224.

Aim: To gain an understanding of nutrition security in South Africa, & intemationally, & initiatives to improve nutrition security.

Content: World & SA nutrition situation; Epidemiological concepts, methods & applications to nutrition; Policies & programmes to improve nutrition; Making policy; Nutrition & Human Rights; Advocacy; The INP; Assessment of communities; Principles of & establishing successful nutrition programmes; Health services in SA; Child survival programmes; Social grants.

Practicals: Causes of malnutrition in SA; KZN Profile; Nutrition strategy for SA; Community assessment; Community project visit; Human Rights; Nutrition advocacy; Local NGOs; Infant feeding (HIV).

Assessment: Test, essay, workbook (33%), 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Applied Nutrition Science

NUTR350 P2 (89L-0T-9P-0S-85H-14R-10F-0G-3A-13W-16C)
Prerequisite Modules: NUTR224.

Aim: This module gives students an understanding of the scientific basis of nutrient requirements, the use of epidemiology to prioritise nutrition related problems, to determine their causes and to evaluate the effectiveness of specific nutrition interventions.

Content: Scientific basis of nutritional requirements; Nutritional assessment and nutritional surveillance; Basic epidemiological concepts and methods; Prevalence, causes, consequences and prioritisation of nutrition related problems of public health significance. Specific nutrition and other interventions. Sources of data. Community involvement in nutrition security.

Practicals: Case studies and field trips.

Assessment: Tests (10%), assignments (23%); 3 h exam (67%).

DP Requirement: 40% Class mark, 80% attendance at practicals.

Community Nutrition Internship

NUTR711 PY (70L-0T-6P-7S-59H-15R-319F-0G-4A-26W-48C)
Prerequisite Requirement: BScDiet or BScHuman Nutrition Degree.

Aim: To enable students to gain practical experience of community nutrition interventions.

Content: Revision; Growth monitoring; lactation management. Daily reports. Group activity, making educational material. Selected area of interest for individual report & book review. Group report (with individual components).
Literature review.

Practicals: Students work in antenatal clinic, postnatal/maternity ward, well baby clinic, paediatric outpatients, medical outpatients & HIV clinic.

Assessment: Minimum of 75% for MC questionnaire prior to practice placement (0%). Professional evaluation & task assessment (14%, submin 50%), written reports (15%), literature review (2%), oral exam (2%); 3 h exam (67%, submin 40%).

DP Requirement: 40% Class mark.

Year-long Module.

Com Nutrition Case Study Level 7

NUTR730 P2 (2L-8T-0P-33-67H-0R-0F-0G-0A-13W-8C)
Prerequisite Modules: NUTR343.

Aim: To enable students to carry out a nutritional situational analysis and propose suitable interventions in the community, with reference to the literature. The student should also propose the methods of evaluating the intervention.

Content: Exact content will depend on community selected.

Practicals: Case study.

Assessment: Case study report (100%).

DP Requirement: Not applicable.

Research Project in Nutrition

NUTR741 PY (10L-6T-0P-0S-304H-0R-0F-0G-0A-7W-32C)
Prerequisite Requirement: BScDiet Degree or BScHuman Nutrition Degree.

Aim: This module enables students to plan, implement, analyse and write up a relevant research project as part of a research group.

Content: A research question in the area of nutrition and dietetics as agreed with the research supervisor.
Practicals: Project related.

Assessment: Research project report (80%), group participation (peer assessment) (5%), research proposal (10%), oral presentation (5%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Physics

Offered in the School of Physics

Foundation Physics

PHYS099 PY WY (30L-9T-99P-0S-66H-33R-0F-0G-3A-26W-24F C-0DC)
Corequisite: BIOL099, CHEM099, MATHO099, (SCOMO03 or 013).

Aim: To provide students from disadvantaged educational backgrounds with scientific reasoning, problem solving skills, and laboratory skills in Physics to enable them to pursue a BSc degree.

Content: Experimental investigations of properties of matter; Scalars and vectors; Electrostatics and current electricity; Graphs and equations of motion; Newton's laws of motion and gravitation; a Research topic and an Elective. i

Practicals: Experimental techniques and investigations.

Assessment: Class mark (50%), 3 h Final Exam (50%).

DP Requirement: 40% Class mark, plus 80% attendance at all lectures, practicals, and tutorials.

Year long module. This module is only for students in the Science Foundation Programme and carries 24 Foundational credits only.

Mechanics, Optics and Thermal Physics

PHYS110 P1 W1 (39L-9T-36P-0S-52H-18R-0F-0G-6A-13W-16C)
Corequisite: MATH130.

Aim: Introduction to mechanics, geometrical optics, and thermal physics.

Content: Mechanics: fundamental units, vectors, scalars, kinematics, particle dynamics, gravitation, work, energy, momentum, equilibrium of rigid bodies, rotational motion, angular momentum, hydrostatics, elastic properties of materials, simple harmonic motion. Geometrical Optics: reflection, refraction, thin lenses, mirrors, prisms, optical instruments. Thermal Physics: temperature, heat, calorimetry, thermal expansion, conduction, radiation, ideal gases, thermodynamics.

Assessment: Class Tests (24%), practical reports (6%), practical test (10%); 3 h theory exam (60%).

DP Requirement: Class mark 40%, 100% attendance at tests , 80% attendance at lectures, tutorials and practicals
Credit may not be obtained for both PHYS110 and PHYS195.

Electromagnetism, Waves and Modern Physics

PHYS120 P2 W2 (39L-9T-36P-0S-55H-15R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in PHYS110 or 60% in PHYS131.

Corequisite: MATH140.

Aim: Introduction to electromagnetism, waves, physical optics and modern physics.

Content: Electricity and Magnetism: charge, Coulomb's law, electric field, Gauss' law, electric potential, capacitance,

resistance, Ohm’s law, dc circuits, Kirchhoff’s rules, ammeters, voltmeters, Ampere’s law, Faraday’s law, inductance.
Waves: transverse, longitudinal, travelling, standing, beats, Doppler effect. Physical Optics: interference, diffraction, polarisation. Modem physics: photoelectric effect, Bohr model of hydrogen atom, nucleus, radiation, elementary particles, aspects of astronomy and cosmology.

Assessment: Class Tests (24%), practical reports (6%), practical test (10%); 3 h theory exam (60%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals
Credit may not be obtained for both PHYS120 and PHYS196.

Intro Physics for Life Sciences & Agriculture

PHYS131 P1 W1 (39L-9T-36P-0S-56H-15R-0F-0G-5A-13W-16C)
Aim: To introduce basic concepts in mechanics, geometrical optics, and thermal physics.

Content: Mechanics: fundamental units, vectors, scalars, kinematics, particle dynamics, gravitation, work, energy,
momentum, simple harmonic motion, equilibrium of rigid bodies, wave fundamentals, rotational motion, angular
momentum, hydrostatics, elastic properties of materials, surface tension. Geometrical Optics: reflection, refraction,
thin lenses, mirrors, prisms, optical instruments, the eye. Thermal Physics: temperature, heat, calorimetry, thermal
expansion, conduction, radiation, ideal gases, thermodynamics.

Assessment: Tests (25%), practical reports (5%), 3 h exam (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.
Note: For the purposes of serving as prerequisite for other modules, a result of 60% or more will be regarded
as equivalent to PHYS110.

Electromagnetism & Modern Phys for Life Sc

PHYS132 W2 (39L-9T-36P-0S-56H-15R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 40% in PHYS131 or PHYS110.

Aim: To introduce the basic concepts of electricity, magnetism, physical optics and modemn physics.

Content: Electricity and Magnetism: charge, Coulomb’s law, electric field, Gauss’ law, electric potential, capacitance,
resistance, Ohm’s law, dc circuits, Kirchhoff’s rules, ammeters, voltmeters, AmpÃ©re’s law, Faraday’s law, inductance.
Waves: transverse, longitudinal, travelling, standing, beats, Doppler effect. Physical Optics: interference, diffraction,
polarisation. Modem physics: photoelectric effect, Bohr model of hydrogen atom, nucleus, radiation, elementary
particles, aspects of astronomy and cosmology.

Assessment: Tests (25%), practical reports (5%), 3 h exam (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.
Note: For the purposes of serving as prerequisite for other modules, a result of 60% or more will be regarded
as equivalent to PHYS120.

Modern Physics for Life Sciences & Agric

PHYS133 P2 (18L-9T-18P-0S-15H-15R-0F-0G-5A-13W-8C)
Prerequisite Requirement: 40% in PHYS131 or PHYS110.

Aim: To provide an introduction to Modem Physics, presented in an applied and practical manner with an emphasis
on problem solving.

Content: Electricity and Magnetism: Charge, Coulomb’s law, electric field, electric potential. Current, emf, dc circuits.
Magnetic fields and forces, ac waveforms and devices. Physical Optics: Interference and diffraction of light,
polarisation. Modern physics: The nucleus, nuclear reaction equations, isotopes. Radioactivity, decay law and half
lives. Biological effects of radiation, handling of radioactive sources.

Assessment: Class tests (24%), practical reports (6%), practical test (20%)3 h theory exam (60%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.

Physics for Optometry

PHYS139 W1 (39L-9T-36P-0S-57H-15R-0F-0G-4A-13W-16C)
Aim: To introduce basic concepts in mechanics, geometrical optics, and physical optics.

Content: Mechanics: Scalars and vectors, 1-D kinematics, equilibrium and dynamics, 2-D kinematics, rotational motion, work, energy, power, momentum, simple harmonic motion, spring systems. Optics: Reflection and refraction of light, image production, lens maker's equation, defects of the eye, myopia, hypermetropia, wave optics, polarization, interference, diffraction, thin lenses, optical instruments.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 40% Class mark. Attendance at all tests; at least 80% attendance at lectures, tutorials and practicals.

Offered to students in the Faculty of Health Sciences only.

Engineering Physics 1A

PHYS151 H1 (39L-9T-36P-0S-51H-19R-0F-0G-6A-13W-16C)
Aim: Introduction to, and an ability to apply, mechanics, oscillations and thermal physics at an introductory level. This is a calculus-based module.

Content: Mechanics: Units, physical quantities and vectors, motion along a straight line, motion in two or three dimensions, Newton’s laws of motion, application of Newtonâ\200\231s laws, work and kinetic energy, momentum, impulse and coliisions, rotation of rigid bodies, dynamics of rotational motion, equilibrium and elasticity, gravitation, fluid mechanics. Oscillations and Waves: Periodic motion, mechanical waves, wave interference and normal modes, sound. Thermal physics: Temperature and heat, thermal properties of matter.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.
Offered to students in the Faculty of Engineering only.

Engineering Physics 1B

PHYS152 H2 (39L-9T-36P-0S-51H-19R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in PHYS151.

Aim: To gain understanding of, & ability to apply, thermodynamics, electricity & magnetism, geometrical optics & atomic physics at an introductory level. This is a calculus-based module.

Content: Thermal Physics: First & second laws of thermodynamics. Electricity & magnetism: Electric charge & electric field, Gauss’s law, electric potential, capacitance & dielectrics, current, resistance & electromotive force, direct-current circuits, magnetic field & magnetic forces, sources of magnetic field, electromagnetic induction, inductance & alternating current. Optics: The nature & propagation of light, geometric optics & optical instruments. Atomic Physics: Photons, electrons & atoms, atomic structure.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.
Offered to students in the Faculty of Engineering only.

Chemical Engineering Physics 1A

PHYS161 H1 P1 (20L-5T-18P-08-20H-12R-0F-0G-5A-13W-8C)
Aim: To gain understanding of, and ability to apply, mechanics at an introductory level. This is a calculus-based module.

Content: Mechanics: Units, physical quantities and vectors, motion along a straight line, motion ion two or three dimensions, Newtonâ\200\231s laws of motion, application of Newton’s laws, work and kinetic energy, momentum impulse and collisions, rotation of rigid bodies, dynamics of rotational motion, equilibrium, gravitation, fluid statics.

Assessment: Class mark (25%), 2 h exam (75%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutor

ials and practicals.
Offered to students in the Faculty of Engineering only.

