UNIVERSITY OF ZULULAND

A NODE FOR AFRICAN THOUGHT

HANDBOOK 2023

FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING (UNDERGRADUATE)

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UNIVERSITY OF ZULULAND

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UNIVERSITY OF ZULULAND

FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING

2023

UNDERGRADUATE PROSPECTUS

Vision

A leading comprehensive African university that thrives on quality and fosters collaborative and innovative cultures with its rural and urban campuses.

Purpose Statement

We believe in educating and producing competitive, globally relevant, high-quality African scientists with future-focused competencies

Values

The FSAE embraces the UNIZULU values, which serve as a foundation for a more equitable and inclusive UNIZULU community. The values are:

a) **Discovery** and pursuit of excellence through teaching, learning, research, and innovation in science

b) **Community of Belonging:** We embrace all forms of diversity, social inclusion and elimination of social injustices.

c) **Teamwork:** Working together to accomplish a common goal.

d) **Accountability:** Subscribing to integrity and transparency.

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INTRODUCTION AND OVERVIEW

The Faculty of Science, Agriculture and Engineering, herein called the Faculty, is one of four Faculties at the University of Zululand. It consists of thirteen academic departments and a Science Access Department:

Agriculture
Biochemistry and Microbiology
Botany
Chemistry
Computer Science
Consumer Sciences
Engineering
Geography and Environmental Studies
Human Movement Science
Hydrology
Mathematical Sciences
Nursing Science
Physics
Science Access
Zoology

Change of Codes

As of 2019 the programme and modules codes were changed from ''S" to "4". Programmes have changed for example: SBSC01 has become 4BSC01 and SZOL111 has become 4ZOL111 (SBSC60 which will continue with "S" until the exit of the pipeline students in January 2025). Note: Senior students will continue with the "S" codes.

Qualifications

The Faculty offers the following qualifications:

UNDERGRADUATE QUALIFICATIONS (all semesterised).

The following undergraduate programmes are offered by the Faculty:

(a) A three-year **double major programme** leading to the award of a B.Sc. degree. This permits students to study certain combinations of disciplines in accordance with their interests and requirements. Curricula are designed so that graduates are equipped with the necessary skills to pursue careers in various fields.

(b) A three-year **focussed programme** leading to the following degrees:
B. Consumer Science (Hospitality and Tourism).

(c) A four-year **focussed programme** leading to the following degrees:
B.Sc. Agriculture (Agronomy),
B.Sc. Agriculture (Animal Science),
B.Sc. Agriculture (Agribusiness and Management),
B. Consumer Science (Extension and Rural Development),
Bachelor of Engineering in Electrical Engineering,
Bachelor of Engineering in Mechanical Engineering
Bachelor of Engineering in Electrical Engineering and Computer Engineering,
B.N. (Bachelor of Nursing) [SBSC60] – ***No new first year entrants*** – only existing pipeline students,
B.N. (Bachelor of Nursing) [4BSC60] – **All new first year entrants** – only new registrations.

(d) A three-year **diploma programme** leading to the following diplomas:
Diploma in Sport and Exercise Technology,
Diploma in Hospitality Management.

All the above qualifications are accredited by the Council on Higher Education (CHE) and registered with the South African Qualifications Authority (SAQA) and where applicable, with the relevant Professional bodies i.e. HPCSA, SANC. Engineering qualifications have a Letter of Endorsement from the Engineering council of South Africa (ECSA) and they will be accredited by ECSA as part of the Washington Accord international accreditation process.

Students are advised that even though a module or programme may be included in this Handbook the Faculty of Science, Agriculture and Engineering is not compelled to offer it.

The **Rules** and **Syllabi** sections contain outlines of each qualification and programme offered by the Faculty.

Career Opportunities

Among potential employers of graduates are the commercial and industrial sectors, the education sector, healthcare sector, government departments and research institutes. Please contact individual departments for information on career opportunities in specific fields.