Chemical Engineering Physics 1B

PHYS162 H2 P2 (39L-9T-36P-0S-51H-19R-0F-0G-6A-13W-16C)
Prerequisite Requirement: 40% in PHYS161.

Aim: To gain understanding of & ability to apply oscillations & waves, electricity & magnetism, & atomic & nuclear physics at an introductory level. A calculus-based module.

Content: Oscillations & Waves: Periodic motion, mechanical waves, wave interference & normal modes, sound, nature & propagation of light. Electricity & magnetism: Electric charge & electric field, Gauss's law, electric potential, capacitance & dielectrics, current, resistance & electromotive force, direct-current circuits, magnetic field & forces, sources of magnetic field, electromagnetic induction, inductance & altemating current. Atomic & Nuclear Physics: Photons, electrons & atoms, atomic structure, nuclear physics.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.
Offered to students in the Faculty of Engineering only.

Mech Optics & Thermal Physics (Augmented)

PHYS195 P1 W1 (72L-18T-72P-0S-56H-60R-0F-0G-12A-13W-16FC-13DC)
Corequisite: MATH195.

Aim: Introduction to mechanics, geometrical optics, and thermal physics.

Content: This module is only for students in the BSc4(Augmented). It covers the syllabus of PHYS110 but, in addition, includes a substantial amount of supplementary material and tuition designed for students who are under-prepared for university-level studies to @ maximum of 160 Hours.

Assessment: Class Tests (24%), practical reports (6%), practical test (10%); 3 h theory exam (60%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.
Credit may not be obtained for both PHYS195 and PHYS110. This module is worth 16 degree credits and 16 foundational credits.

Electromagnetic Waves & Mod Phys (Augmented)

PHYS196 P2 W2 (72L-18T-72P-0S-86H-60R-0F-0G-12A-13W-16FC-16DC)
Prerequisite Requirement: 40% in PHYS195; MATH133 or MATH195.

Corequisite: MATH196.

Aim: Introduction to electromagnetism, waves, physical optics and modem physics. This module is only for students in the Augmented Curriculum.

Content: This module is available only to students registered for BSc4(Augmented). It covers the syllabus of PHYS120 but, in addition, includes a substantial amount of supplementary material and tuition designed for students who are under-prepared for university-level studies to @ maximum of 160 hours.

Assessment: Class Tests (24%), practical reports (6%), practical test (10%); 3 h theory exam (60%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.
Credit may not be obtained for both PHYS196 and PHYS120. This module is worth 16 degree credits and 16 foundational credits.

Foundation Physics

PHYS199 PY WY (30L-9T-99P-0S-66H-33R-0F-0G-3A-26W-20FC-4DC)
Corequisite: BIOL199, CHEM199, MATH199, (SCOM103 or 113).

Aim: To provide students from disadvantaged educational backgrounds with scientific reasoning, problem solving skills, and laboratory skills in Physics to enable them to pursue a BSc degree.

Content: Experimental investigations of properties of matter; Scalars and vectors; Electrostatics and current electricity; Graphs and equations of motion; Newton’s laws of motion and gravitation; a research topic and an elective.
Practicals: Experimental techniques and investigations.

Assessment: Class mark (50%), 3 h Final Exam (50%).

DP Requirement: 40% Class mark, plus 80% attendance at all lectures, practicals, and tutorials.

Year long module. This module is only for students in the Foundation Stream of the BSc4. It carries 20 Foundational credits and 4 degree credits.

Mechanics and Modern Physics

PHYS201 W1 (39L-9T-36P-0S-56H-15R-0F-0G-5A-13W-16C)
Prerequisite Modules: PHYS110, 120; MATH130, 140.

Corequisite: PHYS231.

Aim: To introduce students to Mechanics, Classical Thermodynamics and Waves at the intermediate level.

Content: Newton's laws of motion and conservation laws; Damped and driven harmonic oscillator; Angular momentum, central forces, planetary motion, rotating frames. Lagrangian and Hamiltonian mechanics. Wave theory and waves in physical media; Zeroth, first and second laws of thermodynamics; entropy; thermodynamic potentials; nonequilibrium thermodynamics.

Assessment: Class mark (30%), 3 h exam (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.

Electromagnetism and Quantum Physics

PHYS204 W2 (39L-9T-36P-0S-56H-15R-0F-0G-5A-13W-16C)
Prerequisite Modules: MATH130, 140, PHYS110, 120.

Aim: To introduce students to electromagnetism and modern physics at an intermediate level.

Content: Electromagnetism, including Maxwell's equations in integral form. Elementary nuclear physics: Radioactivity and Nuclear reactions; Particle character of light, Planck's radiation formula, the photoelectric effect, the Compton effect, wave character of electrons; Bohr's model of the hydrogen atom; Special relativity. Basic properties of matter waves, wave packets, probability interpretation, uncertainty relations; Introduction to quantum theory: SchrÃ©dinger equation and applications; measurement.

Assessment: Class mark (30%), 3 h theory exam (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.

Mechanics & Modern Physics

PHYS211 P1 (36L-12T-36P-0S-40H-30R-0F-0G-6A-13W-16C)
Prerequisite Modules: PHYS110, 120, MATH130, 140.

Corequisite: PHYS231.

Aim: To introduce students to mechanics and modern physics at an intermediate level.

Content: Solution of dynamical problems. Energy, momentum, angular momentum of a system of particles. Harmonic oscillator. Special relativity. Black body radiation. Photoelectric effect. Bohr model. Compton effect. De Broglie hypothesis.

Assessment: Class mark (30%), 3 h theory exam (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.

Electromagnetism, Waves & Vibrations

PHYS212 P2 (36L-12T-36P-0S-40H-30R-0F-0G-6A-13W-16C)
Prerequisite Modules: MATH130, 140, PHYS110, 120.

Aim: To introduce students to electromagnetism, waves and vibrations at an intermediate level.

Content: Electromagnetism, including Maxwell's equations in integral form. DC and AC circuit theory. Wave theory and waves in physical media. Waves, driven vibrations and coupled oscillators.

Assessment: Class mark (30%), 3 h theory exam (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.

Theoretical & Computational Physics Methods

PHYS231 P1 W1 (36L-9T-36P-0S-56H-15R-0F-0G-5A-13W-16C)
Prerequisite Modules: PHYS110, 120, MATH130, 140.

Aim: To introduce students to concepts in the physics of fluids and fields, and use these t

o develop key theoretical
and computational skills needed for senior physics modules.

Content: Mathematical preliminaries; Elements of fluid dynamics and classical theory of fie
lds; computational
modelling of fluids and fields.

Assessment: Class Mark (30%); 3 h Theory Exam (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutor
ials and practicals.

Introductory Applied Physics

PHYS242 W2 (39L-9T-36P-0S-56H-15R-0F-0G-5A-13W-16C)
Prerequisite Requirement: 32C in MATH at Level 1.

Prerequisite Modules: PHYS110 or 131; PHYS120 or 132;

Aim: To introduce students to basic principles of applied physics, with emphasis on instrum
entation, medical physics
and energy sources.

Content: Elementary semiconductor physics, diode and transistor circuits and digital electr
onics. Concepts in
radiation physics, including coherent light sources, gamma ray, x-rays and ultrasonic waves
. Energy sources and
storage, including nuclear and renewable energy sources.

Practicals: A large section of the module is practical based.

Assessment: Class mark 30%, 3 h theory exam (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutor
ials and practicals.

Optics & Wave Motion

PHYS251 H1 (20L-3T-12P-0S-26H-16R-0F-0G-3A-13W-8C)
Prerequisite Requirement: 40% in PHYS152.

Prerequisite Modules; PHYS151.

Aim: Knowledge and understanding of, and an ability to apply, optics and wave motion at an intermediate level.
Content: Wave Equation, radiation, geometric optics, interaction of light and matter, polarisation, interference,
diffraction, topics from contemporary optics.

Assessment: Class mark (25%); 2 h exam (75%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.
Offered to students in the Faculty of Engineering only.

Electromagnetism and Solid State Physics

PHYS305 P2 W2 (39L-9T-0P-0S-90H-16R-0F-0G-6A-13W-16C)
Prerequisite Modules: (PHYS210, 204) or (PHYS211, 212).

Aim: To introduce basics of Electromagnetism & Solid State Physics.

Content: Gauss', Stokes' theorems, electric charge, current, continuity equation, Maxwell's egns, conductivity,
Poissonâ\200\231s & Laplaceâ\200\231s eqgns, uniqueness theorem, images, multipole expansion, electric dipoles, dielectric materials,
vector potential, magnetic dipoles, electromagnetic waves, Poyntingâ\200\231s theorem. Bonding in solids; Bravais Lattices,
unit cells, lattice directions, Miller indices; the reciprocal lattice, Brillouin zones; lattice vibrations, phonons, Einstein &
Debye Models, lattice specific heat acoustic & optic modes; Bragg, Von Laue & X-ray diffraction; free electron Fermi
gas, energy bands.

Assessment: Class mark (30%), Two 2 h theory exams (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.

Quantum Mechanics and Statistical Physics

PHYS306 P1 W1 (39L-9T-0P-0S-92H-15R-0F-0G-5A-13W-16C)
Prerequisite Modules: (PHYS201 & 204) or (PHYS211 & 212).

Aim: To introduce basic ideas in Quantum Mechanics, Statistical Physics & Thermodynamics.

Content: Wave functions, Schrodinger's equation, observables & operators, hermiticity, commutation relations,
uncertainty. Hydrogen & many-electron atoms, central field approximation, configurations. Thermal & Statistical
Physics: macroscopic vs. microscopic physics; zeroth, 1st, 2nd & 3rd laws; reversible & irreversible processes;
thermodynamic cycles; accessible states, entropy; ensembles; partition functions, thermodynamic potentials, relations,
Maxwell, Fermi-Dirac & Bose-Einstein distributions, Doppler broadening, quantum statistics, black-body radiation.
Assessment: Class mark (30%), Two 2 h theory exams (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.

Optics and Experimental Physics

PHYS331 W1 (18L-6T-72P-0S-45H-16R-0F-0G-3A-13W-16C)
Prerequisite Modules: (PHYS201 & 204) or (PHYS211 & 212).

Aim: To introduce concepts in classical & quantum optics and develop skills in experimental physics.

Content: Elements of electromagnetic theory, geometrical optics, elements of the theory of interference, elements of the theory of diffraction, coherent light, modem optics (e.g. lasers). Field quantization, coherent states, emission & absorption of radiation by atoms, beam splitters and interferometers, nonclassical light, optical tests of quantum mechanics, cavity QED, decoherence, entanglement, elements of quantum information processing.

Practicals: A range of experiments & use of experimental equipment & techniques will be covered.

Assessment: Class mark (15%), practical reports (50%), 2 h theory exam (35%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.

Nuclear and Particle Physics

PHYS332 W2 (18L-6T-72P-0S-45H-16R-0F-0G-3A-13W-16C)
Prerequisite Modules: (PHYS201 & 204) or (PHYS211 & 212).

Aim: To study concepts in Nuclear and Particle Physics and to develop further skills in exp erimental physics.
Content: General Properties of Nuclei; Nuclear Models; Decay of unstable nuclei; Nuclear re actions; nucleosynthesis;
Sub-nuclear particle physics; the quark model.

Practicals: A range of experiments and the use of experimental equipment and techniques wil l be covered in two 3 h
laboratory sessions per week.

Assessment: Class mark (15%), practical reports (50%), one 2 h theory exam (35%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutor ials and practicals.

Instrumentation and Signal Processing

PHYS343 W1 (39L-9T-36P-0S-56H-15R-0F-0G-5A-13W-16C)
Prerequisite Modules: PHYS242.

Aim: Introduce students to techniques of instrumentation, data processing and measurements.

Content: Instrumentation electronics, including operational amplifiers, passive and active filters, and A/D and D/A
converters. Elementary signal processing, measurement sensors and measurement techniques.

Assessment: Class mark (30%); 3h exam (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutor ials and practicals.

Applied Radiation Technologies & Techniques

PHYS344 W2 (39L-9T-36P-0S-56H-15R-0F-0G-5A-13W-16C)
Prerequisite Modules: PHYS242 or PHYS204.

Aim: Introduce students to the theory and practice of applied nuclear science, medical phys ics and remote sensing
techniques.

Content: Measurement of nuclear radiation, theory and operation of nuclear reactors, with e mphasis on pebble bed
reactors. Theory and operation of NMR, ultrasonics and other tomographic techniques in medi cal physics. Electron
microscopy and micro probe techniques. Theory and practice of remote sensing techniques inc luding but not limited to
Radar and Lidar.

Assessment: Class mark (30%); 3h exam (70%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutor ials and practicals.

Classical Mechanics & Atomic Spectroscopy

PHYS351 P1 (19L-9T-36P-0S-77H-15R-0F-0G-4A-13W-16C)
Prerequisite Modules: (PHYS201 & 204) or (PHYS211 & 212).

Aim: To introduce the basics of Lagrangian & Hamiltonian mechanics and use quantum-mechanic al theory of the spectra of many-electron atoms.

Content: Lagrangian Mechanics - Holonomic constraints, generalized coordinates, D'Alembert's Principle, Lagrange's eqns; variational principles; cyclic coordinates, conservation theorems, Noether's theorem. Hamiltonian Mechanics - Legendre transformations; Hamilton egns of motion and in symplectic form. Atomic Spectroscopy: Electronic configurations, Pauli's exclusion principle. Perturbation theory, terms, levels, Hund's rules, energy-level diagrams, selection rules, Zeeman effect.

Practicals: Suitable for the above.

Assessment: Class mark (15%), practical reports (50%), one 2 h theory exam (35%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.

Topics in Modern Physics

PHYS352 P2 (19L-9T-36P-0S-77H-15R-0F-0G-4A-13W-16C)
Prerequisite Modules: (PHYS201 & 204) or (PHYS211 & 212).

Aim: To introduce students to concepts in a range of current modem physics aspects, including cosmology, astrophysics, particle physics, etc.

Content: Content drawn from cosmology, astrophysics, particle physics and nuclear physics.

Practicals: A range of experiments and the use of experimental equipment and techniques will be covered in the laboratory sessions.

Assessment: Class mark (15%), practical reports (50%), one 2 h theory exam (35%).

DP Requirement: Class mark 40%, 100% attendance at tests, 80% attendance at lectures, tutorials and practicals.

Classical Field Theory

PHYS701 WC (36L-0T-0P-0S-77H-41R-0F-0G-6A-13W-16C)
Aim: Study of classical field theory.

Content: Mathematical tools; electrodynamics; special relativity; elements of general relativity; introduction to numerical methods for electrodynamics.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Quantum Mechanics

PHYS702 WC (36L-0T-0P-0S-77H-41R-0F-0G-6A-13W-16C)
Aim: Study of quantum mechanics.

Content: Foundations of quantum mechanics; quantum phenomena; measurement and evolution; selected applications and quantum technology; numerical methods of quantum mechanics.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Statistical Physics & Classical Mechanics

PHYS703 WC (36L-0T-0P-0S-77H-41R-0F-0G-6A-13W-16C)
Aim: Study of statistical physics and classical mechanics.

Content: Statistical Physics: Mathematical tools; general concepts; ergodic theory; equilibrium statistical mechanics; non-equilibrium statistical physics; open quantum systems. Classical Mechanics: Lagrangrian mechanics; symplectic mechanics; qualitative mechanics; Monte Carlo methods.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Pure Physics Project

PHYS704 WC (OL-0T-0P-6S-154H-0R-0F-0G-0A-13W-16C)
Aim: To provide an introduction to research methods in experimental, theoretical or computational physics, and to
develop communication skills through preparation of a written report and presentation of a seminar.

Content: Theoretical, experimental or computational project. Might include field work or placement.

Assessment: Evaluation of submitted report and/or seminar presentation.

DP Requirement: Not applicable.

Offered in either Semester 1 or Semester 2. This module has no supplementary exam.

Electronics and Microprocessors

PHYS707 WC (36L-0T-0P-0S-77H-41R-0F-0G-6A-13W-16C)
Aim: Study of electronics and microprocessors.

Content: Fundamentals of electronics. Design and implementation of microprocessor-based instrumentation for control, and analog/digital acquisition with industrial applications.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Instruments, Measurement & Signal Processing

PHYS708 WC (36L-0T-0P-0S-77H-41R-0F-0G-6A-13W-16C)
Aim: Study of instrumentation, measurement, data and signal processing.

Content: The operation and use of specialized scientific instrumentation â\200\230including, but not limited to, magnetic resonance imaging, A/D converter, lock-in amplifier, box-car integrator, gamma and optical spectrometers, scanning electron microscope. Analogue and digital signal concepts, convolution and correlation analysis, spectral estimation and analysis, time and frequency domain filtering, application of mathematical transforms.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Applied Physics Project

PHYS709 WY (OL-0T-0P-6S-314H-0R-0F-0G-0A-26W-32C)
Aim: To provide an introduction to research methods in applied physics, and to develop scientific communication skills through preparation of a written report and presentation of a seminar.

Content: A research project is undertaken, which may be in collaboration with an external partner. Might include field work or placement.

Assessment: Evaluation of submitted report/dissertation and/or seminar presentation.

DP Requirement: Not applicable.

Year-Long module. This module has no supplementary exam.

Quantum Mechanics & Electrodynamics

PHYS711 P1 (60L-21T-0P-0S-133H-100R-0F-0G-6A-13W-32C)
Prerequisite Modules: PHYS305, 306, 351, 352.

Aim: To consolidate and extend 3rd-year concepts of quantum mechanics and electrodynamics.

Content: Abstract vectors, operations, parity, displacement operators for position and momentum, coordinate representation, time evolution, Hellmann-Feynman, virial and hypervirial theorems, shift operators, oscillator angular momentum, H atom, nondegenerate, degenerate, time-dependent perturbation theories. Review of Maxwell’s equations, advanced applications thereof. Electromagnetic potentials and gauge. Relativisti

c field transformations.
Practicals: None within this module, but project work may stem from it.

Assessment: Class mark (20%), two 3 h exams (80%).

DP Requirement: 80% attendance.

Laser Physics and Nonlinear Optics

PHYS720 WC (18L-5T-0P-0S-36H-18R-0F-0G-3A-13W-8C)
Aim: To introduce the physics and properties of laser radiation and its nonlinear effects in solids and gases.

Content: Review of quantum properties of light, radiative transitions and emission linewidth, absorption and stimulated emission, lasers amplifiers and resonators. Study of specific laser systems. Theory of non-linear optical processes.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests. 80% attendance at lectures.

Offered in either Semester 1 or 2.

Special Topics in Physics |

PHYS721 P1 (36L-0T-0P-0S-77H-41R-0F-0G-6A-13W-16C)
Prerequisite Modules: PHYS311, 321, 312, 322.

Aim: To introduce the Honours student to a number of specialist topics in Physics to suit the career directions and interests of students. Students may also go outside the Physics discipline to select material with equivalent credit, subject to the approval of the Academic Coordinator. A total of 16C is elected.

Content: Topics include: Advanced symbolic programming, Cosmology. Galaxies and galactic structure, Group theory, Particle physics, Molecular spectroscopy, Polarization optics, Relativity, Field theory, and other material subject to available expertise.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Physics Project |

PHYS731 P1 (OL-0T-72P-6S-82H-0R-0F-0G-0A-13W-16C)
Prerequisite Modules: PHYS305, 306, 351, 352.

Aim: To provide an introduction to research methods in experimental, theoretical and computational Physics. Projects will also be used to promote writing and verbal skills through preparation of written reports and presentation of a seminar.

Content: Variable, but in the general fields of experimental, theoretical and computational physics. Topics or problems will be on offer from lecturers, who will supervise the projects, giving guidance and assistance as within a normal research programme.

Practicals: Each project will contain a large experimental and/or computational component.

Assessment: This will be based on the project report and a verbal presentation (100%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Physics Project Il

PHYS732 P2 (0L-0T-72P-6S-82H-0R-0F-0G-0A-13W-16C)
Prerequisite Modules: PHYS305, 306, 351, 352.

Aim: To provide an introduction to research methods in experimental, theoretical and computational Physics. Projects will also be used to promote writing and verbal skills through preparation of written reports and presentation of a seminar.

Content: Variable, but in the general fields of experimental, theoretical and computational physics. Topics or problems will be on offer from lecturers, who will supervise the projects, giving guidance and assistance as within a normal research programme.

Practicals: Each project will contain a large experimental and/or computational component.

Assessment: This will be based on the project report and a verbal presentation (100%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Statistical Physics and Superfluidity

PHYS742 P2 (36L-0T-0P-0S-77H-41R-0F-0G-6A-13W-16C)
Aim: To teach the theory and applications of intermediate level statistical physics.

Content: Grand canonical ensemble. Fluctuations, thermodynamic limit. Quantum statistics; t
he ideal fermion and
boson gases, the photon gas. Properties of superfluids.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Special Topics in Physics II

PHYS752 P2 (60L-24T-0P-3S-140H-90R-0F-0G-3A-13W-32C)
Aim: Special Topics Il (and its counterpart Special Topics | in the first Semester) serve to introduce the Honours student to a number of specialist topics in Physics to suit the career directions and interests of students. Students may also go outside the Physics discipline to select material with equivalent credit, subject to the approval of the Academic Coordinator. A total of 32C is elected.

Content: See PHYS721, Special Topics | for a list of present options, plus Solid State Physics offered in Semester 2.
Practicals: Topics may form the basis for projects in the Project modules.

Assessment: Project work &/or formal exam with a minimum Class mark of 20%.

DP Requirement: 80% attendance.

Additional Project 1 ;

PHYS760 WC (OL-0T-0P-38-77H-0R-0F-0G-0A-6W-8C)
Aim: Project in pure or applied physics.

Content: Theoretical, experimental or computational project.

Assessment: Evaluation of report, and/or seminar.

DP Requirement: Not applicable.

Offered in either Semester 1 or Semester 2. This module has no supplementary exam.

Additional Project 2

PHYS761 WC (0L-0T-0P-3S-77H-0R-0F-0G-0A-6W-8C)
Aim: Project in pure or applied physics.

Content: Theoretical, experimental or computational project.

Assessment: Evaluation of report and/or seminar.

DP Requirement: Not applicable.

Offered in either Semester 1 or Semester 2. This module has no supplementary exam.

Special Topics A

PHYS762 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: To introduce specialist topics in Physics.

Content: Topics include, but are not confined to: Chaos, Data Analysis, Electronics, Fluids, Foundations of QM, General Relativity, Magnetism, Mossbauer Spectroscopy, Open Quantum Systems, Particles, Advanced Plasmas, QM Apps, Special Relativity, Advanced Superconductivity, Transform Methods, and other material, subject to available expertise.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2. Note: Credit cannot be obtained for the same material studied in this module and in another module.

Special Topics B

PHYS763 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: To introduce specialist topics in Physics.

Content: See PHYS762 (Special Topics A) for a list of options.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2. Note: Credit cannot be obtained for material studied in this
module and in another module.

Computational Physics

PHYS766 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)

Qim: To give students an introduction to the power of computer simulation by solving problems often encountered in
hysics.

Content: Review of basic numerical methods and programming. Computational solution of partial differential

equations in physics. Computational analysis and visualisation of data in physics. Introduction to parallel computing

techniques for physics. Applications, depending on students' background and interests, such as: computational fluid

dynamics, plasma simulations, Monte Carlo methods for quantum systems.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Materials

PHYS768 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: Study of materials.

Content: Properties of materials: emphasis will be on one or more of the following: Magnetism and magnetic
properties of materials, mechanical properties of materials, electrical properties of materials, optical properties of
materials.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Mathematical Methods

PHYS769 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: To equip students with mathematical tools for theoretical physics.