Meanings of Terms Used

Module	Unit of study. Each such unit is given a code. The code structure is as follows:
First letter	Faculty indicator (4 & 5 = Science, Agriculture and Engineering).
Next three letters	Department or discipline indicator (BOT = Botany, CHM = Chemistry, EEE = Electrical, Electronic and Computer Engineering, MEC = Mechanical Engineering etc.).
First number	Year-level (1, 2, 3 or 4).
Second number	Numeric to distinguish between modules offered in the same year and semester (1, 2, 3, etc.).
Third number	Semester (1 = first semester, 2 = second semester, 0 = module offered in both semesters, 9 = year length module).
Elective (module)	A module selected from a given list.
Prerequisite	A module which must be passed before the registration of a module having the prerequisite.
Co-requisite	A module which must be passed before, or registered together with, the module having the co-requisite.
Curriculum	The modules that comprise a qualification.
Programme	A structured curriculum leading to a qualification.
Assessment	The evaluation of a student's work in a module. This will include a combination of tests, seminars, assignments, projects, examinations (formal official evaluations) and other methods.
Continuous Assessment Mark (CAM)	The mark awarded to a student and arises from assessments conducted within a module but excludes the final summative examination. The syllabus for each module indicates how the CAM mark is calculated.
Notional study hours	The learning time required for a student of average ability to meet the outcomes for a module.
Credit points (credits)	One credit point is the value assigned to ten notional study hours of learning and assessment.

Major	In a discipline consists of: 64 credits, modules in that discipline are at year-level 3, At least 30 credits, modules in that discipline are at year-level 2, and At least 30 credits, modules in that or in closely allied disciplines are at year-level 1.
Senate	The Senate of the University of Zululand.
University	The University of Zululand.
Year of study	A student will be deemed to be in the: (a) First year of study, if s/he has not yet obtained a minimum of 64 degree credit points. For Engineering first year of study, if s/he has not yet obtained a minimum of 108 degree credit points. (b) Second year of study, if s/he has obtained at least 64 degree credit points, but has not yet achieved a minimum of 180 degree credit points. For Engineering second year of study if s/he has obtained at least 108 degree credit points but has not yet obtained 50% of the credits needed for the qualification. (c) Third year of study if, either: (i) in a three year programme, s/he has obtained 180 degree credit points. (ii) in a four year programme, s/he has obtained at least 180 degree credit points but has not yet achieved a minimum of 300 degree credit points. (iii) For engineering third year of study, if s/he has obtained at least 50% of the degree credits needed for the qualification. (d) Fourth year of study, if s/he is in a four-year programme and has passed a minimum of 300 degree credit points. For engineering fourth year of study if s/he has registered for such modules which, if passed, will lead to the completion of the degree.

Curriculum Design

(a) Each subject is made up of a number of modules each having a credit rating based on the number of lectures, practical's, tutorials and other related learning activities. A semester-long module is usually worth 16 credit points.

(b) All three-year degrees and diplomas require at least 384 credit points and all four-year degrees require at least 480 credit points. A student normally takes 128 credit points per year.

(c) The choice of modules for a programme is subject to the constraints of the timetable.

(d) Some modules have prerequisite and/or co-requisite requirements. These are listed under **Syllabi** below.

(e) Curricula must be designed to lead to year-level 2 and year-level 3 modules which are necessary (SBSC60 no exit allowed to get a lower qualification) for the completion of a qualification.

(f) In Double Major qualifications, the first year of study students usually take modules in four different disciplines. At the second level of study students must choose modules from two, three or four different subjects (major subjects) from which they will then take two subjects as majors in their third year.

(g) In Focussed Programmes, students will follow a fixed curriculum that specifies which modules are taken and in what sequence they are taken.

(h) The first year of the Electrical Engineering degree curriculum, the Mechanical Engineering degree curriculum, the Electrical and Computer Engineering degree curriculum and

Mechatronic Engineering degree curriculum are identical. Students can transfer from one degree to the other at the end of the first year.

(i) The content may be delivered face to face using the traditional classroom structure or virtually using an on online platform. Students further need to have compatible devices in order to participate in all virtual learning platforms and activities.

Procedure for External Moderation / Examination

(a) Departmental reviews

Each department in the Faculty of Science, Agriculture and Engineering will be reviewed by an External Reviewer(s) on a periodic basis. The External Reviewer(s) will be academic staff member(s) from a similar department at another university and qualified industry representative(s) who have a wide knowledge of the discipline offered by the department. External Reviewers will be appointed by the Faculty Board for a particular review. The minimum qualifications of reviewers will be a PhD in a field directly relevant to the department being reviewed; Reviewers who are or have been Heads of Department are preferred. The External Reviewer(s) will be expected to spend at least two days at the University and will assess the following aspects of Departmental activities:

1. Content of programmes offered.
2. Content of the modules offered.
3. Student study guides / work schedules.
4. Assessments: standard, variety, mark allocation, applicability, fairness of marking, etc.
5. General academic administration of department.
6. Identification of weak and / or strong areas concerning the department.
7. Department productivity (Research and Community Service).
8. Departmental equipment and facilities.