Content: Complex Variables, Laplace transforms, Fourier Transforms, Delta Functions and Greenâ\200\231s Functions,
Geometrical Physics, Calculus of Variations, Light Cone Coordinates, Wilson's Loops, the Hamiltonian Methods
including Hamiltonian Constraints in LQG, Renormalization and Renormalization Group Equations, and Ashtekar
Variables.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Plasma Physics

PHYS771 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: To introduce the basic properties of space and laboratory plasmas and their single-par

ticle and collective
motions, with an emphasis on space plasmas.

Content: Occurrence of plasmas in nature with emphasis on properties of space plasmas; basi
c plasma parameters;
single particle motions; plasmas as fluids; waves in plasmas; diffusion and resistivity of plasmas; introduction to
plasma instabilities.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Solid State Physics

PHYS772 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: Study of solid state physics at an advanced level.

Content: Electrons in solids, beyond the free electron model, band structure, Fermi surface
s and measurement,
transport coefficients and scattering phenomena, Semiconductors and semiconductor propertie
s, preparation
techniques, semiconductor devices.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Space Physics

PHYS773 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: To introduce aspects of Space Physics.

Content: The Sun, solar wind, Earth's magnetosphere, plasmasphere and ionosphere. Particles in the Earth's magnetic field, the aurora.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Nuclear Physics

PHYS775 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: Study of Nuclear Physics. 4

Content: Nucleons, shell model, standard model.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Renewable Energy

PHYS782 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: To introduce alternative and renewable sources of energy.

Content: Basis of energy; social demand; different sources of energy (nuclear, fossil, biomass, renewable); environmental impact; modelling; solar parameters and measurement; energy conversion; storage; photovoltaic; wind and ocean.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests, 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Atmospheric Physics

PHYS786 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: To introduce students to atmospheric physics and associated observational techniques.

Content: Atmospheric thermodynamics; atmospheric radiation; atmospheric fluid dynamics; atmospheric waves; atmospheric coupling; atmospheric optics; atmospheric modelling; atmospheric remote sensing.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests. 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Applied Quantum & Electrodynamics

PHYS787 WC (36L-0T-0P-0S-77H-41R-0F-0G-6A-13W-16C)
Aim: To introduce the applications of quantum physics and electrodynamics.

Content: Quantum: Solution of Schrodinger wave equation, propagation matrix, eigenstates and operators, harmonic oscillator and perturbation theory; numerical and analytical solutions to various physical quantities of interest in quantum electronics. Electrodynamics: EM waves, waveguides, microwave oscillators & amplifiers, antennae & radiation theory, measurement techniques.

Assessment: Class mark (25%), 3 h exam (75%).

DP Requirement: 100% attendance at tests. 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Quantum Optics & Quantum Information ;

PHYS788 WC (18L-0T-0P-0S-39H-20R-0F-0G-3A-13W-8C)
Aim: To introduce concepts of quantum optics and quantum information processing.

Content: Field quantization, coherent states, atom and field interactions, beam splitters and interferometers,
nonclassical light, optical test of quantum mechanics, cavity QED, decoherence and entanglement. Basic concepts of
quantum information processing, quantum circuits, quantum Fourier transforms and applications, quantum search
algorithms, quantum computers, quantum noise and error correction, quantum cryptography.

Assessment: Class mark (25%), 1.5 h exam (75%).

DP Requirement: 100% attendance at tests. 80% attendance at lectures.

Offered in either Semester 1 or Semester 2.

Plant Breeding

FOR UNDERGRADUATE PROGRAMME IN PLANT BREEDING - See Rule SAg2 and
; Agricultural Plant Sciences

Offered in the School of Agricultural Sciences & Agribusiness

Topics in Advanced Plant Breeding

PLBR901 PY (384L.-100T-128P-0S-640H-0R-0F-0G-28A-52W-128C)
Aim: Provide ACCI students with understandings and skills relevant to PhD and to senior scientists in plant breeding.
Content: Elements of thesis; fund raising; project planning and proposal writing; budgeting and financial
administration; poster and conference paper presentations; applied plant breeding; research methodology; advanced
biometry for plant breeders; biotic and abiotic constraints on plant breeding; application of biotechnology to plant
breeding.

Practicals: Plant breeding methods and skills.

Assessment: Portfolio of completed tests, essays, practical assignments (50%); project proposal (30%); literature
review (20%).

DP Requirement: Not applicable.

Offered over Semester 1 and 2. Only for students in ACCI programme. This module has no supplementary
exam.

Plant Pathology

Offered in the School of Agricultural Sciences & Agribusiness

Fungi, Food and Phytopathogens

PPTH214 P2 (36L-0T-36P-6S-53H-23R-0F-0G-6A-13W-16C)
Prerequisite Modules: BIOL101 or BIMI120.

Aim: To introduce students to a basic understanding of fungi, bacteria, viruses and nematod es causing' plant diseases.

Content: An introduction to the structure, function and diversity of plant pathogenic organisms, epidemiology, diseases symptoms and methods of control. Symbiotic relationships, industrial applications and the role of fungi in human health.

Practicals: Hands-on experience in inoculation, germination, infection, isolation and other techniques for identifying fungal plant pathogens.

Assessment: 3 theory tests (8%); practicals (5%); literature survey (5%); seminar presentation (2%); disease collection (10%); 3 h exam (70%).

DP Requirement: Class mark of 40%, attendance at 80% of practicals.

Introductory Plant Virology

PPTH310 P2 (20L-0T-23P-6S-14H-13R-0F-0G-4A-13W-8C)
Prerequisite Modules: PPTH214.

Aim: Plant viruses cause significant losses to global agriculture. This module will give a background and understanding of plant viruses and their control.

Content: An introduction to virus diseases of plants, especially their epidemiology and control, and to plant pathogenic plants (phanerogams).

Practicals: An introduction to plant virus diseases in the laboratory and field.

Assessment: Class tests (10%), prac assignments (10%), literature review (40%), 2 h exam (40%).

DP Requirement: Class mark of 40%, attendance at 80% of practicals.

Plant Disease Epidemiology & Bacteriology

PPTH330 P1 i (40L-10T-40P-18S-24H-23R-0F-0G-5A-13W-16C)
Prerequisite Modules: PPTH214 or AGPS308.

Aim: This module introduces a mathematical background to disease progress, the genetics and biochemistry of disease resistance and an introduction to plant diseases caused by bacteria.

Content: An introduction to quantitative plant disease epidemiology, host-parasite interactions, the genetics of plant disease resistance and plant bacteriology.

Practicals: An applied project involved in the isolation and testing of a biocontrol agent.

Assessment: Tests (17%), bacteriology assignment (8%), prac project & assignments (9%), 3 h exam (66%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Fungi in Phytopathology - Advanced Mycology

PPTH713 P2 (OL-40T-0P-42S-45H-30R-0F-0G-3A-13W-16C)
Prerequisite Modules: PPTH310, 330 and AGPS308.

Aim: To introduce students to advanced, current and controversial topics in phytopathology with emphasis on the impact of fungi on agriculture and food production.

Content: An extensive reading course in advanced topics in plant phytopathology, including: advanced mycology, physiology, biochemistry, aerobiology, conidiogenesis, infection processes and host-parasite interactions; disease forecasting and modelling, a case study of a significant pathogen, the sociological impact of plant diseases, GMO's and food security prÃ©cis and present papers in mini-seminars.

Assessment: Assignments (17%), essays (17%), 3 h theory exam (66%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Advanced Topics in Virology

PPTH723 P1 (0L-40T-0P-42S-45H-30R-0F-0G-3A-13W-16C)
Prerequisite Modules: MICR305, PPTH310, 330.

Aim: To study a wide range of selected topics to fully understand the complex relationships between viruses, their hosts and vectors and to formulate disease control measures.

Content: An extensive reading course in advanced topics in plant phytopathology, and viral epidemiology including: taxonomy of viruses, infection processes, vectored diseases, virus helpers and viroids; significant plant viruses, virus control measures, GE virus resistance and the social impact of viruses; prÃ©cis and present papers in mini-seminars.
Assessment: Assignments (17%), essays (17%), 3 h exam (66%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Offered in Semester 1.

Advanced Plant Disease Epidemiology

PPTH730 P1 (0L-40T-0P-42S-43H-30R-0F-0G-5A-13W-16C)
Prerequisite Modules: PPTH310, 330.

Aim: A development of advanced concepts and practice in plant disease epidemiology.

Content: Discussion, review and practice of the theory and application of plant disease epidemiology in the form of seminars and laboratory tutorials.

Practicals: An applied project involved in the isolation and testing of a biocontrol agent.

Assessment: Class tests (17%), essays (17%), 3 h exam (66%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials.

Offered in Semester 1.

Field Plant Pathology

PPTH745 P1 (0L-12T-132P-12S-0H-4R-0F-0G-0A-13W-16C)
Aim: Experiential learing of applied plant pathology provided by farm visits to diseased crops.

Content: Weekly visits to farms, nurseries and other sites of plant pathological interest, where applied disease diagnosis and control measures are developed.

Practicals: Field work and evaluations.

Assessment: Field prac reports (100%).

DP Requirement: Not applicable.

This module has no supplementary exam.

Plant Pathology Major Research Project

PPTH750 PY (OL-40T-0P-40S-400H-0R-0F-0G-0A-26W-48C)
Aim: To teach scientific research methods in plant pathology.

Content: An extended research project on a plant pathological topic, to give the student experiential learning of the application of the scientific process in plant pathology.

Practicals: The project will require detailed design, implementation and analysis of a series of experiments for an overall project, at a significant depth.

Assessment: Project report (70%), research paper taken from the report (15%), conference presentation of results (15%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Plant Pathology Literature Review

PPTH785 P1 (OL-8T-0P-72S-0H-0R-0F-0G-0A-13W-8C)
Corequisite: PPTH750 or 790.

Aim: To develop skills in the accessing and synthesis of scientific literature in plant pathology.

Content: A detailed literature review on a plant pathology topic, using all accessible forms of technical information.
Practicals: Use of library resources, interlibrary loans, abstracting services, computer databases, the Internet, etc. to access information on the chosen subject. Collation and synthesis of the information into a coherent review correct technical writing. Formal presentation of the review in a seminar.

Assessment: Literature review (75%), seminar presentation (25%).

DP Requirement: Not applicable.

Offered in Semester 1. This module has no supplementary exam.

Plant Pathology Research Project

PPTH790 PY (OL-40T-0P-40S-240H-0R-0F-0G-0A-26W-32C)
Aim: To teach scientific research methods in plant pathology.

Content: A research project on a plant pathological topic, to give the student experiential leaming of the application of the scientific process in plant pathology.

Practicals: The project will require detailed design, implementation and analysis of a series of experiments for an overall project.

Assessment: Project report (70%), research paper taken from the report (15%), conference presentation of results (15%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Protected Area Management

Offered in the School of Environmental Sciences

Foundations of Protected Area Management

PAMT811 P1 (OL-0T-12P-0S-148H-0R-0F-0G-0A-11W-16C)
Prerequisite Requirement: Acceptance into the MEnvDev, Protected Area Management stream.

Aim: To present the underlying concepts & frameworks of protected area management & highlight the emerging trend
that seeks to integrate conservation & human development.

Content: Concepts & definitions of conservation and sustainable development; conventions & congresses that have
steered this thinking. Historical perspectives of protected areas. IUCN and other categories of protected areas,
evaluation of category systems; World Heritage sites, biosphere reserves; conservancies, buffer zones. Trans-frontier
protected areas; integrated conservation and development models of integration and their application.

Assessment: Reflective journal & position paper (30%); case study (40%); assignment (30%).

DP Requirement: Not applicable.

This module has no supplementary exam. In 2010 this module is available only to continuing students.

PAM Policy Foundations

PAMT812 P1 (OL-0T-6P-0S-74H-0R-0F-0G-0A-5W-8C)
Prerequisite Requirement: Acceptance into the MEnvDev, Protected Area Management stream.

Aim: To introduce models and legal/policy frameworks for integration and the real world barriers that challenge this
notion.

Content: The role and importance of the legislative context; Introduction to the rule of law; government and
governance; policy definitions and theories; policy cycle and public participation; legal framework for protected area
management ; international environmental law; protected areas as an aspect of international environmental law;
national regulation of protected areas.

Assessment: Reflective journal and position paper (30%); case study (40%); assignment (30%).

DP Requirement: Not applicable.

This module has no supplementary exam. In 2010 this module is available only to continuing students.

PAM Systems and Approaches

PAMT813 P2 (OL-0T-12P-0S-148H-0R-0F-0G-0A-11W-16C)
Prerequisite Requirement: Acceptance into the MEnvDeyv, Protected Area Management stream.

Aim: To address the fundamental core of protected area management, which covers organisational and human
resource management, financial and operational management.

Content: Legislation and policy framework protected area networks, systems, planning & management; effective

implementation of plans & adaptive management practices; elements of financial planning; park administrative & project management systems; key elements of a leadership to create a learning-environment, adaptable to change and wide ranging demands; introduction to surveys, monitoring, data analysis, presentation of statistics in research.
Assessment: Reflective journal and position paper (30%); case study (40%); assignment (30%).

DP Requirement: Not applicable.

This module has no supplementary exam. In 2010 this module is available only to continuing students.

PAM Tools & Skills for Participatory Mgnt

PAMT814 P2 (OL-0T-12P-0S-148H-0R-0F-0G-0A-11W-16C)
Prerequisite Requirement: Acceptance into the MEnvDev, Protected Area Management stream. (MEnvDev not MEnDev)

Aim: To equip students with the essential skills for working with people in the management of protected areas.
Content: Communication skills: listening, writing, presentation, negotiation and mediation; Proposal and report writing; awareness raising; Participatory techniques; collaborative and community-based management; conflict resolution and consensus building; marketing and customer care; role of policy and governance; leadership skills.

Assessment: Reflective journal and position paper (30%); case study (40%); assignment (30%).

DP Requirement: Not applicable.

This module has no supplementary exam. In 2010 this module is available only to continuing students.

PAM Wilderness

PAMT815 P2 (OL-0T-6P-0S-74H-0R-0F-0G-0A-5W-8C)
Prerequisite Requirement: Acceptance into the MEnvDev, Protected Area Management stream.

Aim: To teach scientific research methods in plant pathology.

Content: Wildemess concepts, philosophy and history; Wildemness definitions, legal aspects and protected area
category; wildemess ecosystem systems services, benefits and values; relevance of wildernes s in developed and
undeveloped countries; principles of wilderness planning; managing the wilderness resource; visitor management in
wilderness; global and regional perspectives of wilderness; wilderness education strategies ; challenges and way
forward for wilderness conservation.

Assessment: Reflective journal and position paper (30%); case study (40%); assignment (30%) .

DP Requirement: Not applicable. {

This module has no supplementary exam. In 2010 this module is available only to continuing students.

PAM Geographic Information Systems

PAMT817 P2 (OL-0T-6P-0S-50H-0R-0F-0G-24A-5W-8C)
Prerequisite Requirement: Acceptance into the MEnvDev, Protected Area Management stream.

Aim: To develop a working knowledge of GIS and its capabilities for use in protected area m anagement.

Content: Maps: scales, map reading, projections, topographic: and thematic maps relevant to protected area
management; desktop cartography. global positioning system (GPS): GPS in surveying; types o f GPS; WGS84
coordinates; UTM data; types of error; precision of equipment. Principles of data, data bas es. Principles of GIS: data
acquisition techniques; GIS analysis techniques. Exercises on the methods used in surveying , mapping and spatial
analysis in a protected area context.

Assessment: Reflective journal and position paper 30%; case study 40%; assignment 30%.

DP Requirement: Not applicable.

This module has no supplementary exam. In 2010 this module is available only to continuing students.

PAM Tourism - Theory & Practice

PAMT818 P2 (OL-0T-6P-0S-50H-0R-0F-0G-24A-5W-8C)
Prerequisite Requirement: Acceptance into the MEnvDev, Protected Area Management stream.

Aim: To explore the field of tourism with specific focus on the environmental dimensions of tourism and the tourism
industry.

Content: Conceptualising tourism-critical issues; tourism and less developed countries; pro duction of tourism
services; enterprise promotion; â\200\234greenâ\200\235 tourism; tourism development and pl anning.

Assessment: Reflective journal and position paper 30%; case study 40%; assignment 30%.

DP Requirement: Not applicable.

This module has no supplementary exam. In 2010 this module is available only to continuing students.

Protected Area Management Mini-Dissertation

PAMT890 PB (0L-0T-0P-0S-640H-0R-0F-0G-0A-24W-64C)
Prerequisite Requirement: Successful completion of all prescribed modules for the course-work component of the Protected-Area Management stream with a final mark of at least 50% in each module.

Aim: To undertake supervised research on an interdisciplinary theme of the student's choice.

Content: Decided upon by the student in consultation with his/her supervisor(s) and the related research panel.
Practicals: None.

Assessment: Mini-dissertation (100%).

DP Requirement: Not applicable.

Offered in Semester 1 and 2. This module has no supplementary exam. In 2010 this module is available only to continuing students.

Recombinant DNA Technology

Offered in the School of Biochemistry, Genetics & Microbiology

Molecular DNA Technology

RDNA202 P2 W2 (39L-10T-39P-0S-60H-7R-0F-0G-5A-13W-16C)
Prerequisite Modules: BIOL101 or BIMI120; CHEM110, 120.

Aim: To provide a strong foundation in bacterial and viral molecular biology and recombinant DNA technology.
Content: Organisation of bacterial & viral genomes. DNA replication. Regulation of gene expression. Plasmid biology.
Transposons and mobile elements. DNA repair & recombination. Theory of cloning, manipulation & analysis of genes
and the expression of their protein products. A working knowledge of genetic engineering.

Practicals: Hands on experience in screening for bacterial mutants, detection of antibiotic resistance, conjugation and
transduction and bacteriophage cultivation. Hands on experience with basic recombinant DNA technology techniques.
Assessment: Practicals (25%), 2 h theory tests (25%), 3 h exam (50%).

DP Requirement: Class mark of 40%, attendance at 80% of tutorials and practicals.

Rural Resource Management

Offered in the School of Agricultural Sciences & Agribusiness

Foundations of Rural Wealth Creation

RRMG111 P1 (39L-52T-27P-0S-26H-12R-0F-0G-4A-13W-16C)
Aim: To introduce concepts of rural development, wealth and poverty; to build skills in structuring projects to facilitate
movement of communities along a pathway to prosperity.

Content: The nature of wealth and poverty. Rural and community development. Sustainable livelihoods. Project
planning.

Practicals: Group discussions. Use of library and internet. Workshops on academic research and writing.
Assessment: Project proposal (20%), 1 test (10%), research paper (20%); 3h exam (50%).

DP Requirement: 40% class mark; 80% attendance in all academic contact activities.

Rural Economic Systems

RRMG112 P2 (39L-0T-40P-0S-61H-15R-0F-0G-5A-13W-16C)
Aim: To provide a basic understanding of macro and micro economic systems in the rural socio-agricultural context in
relation to facilitating prosperity.

Content: Basic concepts in farm economics and integrated rural development; sustainability planning/assessment
using a sustainability model; analysis of farm/enterprise systems in the context of the rural community.

Practicals: Skills covering concepts selected from above.

Assessment: Policy review (20%), 1 test (10%), learning report (20%); 3 h exam (50%).

DP Requirement: 40% class mark; 80% attendance in all academic contact activities.

Extension Methods

RRMG212 P1 (45L-0T-0P-0S-75H-16R-0F-20G-4A-13W-16C)
Aim: To introduce different models of extension and to equip students with basic skills in participatory extension work.
Content: Introduction to rural development and extension; Trends in extension; Different Extension models and adult education philosophies; Theory of adult leamning and experiential learning; Conventional approaches; Introduction to farming systems. Participatory approaches to extension; PLA, PTD, Farmer to Farmer; Policies impacting on extension and rural development. Application of farming systems analysis in the field.

Assessment: Group presentation (10%), 1 test (15%), individual field report (25%); 3 h Exam (50%).

DP Requirement: 40% class mark, 80% attendance in all academic contact activities, attendance on field trip.

Extension Practice

RRMG222 P2 (45L-0T-0P-0S-75H-16R-0F-20G-4A-13W-16C)
Prerequisite Modules: RRMG212.

Aim: The module offers students the opportunity to apply the competencies leamed in RRM212 in a "real" extension
tasks in resource poor rural communities.

Content: Group dynamics and team contracts. Facilitation and presentation skills. Active communication strategies.
Application of participatory techniques.

Assessment: Individual field report (30%), group presentation (10%), project plan (10%); 3 h Exam (50%).

DP Requirement: 40% class mark, 80% attendance in all academic contact activities, attendance at field trip.

Organisation and Project Management

RRMG312 P1 (45L-0T-0P-0S-78H-16R-0F-20G-1A-13W-16C)
Aim: To understand the sustainable livelihoods assets and vulnerability framework; write a cogent research
paper/critique about agricultural extension/development engagement; design and write a proposal for a project; reflect
on and develop learning styles.

Content: Learning models, Group dynamics, Sustainable Livelihoods approach, participatory project planning,
developing and applying a theoretical framework for research/policy critique.

Assessment: Portfolio [Policy critique (40%); Project Proposal (40%); Learning Journal (20%)] defended ina 1 h Oral
defence. The entire portfolio is externally examined.

DP Requirement: Students must complete all assessments; 80% attendance at lectures.

Community Development Systems Project

RRMG350 P2 (12L-0T-0P-0S-44H-3R-120F-140G-1A-6W-32C)
Prerequisite Modules: RRMG312.

Aim: To enable students to design and implement a situation improving project in a rural community context.
Content: The theory for this module is given in RRMG312. Students are required to spend 4-5 weeks in a rural
community during which time they are expected to engage with key stakeholders in the community in designing and
implementing a project to improve a situation in the community.

Assessment: Portfolio [Placement report (20%); Reflection on learning (10%); Project Proposal (20%)]; 1 h Oral
Exam (50%).

DP Requirement: Submission of portfolio in time, 80% attendance in internship.

Community Participation

RRMG370 P1 (45L-0T-0P-0S-75H-16R-0F-20G-4A-13W-16C)
Corequisite: RRMG312.

Aim: To acquire skills required by a community development practitioner including understanding and applying the
various approaches and models to development.

Content: Philosophies, theories of development in rural communities; development models: sustainable livelihoods, community mobilisation & social action, needs based and asset based approaches; development as a holistic approach: welfare, developmental social welfare, liberation & transformation approaches. Participatory techniques for research, planning, implementation, evaluation and monitoring. Roles & skills expected of practitioners in a rural socio-agriculture context.

Assessment: Research Paper (15%), Field trip report (10%) Project proposal (15%), Test (10%), 3 h Exam (50%).
DP Requirement: 40% class mark, 80% attendance in all academic contact activities, Attendance at field trip.

Systems Thinking Foundations

RRMG700 PY (45L-0T-0P-0S-115H-0R-0F-0G-0A-26W-16C)
Aim: To give students a foundation in experiential leaming and systems methodologies.

Content: Formal systems characteristics; Kolb's Leaming Cycle; Hard & Soft Systems Thinking; Soft Systems Methodology; Viable Systems Method; Critical Systems Thinking.

Assessment: 1 report on a project in which a systems methodology is applied to a real world problem situation (100%).

DP Requirement: Not applicable

Year-long module. This module has no supplementary exam.

Rural Development Placement

RRMG710 PY (6L-0T-0P-0S-314H-0R-0F-0G-0A-26W-32C)
Corequisite: RRMG711, 712.

Aim: To provide the student with a real-ife experience to apply theory from RRMG711 andfor 712 in rural development practice within a government department, NGO or other relevant agency.

Content: The theory for this module is provided by RRMG711 & RRMG712.

Practicals: An internship with an organisation/institution.