The External Reviewer(s) will submit a written report to the Dean of the Faculty with recommendations of how possible weak areas can be corrected. The Dean will implement appropriate action in conjunction with or after the review in consultation with departmental staff members.

(b) Moderation of Undergraduate Module examinations and scritps

All final-year modules will have their final examination papers and completed scripts sent to external moderators approved by the Faculty Board for moderation and review.

All other modules will have their final examination papers moderated internally.

Recognition of Prior Learning and course passed elsewhere

The onus to apply for recognition of courses passed elsewhere, to be used as credit for a degree at the University of Zululand, rests on the candidate in accordance with University rules found in the general calendar. This is done through the Student Affairs Section. Heads of Departments at the University of Zululand will, on request, evaluate the relevant courses. The candidate must supply any information needed to evaluate each course e.g. the prospectus or course descriptions as published by the former institution. Only after the faculty board has approved the applications will they be entered on the students' record. If a course is not approved the student has to do the relevant modules at the University of Zululand.

Learner Guides / Mode of Delivery

Every student will receive a learner guide for each module that will be distributed as a hardcopy or a soft copy online. This document will contain at least the following information:

(i) Title and code of the module.
(ii) Brief description of the module.
(iii) The learning outcomes to be reached in the module.

(iv) Details of the Lecturer(s) who present the module.
(v) All details of the study material for the module and where it is available.
(vi) A module time schedule, e.g., what work will be covered per week, when assessments take place or when work needs to be handed in, etc.
(vii) A description of the assessment methods and assessment criteria, the schedules for assessments and a breakdown of the composition of the final mark for the module.
(viii) How feedback of assessments is to be given to students.

The content may be delivered face to face using the traditional classroom structure or virtually using an on online platform. Students further need to have compatible devices in order to participate in all virtual learning platforms and activities.

Format of Cover for Examination Papers

All Examination papers, i.e. Examination, Re-examination, Special examination and Aegrotat papers, must contain the following information:

UNIVERSITY OF ZULULAND
FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING

DEPARTMENT OF … … …

Type of Assessment (e.g., Assessment 1, Final Assessment, etc.)

MODULE CODE AND TITLE

Examiner:
Internal Moderator:
External Examiner/Reviewer:

DURATION: DATE: TOTAL MARKS:

Instructions: … … …

Matriculation Points System

The Faculty has adopted the matriculation points system as used by the Central Applications Office and other Universities as part of the entrance requirements for qualifications in the Faculty. Points are awarded as follows:

Under the old (pre 2008) matriculation system (only using the six best results)

Higher Grade

A	>80%	8 points
B	70-79%	7 points
C	60-69%	6 points
D	50-59%	5 points
E	40-49%	4 points
F	33-40%	3 points

Standard Grade

A	>80%	6 points
B	70-79%	5 points
C	60-69%	4 points
D	50-59%	3 points
E	40-49%	2 points
F	33-40%	1 point

Under the new National School Certificate (2008 onwards) (only using the six best subjects and excluding Life Orientation)

Level 7	>80%	7 points
Level 6	70-79%	6 points
Level 5	60-69%	5 points
Level 4	50-59%	4 points
Level 3	40-49%	3 points
Level 2	30-39%	2 points
Level 1	<30%	1 point

Timetable for undergraduate science courses

The University follows a standardised timetable structure which for the Faculty of Science, Agriculture and Engineering is organised such that each module is allocated three 50-minute lecture periods and one three-hour practical period per week. There are eight timetable groups; these are labelled alphabetically (A to H). These groups are distributed according to the following schedule. No student may register in any semester for more than one course in any of these groups.