Assessment: Portfolio (80%), oral presentation reflecting on the intemship experience (20%). [Portfolio: Placement report (30%), Reflection Report (20%), Programme Proposal (30%)].

DP Requirement: Not applicable.

Year-long module. This module has no supplementary exam.

Advanced Communication & Innovation

RRMG711 PY (45L-0T-0P-0S-115H-0R-0F-0G-0A-26W-16C)
Aim: To give students an understanding of, and hands on experience with innovation in agriculture and rural development.

Content: Social leaming theory; Participatory Technology Development (PTD); farmer to farmer leaming through Farmer Field Schools (FFS); Rapid Appraisal of Agricultural Knowledge Systems (RAAKS); facilitating joint learning and action through Participatory Learning & Action methodologies.

Assessment: Papers (40%), project plan (10%), final paper (40%), presentation (10%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Project Design & Management

RRMG712 PY (45L-0T-0P-0S-115H-0R-0F-0G-0A-26W-16C)
Prerequisite Requirement: RRMG350 or similar project management module or experience in working with organisational systems recommended in consultation with the Academic Director and approved by the Dean.

Aim: To give students advanced project design & management skills.

Content: Development & development projects: Project cycle: blueprint vs. process approach; Project boundaries & environments: taxonomy of environments & insights from CST; Project Appraisal; Implementation planning: work breakdown structure; Gantt Charts; Critical Path Analysis; PERT; Recent trends in the development paradigm.
Assessment: 1 report on the process & outcome of a project designing activity (100%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Rural Development/Extension Research Project

RRMG730 PY (12L-0T-0P-4S-464H-0R-0F-0G-0A-26W-48C)

Aim: To undertake supervised research on a theme relevant to rural development, agricultura l development,
agricultural extension or a related area to develop post-graduate level research and writin g skills.

Content: Structured development of a research project. Seminars and mini-dissertation on th e chosen theme.
Assessment: Research joumal (20%), Examination of mini-dissertation (80%).

DP Requirement: Not applicable.

Year-long module. This module has no supplementary exam.

Community Participation

RRMG740 P1 (20L-0T-28P-0S-80H-15R-0F-12G-5A-13W-16C)
Aim: To develop an understanding of the application of various participatory approaches, te chniques and models in a
rural socio-agriculture context.

Content: Participatory development methods. The community development cycle and process in rural communities.
Expectations of community development practioners in a rural socio-agriculture context. The application of specific
participatory techniques, community intervention and project proposal writing.

Assessment: Two research papers (25%0, Field trip report (10%), Project proposal (15%), Ora l presentation (10%), 3
h exam (40%).

DP Requirement: 40% Class mark, attendance at two field trips, attendance at 80% of all aca demic contacts.

Rural Development Systems

RRMG813 PY (16L-0T-0P-32S-112H-0R-0F-0G-0A-26W-16C)
Aim: To enable students to understand a wide range of contemporary rural development issues.

Content: Seminars on a variety of issues relevant to rural development.

Assessment: Publishable research article (25%), Practical manual/guide (25%), Seminar presentations (25%),
Lecture note/Class lecture (25%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Stakeholder Partnerships & Analysis

RRMG815 PY (45L-0T-0P-0S-115H-0R-0F-0G-0A-26W-16C)
Prerequisite Modules: RRMG711.

Aim: To enable students to apply methods and techniques of Stakeholder Analysis and the RAAKS methodology, and
partnership development in real-world situations, and incorporate these in project management and planning.
Content: Presentations, discussions, and assignments on around 'real-world' applications of Stakeholder Analysis
and the RAAKS methodology are geared at leamning-by-doing.

Assessment: Presentations (10%), assignments (30%), project plan (20%), project report (40%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Scientific Communication

Offered in the Centre for Science Access

Communication in Science for SFP

SCOMO003 PY WY (OL-40T-48P-0S-72H-0R-0F-0G-0A-26W-16FC-0DC)
Aim: To develop control of grammatical and discourse competence in English to improve the ability to read basic
scientific texts, to write and to give oral presentations in science.

Content: Attention will be given to areas of grammatical and discourse competence in English that present difficulties
for speakers of English as a second language. Through the process of short research projects relating to science,
students will be supported in their reading in order to understand the purpose of a range of scientific texts. They will
test their understanding of these genres through a process of writing lab reports, essays and posters. There may also
be a field trip.

Assessment: 100% Continuous: written assignments (60%), tests (25%) and oral presentations (15%).

DP Requirement: Not applicable.

Year-long module. For students in the Science Foundation Programme only. This module has no supplementary exam. In order to pass, students must attend 80% of classes and complete all assignments.

Scientific Writing and Reporting for SFP

SCOMO013 PY WY (OL-40T-48P-0S-72H-0R-0F-0G-0A-26W-16FC-0DC)
Aim: To develop students' ability to access and read scientific sources, and their ability to write and make oral presentations in science.

Content: Short research projects relating to science. Scientific Writing and Reporting is a practical module in which students improve their writing through practical experience of a number of different kinds of writing: essay, report and poster. There may also be a field trip.

Assessment: 100% Continuous: written assignments (60%), tests (25%) and oral presentations(15%).

DP Requirement: Not applicable.

Year-long module. For students in the Science Foundation Programme only. This module has no supplementary exam. In order to pass, students must attend 80% of classes and complete all assignments.

Communication in Science A

SCOM101 P1 W1 (0L-20T-24P-0S-36H-0R-0F-0G-0A-13W-8C)
Aim: To develop students' control of grammatical and discourse competence in English to improve their ability to read basic scientific texts, to write and to give oral presentations in science.

Content: Attention will be given to areas of grammatical and discourse competence in English that present difficulties for speakers of English as a second language. Through the process of short research projects relating to science, students will be supported in their reading in order to understand the purpose of a range of scientific texts. They wil test their understanding of these genres by writing lab reports, essays and posters. There may also be a field trip.
Assessment: 100% Continuous – written assignments (60%), tests (25%), oral presentations (15%).

DP Requirement: Not applicable.

This module is primarily for students in the BSc4 Augmented Stream. This module has no supplementary exam. In order to pass, students must attend 80% of classes and complete all assignments.

Communication in Science B

SCOM102 P2 W2 (0L-20T-24P-0S-36H-0R-0F-0G-0A-13W-8C)
Aim: To further develop students' control of grammatical and discourse competence in English and ability to read scientific texts, to write and to give oral presentations in science.

Content: The module extends the knowledge and skills of SCOM101. There will be further attention to grammatical and discourse competence in English that present difficulties for speakers of English as a second language. Through short research projects relating to science, students will be further supported in their reading in order to understand the purpose of a range of scientific texts. They will test their understanding of these genres by writing lab reports, essays and posters.

Assessment: 100% Continuous: written assignments (60%), tests (25%) and oral presentations (15%).

DP Requirement: Not applicable.

This module is primarily for students in the BSc4 Augmented Stream. This module has no supplementary exam. In order to pass, students must attend 80% of classes and complete all assignments.

Communication in Science C

SCOM103 PY WY (0L-40T-48P-0S-72H-0R-0F-0G-0A-26W-16C)
Aim: To develop control of grammatical and discourse competence in English to improve the ability to read basic scientific texts, to write and to give oral presentations in science.

Content: Attention will be given to areas of grammatical and discourse competence in English that present difficulties for speakers of English as a second language. Through the process of short research projects relating to science, students will be supported in their reading in order to understand the purpose of a range of scientific texts. They will test their understanding of these genres through a process of writing lab reports, essays and posters. There may also be a field trip.

Assessment: 100% Continuous: written assignments (60%), tests (25%) and oral presentations(15%).

DP Requirement: Not applicable.

Year-long module. For students in the BSc4 Foundation Stream only. This module has no supplementary exam. In order to pass, students must attend 80% of classes and complete all assignments.

Scientific Writing & Reporting A

SCOM111 P1 W1 (0L-20T-24P-0S-36H-0R-0F-0G-0A-13W-8C)
Aim: To develop students' ability to use scientific sources and to write and give oral presentations in science.
Content: Short research projects relating to science. Scientific Writing and Reporting is a practical module in which students give oral presentations and improve their writing through practical experience of a number of different kinds of writing: essay, report and poster. There may also be a field trip.

Assessment: 100% continuous assessment: written assignments 60%, tests 25%, oral presentation 15%.

DP Requirement: Not applicable.

This module is primarily for students in the BSc4 Augmented Stream. This module has no supplementary exam. In order to pass, students must attend 80% of classes and complete all assignments.

Scientific Writing & Reporting B

SCOM112 P2 W2 (OL-20T-24P-0S-36H-0R-0F-0G-0A-13W-8C)
Aim: To develop students' ability to use scientific sources and to write and give oral presentations in science.
Content: Short research projects relating to science. The module extends the skills developed in SCOM111: ability to use scientific sources, and to write and give oral presentations in science. The types of writing that the module deals with are: essay, report and poster. There may also be a field trip.

Assessment: 100% continuous: written assignments 60%, tests 25%, oral presentation 15%.

DP Requirement: Not applicable.

This module is primarily for students in the BSc4 Augmented Stream. This module has no supplementary exam. In order to pass, students must attend 80% of classes and complete all assignments.

Scientific Writing & Reporting C

SCOM113 PY WY (OL-40T-48P-0S-72H-0R-0F-0G-0A-26W-16C)
Aim: To develop students' ability to access and read scientific sources, and their ability to write and make oral presentations in science.

Content: Attention will be given to areas of grammatical and discourse competence in English that present difficulties for speakers of English as a second language. Through the process of short research projects relating to science, students will be supported in their reading in order to understand the purpose of a range of scientific texts. They will test their understanding of these genres through a process of writing lab reports, essays, posters and doing oral presentations. There may also be a field trip.

Assessment: 100% continuous assessment: written assignments 60%, tests 25%, oral presentation 15%.

DP Requirement: Not applicable.

Year-long module. For students in the BSc4 Foundation Stream only. This module has no supplementary exam. In order to pass, students must attend 80% of classes and complete all assignments.

Soil Science

Offered in the School of Environmental Sciences

Introduction to Soil Science

SSCI212 P1 (18L-4T-18P-0S-24H-12R-0F-0G-4A-13W-8C)
Prerequisite Modules: CHEM110.

Aim: To provide a basic introduction to the physical and chemical properties and processes of soils.

Content: Particulate nature of soil; texture, structure and porosity; retention and movement of water in soil; plant available water. Types of clay minerals; cation exchange capacity and ion exchange reactions; flocculation/dispersion behaviour of colloids and its effect on soil aggregation.

Practicals: Field determination of texture, colour, structure and water infiltration. Labor atory analysis of particle size,
pH, exchangeable cations, extractable acidity and hydraulic conductivity.

Assessment: 2 theory tests (20%), prac laboratory reports & tutorial reports (13%), 2 h exa m (67%).

DP Requirement: 80% attendance at practicals; 40% Class mark.

Credit may not be obtained for both SSCI212 and SSCI217.

Introduction to Soils & the Environment

SSCI217 P1 (37L-6T-33P-0S-54H-25R-0F-0G-5A-13W-16C)
Aim: To understand soil processes and their role within the environment.

Content: Soil-quality; formation; properties; survey; land evaluation. Reactions of nutrien ts with soil mineral and
organic surfaces, land treatment of wastes and soil pollution. Major & trace elements and f ertilizer sources. Water
retention & movement; water availability; infiltration and evaporation. Soil compaction, ag gregate stability and crusting.
Practicals: Field: texture; colour, structure, infiltration; soil identification; land eval uation. Laboratory: particle size; pH;
cation exchange properties; P; C; hydraulic conductivity; fertilizer sources; assessment of variability.

Assessment: 2 theory tests (17%), laboratory & field reports & tutorials (16%), 3 h exam (6 7%).

DP Requirement: 80% attendance at practicals and tutorials; 40% Class mark.

Credit may not be obtained for both $SCI212 and SSCI217.

Pedology

SSCI230 P2 (36L-0T-61P-0S-40H-19R-0F-0G-4A-13W-16C)
Prerequisite Modules: SSCI217 or 212.

Aim: To provide an understanding of the field study of soils.

Content: The morphology, genesis and spatial distribution of soils. Palaeopedology and reco gnition of relic features within current surface soils. Soil classification - South African, FAO, and USDA systems. S oil survey and mapping methods and objectives. Land capability and suitability using international and local syste ms.

Practicals: The field description and classification of soils. Attendance at two full day f ield trips held on weekends is compulsory. A compulsory one week field mapping project may also be held and students are r equired to contribute towards the costs.

Assessment: 2 tests (20%), & project reports (20%), 3 h exam (60%).

DP Requirement: 40% Class mark.

Soil Fertility & Plant Nutrition

SSCI320 P2 (36L-5T-40P-0S-51H-23R-0F-0G-5A-13W-16C)
Prerequisite Modules: SSCI217 or 212.

Aim: To provide a scientific and practical understanding of the management of agricultural and horticultural soils for sustainable crop production.

Content: Soil testing and plant analysis as aids to making fertilizer recommendations and d iagnosing nutrient deficienciesfimbalances. Fundamentals of fertilizer practice. Chemistry/biochemistry of nit rogen, phosphorus, potassium, magnesium, calcium, sulphur and micronutrients in soils in relation to their upt ake and use by crops.
Nature of soil acidity, tolerance of crops to acidity, use of lime and gypsum as ameliorant s.

Practicals: Soil fertility evaluation involving a glasshouse experiment.

Assessment: 2 tests (20%), project report (30%), 3 h exam (50%).

DP Requirement: 80% attendance at practicals; 40% Class mark.

Soil Water Use & Management

SSCI351 P1 (17L-4T-18P-0S-25H-12R-0F-0G-4A-13W-8C)
Prerequisite Modules: MATH133; SSCI217 or 212.

Aim: To provide a fundamental understanding of soil-water relationships and their applicati ons.

Content: Soil water content and energy; water retention characteristics; measurement of soi l water: water flow under saturated and unsaturated conditions. Soil physical properties in relation to hydrological processes; infiltration; internal drainage and redistribution; evaporation from bare and vegetated surfaces; soil water manag ement in irrigated agriculture.

Practicals: A laboratory project involving measurement of soil water status and water flow

through soils.
Assessment: 2 theory tests (17%), laboratory project report (16%), 2 h exam (67%).

DP Requirement: 40% Class mark.

Soil Structure & its Management

SSCI352 PC (18L-3T-18P-0S-25H-12R-0F-0G-4A-13W-8C)
Prerequisite Modules: SSCI217 or 212.

Aim: To gain an understanding of the structural make-up of soils and its implications.

Content: Factors influencing soil strength and consistence and the formation and stabilization of micro- and macrostructure. Effects of dissolved salts on hydraulic properties, crusting and hard setting. Quality of irrigation water and liquid wastes and their effects on soil structure. Sodic soils and their reclamation. Sources and consequences of soil compaction and corrective measures.

Practicals: A laboratory project on selected local soils involving measurement of various soil structural characteristics.
Assessment: 2 theory tests (20%), laboratory project report (13%), 2 h exam (67%).

DP Requirement: 40% Class mark.

Offered in either Semester 1 or 2.

Contaminants of the Soil Environment

SSCI371 P1 (18L-4T-18P-0S-25H-12R-0F-0G-3A-13W-8C)
Prerequisite Requirement: 40% in CHEM120.

Prerequisite Modules: CHEM110, (SSCI217 or 212).

Aim: To provide an understanding of the causes and consequences of contamination of soils.

Content: Source and nature of the major contaminants added to soils (e.g. industrial, municipal and agricultural
wastes, pesticides, petroleum hydrocarbons and other organic materials). Reactions of inorganic (e.g. heavy metals)
and organic (e.g. pesticides) contaminants with soils and soil components; factors affecting their mobility and/or
degradation in soils; their effect on soil processes; management and amelioration of contaminated soils.

Practicals: A laboratory project on soil contamination and its effect on soil processes.

Assessment: 1 theory test (17%), laboratory project report (16%), 2 h exam (67%).

DP Requirement: 40% Class mark.

Soil Processes,Ground Water,AtmosPollution

SSCI372 P2 (18L-4T-18P-0S-25H-12R-0F-0G-3A-13W-8C)
Prerequisite Modules: SSCI217 or 212.

Aim: To provide an understanding of soil processes that lead to pollution of waterways and the atmosphere.

Content: Leaching losses of nitrate and other solutes from soils; principles and modelling of solute movement: factors
affecting leaching and effects on groundwater pollution. Processes involved in gaseous emissions of nitrous oxide,
ammonia and methane from soils including denirification, ammonia volatilization and methanogenisis. Extent and
consequences and such losses.

Practicals: A laboratory project on soil processes leading to environmental pollution.

Assessment: 1 test (17%), laboratory project report (16%), 2 h exam (67%).

DP Requirement: 40% Class mark.

Chemical Processes in the Soil Environment

SSCI710 P1 (18L-4T-18P-0S-25H-12R-0F-0G-3A-13W-8C)
Prerequisite Requirement: 40% in CHEM120.

Prerequisite Modules: CHEM110, (SSCI217 or 212).

Aim: To provide an understanding of basic chemical processes which occur in the soils.

Content: Soil solution chemistry; colloidal chemistry; electrical double layer theory; adsorption phenomena; mineral
solubility; ion exchange; redox equilibria; organic interactions with soil surfaces. Applications of soil chemical
processes in agriculture and environmental protection.

Practicals: Laboratory measurements of chemical properties and processes in soils.

Assessment: One theory test (17%) and a written laboratory project report (16%), 2 h exam (67%).

DP Requirement: 40% Class mark.

Biological Processes in the Soil Environment

SSCI760 PC (18L-4T-18P-0S-25H-12R-0F-0G-3A-13W-8C)
Prerequisite Modules: SSCI217 or 212.

Aim: To provide an understanding of biota and the biological processes that occur in soils.

Content: Nature of microorganisms and fauna that inhabit soils. Role of the soil microbial biomass and soil enzymes in nutrient availability and as indicators of soil quality. Role of earthworm and termite communities in nutrient turnover and soil structural condition. Manipulation of the soil microbial community to ameliorate contaminated soils.
Practicals: A laboratory project on soil biological processes.

Assessment: One theory test (17%) and a written laboratory project report (16%), 2 h exam (67%).

DP Requirement: 40% Class mark.

Offered in either Semester.

Sustainable Soil Fertility Management

SSCI770 P2 (18L-4T-18P-0S-24H-12R-0F-0G-4A-13W-8C)
Prerequisite Modules: SSCI217 or 212.

Aim: To provide an understanding of selected contemporary issues in soil fertility management.

Content: Nature and management of acid soils; chemistry of soil Al, speciation of Al in soil solution, Al toxicity in plants, lime as an ameliorant; P/lime interactions. Nature of subsoil acidity, role of gypsum. Role of soil organic matter in sustainable agriculture, alternative agricultural practices, effects of tillage practice and crop rotations on soil fertility. Concept and role of soil quality indices.

Practicals: A field/laboratory project on soil fertility evaluation.

Assessment: Two tests (20%), written field/ laboratory report(13%), 2 h exam (67%).

DP Requirement: 40% Class mark, compulsory attendance at all academic contact activities.

Pedological Processes in the Environment

SSCI780 P2 (18L-4T-20P-0S-22H-10R-3F-0G-3A-13W-8C)
Prerequisite Modules: SSCI217 or 212.

Aim: To provide a detailed understanding of selected contemporary pedological topics.

Content: Weathering and humification processes and environmental factors; movement of material in soils and across landscapes; time as a factor of soil formation; soils and archaeology; alternative theories of soil formation; micromorphological and electron optical studies of soil materials; pedological modelling; X-ray diffraction as a pedological tool.

Practicals: Computer simulation techniques for pedology; introduction to electron microscopy and X-ray diffraction for clay mineral identification; field trip.

Assessment: One theory test (17%) and written reports (16%) on practical work, 2 h exam (67%).

DP Requirement: 40% Class mark.

Soil Science Seminar

SSCI792 PY (OL-0T-0P-160S-0H-0R-0F-0G-0A-26W-16C)
Prerequisite Modules: SSCI217 or 212.

Aim: To provide experience in researching and synthesizing scientific literature on a specific topic.

Content: Search for information in the scientific literature on an approved topic; prepare a scientific review paper; present the paper orally.

Assessment: Written review paper (70%), oral presentation (30%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Research Project in Soil Science

SSCI793 PY (OL-0T-320P-0S-160H-0R-0F-0G-0A-26W-48C)
Prerequisite Requirement: Admission to BSc (Hons) majoring in Soil Science or to Level 4 of BSc (Agric) majoring in Soil Science.

Aim: To provide experience in conducting of a research project and preparation of a scientific paper.

Content: Conduct an approved research project, prepare a scientific paper on the results, present the results orally.
Assessment: Written scientific paper (75%), oral presentation (25%).

DP Requirement: Not applicable.

Year-long Module. This module has no supplementary exam.

Advanced Topics in Soil Science

SSCI794 PY (OL-0T-50P-0S-100H-10R-0F-0G-0A-26W-16C)
Prerequisite Modules: SSCI217 or 212.

Aim: To introduce students to a range of advanced topics in soil science.

Content: Selected advanced topics and contemporary issues in soil science from an environmental and agricultural perspective.

Practicals: Field trips and laboratory exercises.

Assessment: Assignments (100%).

DP Requirement: Not applicable.

Year-Long Module. This module has no supplementary exam.

Statistics

Offered in the School of Statistics & Actuarial Science

Basic Statistics

STAT101 P2 (18L-10T-8P-0S-24H-15R-0F-0G-5A-13W-8C)
Prerequisite Requirement: Higher Grade E or Standard Grade C for Matric Mathematics or NSC Level 3 Maths.
Aim: To introduce the student to the basic concepts of Statistics and how these may be applied in problem solving.
Content: Organizing data. Introduction to probability. Probability distributions. Estimation, confidence limits and hypothesis testing. Regression and correlation. Chi-square tests. Questionnaire design and surveys. Practicals on the above topics using SPSS.

Assessment: 2 tests (20%), practicals (10%), 2 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorial/practicals.

Credit may not be obtained for both STAT101 and any of the following: MATH133, STAT143, STAT1T71, STAT370.

Introduction to Statistics

STAT130 P1 W1 (39L-18T-18P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Requirement: Higher Grade D or Standard Grade A for Matric Mathematics or NSC Level 5 Maths.
Corequisite: MATH130.

Aim: To introduce the student to the statistical techniques required for the analysis of quantitative data.

Content: Descriptive statistical methods. Measures of central tendency and dispersion. Permutations and combinations. Basic probability concepts. Random variables and their properties: Bemoulli, Binomial, Poisson, Hypergeometric & Normal distributions. Normal approximation to the Binomial and Poisson. Correlation and simple linear regression. Point and interval estimation. Hypothesis tests for proportions, means and variances, for both one and two populations. Introduction to appropriate statistical computing packages.

Assessment: Two tests (30%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Credit may not be obtained for both STAT130 and any of the following: MATH133, STAT101, STAT143, STAT171, STAT370.

Statistical Methods

STAT140 P2 W2 (39L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Requirement: 40% in MATH130.

Prerequisite Modules: STAT130.

Aim: To expand the student's knowledge of basic statistical theory and methods, to introduce the student to a wide range of statistical techniques and to reinforce the student's ability to solve statistical problems.

Content: Introduction to continuous distributions: Uniform, Exponential. Tests of independence and homogeneity.
Analysis of variance: completely randomized design and randomized block design. Nonparametric methods: sign test,
Wilcoxon signed rank test, Mann-Whitney test, Kruskal Wallis test. Introduction to Multiple regression: inference and
application.

Assessment: Two tests (30%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Further Statistics for Natural Sciences

STAT143 P2 W2 (18L-10T-8P-0S-34H-6R-0F-0G-4A-13W-8C)
Prerequisite Requirement: 40% in MATH133.

Aim: To introduce the student to the basic concepts of Statistics and how these may be applied in problem solving.
Content: Introduction to probability. Probability distributions. Estimation, confidence limits and hypothesis testing.
One-way ANOVA. Simple linear regression and simple correlation. chi-square tests.

Assessment: Two tests (30%), 2 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Credit may not be obtained for both STAT143 and any of STAT101, STAT130, STAT171 or STAT370.

Specialized Business Statistics

STAT171 P2 W2 (39L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Requirement: D.P. in MATH134.

Aim: To introduce the student to a wide range of statistical techniques and to reinforce the student's ability to solve and interpret statistical problems.

Content: Organizing data. Descriptive statistical measures. Probability Concepts. Discrete random variables. Normal Distribution. Simple linear regression with correlation analysis. Hypothesis tests for population means and variances, both for one and for two populations. Index numbers. Time series analysis. Special topics.

Assessment: Continuous assessment (30%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Credit may not be obtained for both STAT171 and any of STAT101, STAT130 or STAT143.

Sample Survey Methods

STAT214 P1 (39L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Modules: STAT130, 143, 171 or BMET210.

Aim: To equip the student with the tools to design and effectively analyze the results of a sample drawn from a finite population: quality control experiments and computer applications.

Content: Scope of sample surveys. Simple random sampling. Ratio and regression estimation. Stratified random sampling. Cluster sampling. Principles of questionnaire design. Estimation of population size. Internet surveys. Adaptive sampling. Quality control case studies. Methods for controlling more than one characteristic. Acceptance sampling. Single, multiple and sequential sampling. Introduction to SAS and Genstat (and/or SPSS).

Practicals: Computer-based exercises on the above topics.

Assessment: Two tests (20%), practicals (10%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials and practicals.

Probability Distributions

STAT230 P1 W1 (39L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Modules: MATH140, STAT140.

Corequisite: MATH212.

Aim: To introduce the student to elements of probability theory.

Content: The axioms of probability. Random variables, probability density functions and distribution functions. Expectation and moment generating functions. Transformation of variables.

Assessment: Two tests (30%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Statistical Inference

STAT240 P2 W2 (39L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)

Prerequisite Requirement: 40% in MATH212.

Prerequisite Modules: STAT230.

Corequisite: MATH241.

Aim: To introduce the student to elements of statistical inference.

Content: Point and interval estimation. Properties of estimators. Principles of Bayesian es timation. Hypothesis testing.
Assessment: Two tests (30%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Linear Models

STAT301 P1 W1 (39L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Modules: MATH212 and 241, (STAT240 or BMET314).

Aim: To introduce the student to the theory and application of the general linear model.

Content: Topics from linear algebra. The Gauss-Markov Theorem. The general linear model of full rank and less than
full rank. Regression analysis. Analysis of variance and covariance.

Assessment: Two tests (30%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Biostatistics Methods

STAT305 P2 W2 (39L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Modules: STAT230 and (STAT301 or BMET314).

Aim: To provide the student with a thorough understanding of biostatistics and to expose the student to a range of practical problems in that area.

Content: Introduction to epidemiology including the standardization of mortality rates, morbidity studies and clustering of diseases. Clinical trials. Cohort studies. Survival analysis.

Practicals: Computer-based exercises on the above topics.

Assessment: Two tests (20%), practicals (10%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at practicals.

Applied Statistics

STAT330 P2 W2 (39L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Modules: STAT301.

Aim: To provide the student with practical applications of statistical topics.

Content: Applied regression analysis. Analysis of variance and experimental design. Quality control. Acceptance sampling. Nonparametric methods.

Assessment: Two tests (30%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Random Processes

STAT350 P2 W2 (39L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Modules: STAT360.

Aim: To introduce the student to the theory and applications of stochastic models.

Content: Broad classification of stochastic processes. Markov chains. Birth and death processes. Queueing theory. The Poisson process. Conditional expectations and martingales. Branching processes. Renewal theory. Time series. Loss distributions and risk models.

Assessment: Two tests (30%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Offered in Semester 2.

Applied Probability Theory

STAT360 P1 W1 (89L-36T-0P-0S-65H-13R-0F-0G-7A-13W-16C)
Prerequisite Requirement: 40% in MATH212 and 241.

Prerequisite Modules: STAT240.

Aim: To expose the student to a range of applications of probability theory and to provide the student with the necessary techniques for recognizing and solving problems in probability.

Content: Combinatorial analysis. Union of events. Conditional probability. Random walks. Ge

nerating functions.
Markov chains. Exponential distribution and Poisson process.

Assessment: Tests (30%), 3 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Engineering Statistics

STAT370 H1 (18L-13T-5P-0S-33H-5R-0F-0G-6A-13W-8C)
Prerequisite Requirement: DP in MATH248.

Aim: To introduce engineering students to elementary probability theory and statistical methods.

Content: Elementary probability, standard distributions, bivariate distributions. Estimation of parameters and testing of hypotheses. Regression analysis.

Assessment: Tests (30%), 2 h exam (70%).

DP Requirement: 30% Class mark, 80% attendance at tutorials.

Offered only at Howard College to Engineering students.

Time Series & Forecasting

STAT710 PCWC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To provide the student with a thorough understanding of time series methodology and forecasting and to expose the student to a range of practical problems in those areas.

Content: Descriptive techniques for time series. Probability models for time series. Estimation in the time domain. Principles of forecasting. A miscellany of topics in time series analysis which may include, inter alia, stationary processes in the frequency domain, spectral analysis, bivariate processes and state-space modelling.

Practicals: Computer-based exercises on the above topics.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Bayesian Inference

STAT711 PCWC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To introduce the student to Bayesian theory and methods.

Content: Inference and estimation using Bayesian methods.

Assessment: Class mark (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Regression Diagnostics

STAT712 PCWC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To equip the student with regression diagnostic techniques to employ when fitting regression models to data and checking on the adequacy of the model.

Content: Checking the linear model assumptions of normality, independent errors and constant variance. Transformations of variables. The problem of multicollinearity. Other diagnostic tests including Cook's D, DIFFITS and DIFFBETAS.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Econometrics

STAT713 PCWC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To enable the student to understand the theory and practical applications of econometric methods.

Content: Dummy variables. Simultaneous equation models. Error in variables. Distributed lags. Heteroscedasticity, autocorrelation, multicollinearity. Panel data. Cointegration. Computing aspects.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 100% computer lab attendance.

Offered in either Semester 1 or 2.

The Generalized Linear Model

STAT714 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To provide the student with a thorough understanding of generalized linear models and to expose the student to
a range of practical problems in that area.

Content: The principles of model fitting. Exponential family of distributions and generalized linear models. Estimation
and inference for generalized linear models. Binary responses and logistic regression. The Poisson regression model.
Contingency tables and log-linear models. A miscellany of additional topics in generalized linear models.

Practicals: Computer-based exercises on the above topics.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Multivariate Analysis

STAT715 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To introduce the student to some multivariate distributions, multivariate models and statistical testing procedures.

Content: The matrix normal distribution. The Wishart distribution. Hotelling's T-squared distribution. Wilks' likelihood ratio test. Roy's union intersection procedure. Simultaneous test procedures. MANOVA. Profile Analysis. Principal Components. Canonical Correlation.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Advanced Probability Theory

STAT716 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To expose the student to a measure-theoretic approach to modem probability theory.

Content: Advanced probability theory with the relevant measure theory.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Queueing Theory

STAT717 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To give a systematic account of the basic formulae of queueing theory and their applications.

Content: An introduction to queueing theory. Single-server exponential queueing models. Simple Markovian birth-death queueing models. Simulations and application.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Stochastic Processes

STAT718 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To establish the theoretical foundations of stochastic models and the applications thereof.

Content: Queueing theory. Renewal processes. Markov processes. Brownian motion.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Sampling Theory

STAT719 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)

Aim: To investigate principles of sampling by focusing on various survey procedures commonly used by government departments, in industry and in commerce.

Content: : Simple random sampling. Estimating a mean, total and a proportion. Ratio estimators. Cluster sampling. Stratified sampling. Systematic sampling.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Time Series Analysis

STAT721 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To provide a thorough understanding of the theory and computer applications of time series techniques.
Content: Box-Jenkins ARIMA and SARIMA models, Intervention models, Garch and Arch models, Transfer function models, Spectral Analysis, State Space Models, Computing aspects.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 100% computer lab attendance.

Offered in either Semester 1 or 2.

Advanced Topics in Statistics

STAT723 PC WC (29L-10T-0P-0S-102H-13R-0F-0G-6A-13W-16C)
Aim: Examination of some statistical topics of current research interest.

Content: Topics in statistics, not included in the list of specified modules or additional aspects of the listed modules
(e.g. multivariate analysis, time series analysis, econometrics), may be offered.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Statistical Inference Il

STAT729 PC WC (29L-10T-0P-08-102H-13R-0F-0G-6A-13W-16C)
Aim: To expose the student to non-parametric statistics and sequential analysis.

Content: Sequential analysis, goodness-of-fit, Kolmogorov-Smirnov test, sign test, rank tes ts, tolerance intervals.
Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Mixed Models & Spatial Statistics

STAT730 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To provide the student with a basic theory of linear mixed models and the particular e xtension to spatial forms of
covariance.

Content: Stationary and non-stationary mixed models. Kriging equations for prediction. Co-k riging and validation.
Practical examples using various computer packages.

Practicals: Computer-based exercises on the above topics.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Experimental Design

STAT740 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To provide the student with a basic theory of experimental design, particularly in inc omplete blocks and in the
design and analysis of complex experiments.

Content: Partial confounding in factorials. Fractional replication. Incomplete block design s and the recovery of inter-
block information. Incomplete blocks from a mixed model perspective. Experimental design fo r repeated measures
including cross-overs. Alpha lattices & designs for spatial models. Practical analysis of c omplex designs using SAS
and GENSTAT.

Practicals: Computer-based exercises on the above topics.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Recent Topics in Statistics

STAT752 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To provide the student with knowledge and skills in selected topics in Statistics.

Content: Miscellaneous topics from areas in Statistics which are of current interest to researchers and practitioners.
Practicals: Computer-based exercises.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 40% Class mark, 80% attendance.

Offered in either Semester 1 or 2.

Special Topics in Biostatistics

STAT753 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To provide the student with knowledge and skills in special topics in Biostatistics.

Content: Special Biostatistics topics from the areas in Biostatistics which may not have been covered by other honours courses offered.

Practicals: Computer-based exercises.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 40% Class mark, 80% attendance.

Offered in either Semester 1 or 2.

Nonparametric Inference

STAT754 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To provide the student with knowledge and skills in nonparametric statistical theories and methods.

Content: The general theory of nonparametric statistics, including order statistics, theory of ranks, U-statistics in nonparametric estimation and testing, linear rank statistics and their application to location and scale problems; goodness-of-fit, and other distribution-free procedures.

Practicals: Computer-based exercises.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 40% Class mark, 80% attendance.

Offered in either Semester 1 or 2.

Financial Statistics

STAT760 PC WC (39L-18T-18P-0S-66H-13R-0F-0G-6A-13W-16C)
Aim: To provide the student with an understanding of the basic concepts pertaining to financial statistics and to expose the student to a range of practical problems in that area.

Content: Overview of loss distributions. The theory and practice of risk modelling. Ruin theory.

Practicals: Computer-based exercises on the above topics.

Assessment: Tests (20%), 3 h exam (80%).

DP Requirement: 80% attendance.

Offered in either Semester 1 or 2.

Project in Statistics

STAT791 P2 W2 (OL-0T-0P-1S-159H-0R-0F-0G-0A-13W-16C)
Aim: To allow and enable the student to work independently on a statistical topic of an applied or theoretical nature.
Content: A project of either theoretical or practical nature from a list of suggested topics under the guidance of a supervisor will be undertaken, a typed report submitted and an oral presentation given.

Assessment: Written report (80%), oral presentation (20%).

DP Requirement: Not applicable.

Offered in Semester 2. This module has no supplementary exam.

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