Time	MON	TUE	WED	THU	FRI
7h30 to 8h20	A	D	B	E	C
8h20 to 8h30					
8h30 to 9h20	B	E	C	A	D
9h20 to 9h30					
9h30 to 10h20	C	A	D	B	E
10h20 to 10h30					
10h30 to 11h20	F	F	G	H	F
11h20 to 11h30					
11h30 to 12h20	G				G
12h20 to 12h30					
12h30 to 13h20	H	PA	PD	PB	H
13h20 to 13h30					
13h30 to 14h20					
14h20 to 14h30					
14h30 to 15h20	PC				PE
15h20 to 15h30					
15h30 to 16h20		PF	PG	PH	
16h20 to 16h30					
16h30 to 17h30					

The timetable has been arranged such that for all of the recommended double-major combinations and for all of the focussed programmes there are no timetable clashes. If however, students need to take courses from different year-levels as a result of failing modules, then clashes might occur. In all cases such as these, the student must take the lower year-level course in preference to the higher year-level course.

FACULTY RULES

The Faculty and Departmental Rules contained in this Handbook and the relevant General Academic Rules of the University are applicable to all students registered in the Faculty of Science, Agriculture and Engineering. Unless otherwise stated, any exceptions to these rules require the approval of the Faculty Board. In all instances, Departmental Rules may not relax the requirements stipulated in the Faculty Rules, and Faculty Rules may not relax the requirements stipulated in the General Rules. Departmental Rules may only replace Faculty Rules which in turn replace General Rules in instances where more stringent requirements are specified.

A UNDERGRADUATE QUALIFICATIONS

S1 ENTRY REQUIREMENTS

Please note that the achievement of the minimum requirements for admission does not guarantee an applicant admission to the Faculty. Applications should be channelled through the Central Applications Office and offers will be made taking into account the academic achievements of applicants and the available spaces in the courses of study.

S1.1 Streams for all B.Sc. Programmes

The faculty offers entry to one of three academic streams.

The **Mainstream** allows direct entry to the regular B.Sc. programmes and students in this stream will be assumed to be adequately prepared for University level study, and should therefore be in a position to complete the programme in the minimum time prescribed for the qualification.

The **Augmented** stream (see rule S16.1) will enable students to complete the first academic year over a period of two years and they will receive substantial additional tuition and support. This stream will add an additional year to the minimum time required for the completion of a programme.

The **Foundation** stream (see rule S16.2) will enable students to spend their first year in a dedicated programme designed to improve their academic grounding. This stream will add an additional year to the minimum time required for the completion of a programme.

S1.2 Under the former Senior Certificate Examinations (completed prior to 2008)

S1.2.1 The minimum requirements for entry into the **B.Sc. programmes**:

(a) **Mainstream**
- (i) A full matriculation endorsement, exemption or conditional exemption or its approved foreign equivalent,
- (ii) A minimum of 28 matriculation points,
- (iii) A pass of at least 50 % (D symbol) at the higher grade (HG) or 60% (C symbol) at the standard grade (SG) in Mathematics. For programmes that require Calculus 1 (4MTH111) and Calculus 2 (4MTH112) the minimum requirement for Mathematics at the higher grade (HG) is 60% (C symbol) and at standard grade (SG) is 70% (B symbol),
- (iv) A pass of at least 50% (D symbol) at the higher grade (HG) or 70% (B symbol) at the standard grade (SG) in at least one of Computer Studies, Physical Science, Biology or Agriculture.

(b) **Augmented Stream**
Candidates who do not satisfy (a) (ii) and/or (a) (iii) and/or (a) (iv) and/or (a) (v) above, but have at least 28 matriculation points and a minimum 40% (E symbol**)** at the higher grade (HG) or 60% (C symbol) at the standard grade (SG) in Mathematics and in one of

Computer Studies, Physical Science, Biology or Agriculture may be placed in the Science Augmented stream.

(c) **Foundation Stream**
Candidates who do not satisfy (a) and (b) but have a full matriculation endorsement, exemption or conditional exemption or its approved foreign equivalent, with at least 26 matriculation points and have attempted Mathematics and at least one of Computer Studies, Physical Science, Biology or Agriculture may be placed in the Science Foundation stream.

S1.2.2 The minimum requirements for entry into the **Engineering programmes** are:

(i) A full matriculation endorsement, exemption or conditional exemption or its approved foreign equivalent,
(ii) A minimum of 30 matriculation points,
(iii) A pass of at least 50 % (D symbol) at the higher grade (HG) or 60% (C symbol) at the standard grade (SG) in English (English Home Language or English First Additional Language),
(iv) A pass of at least 60 % (C symbol) at the higher grade (HG) or 80% (A symbol) at the standard grade (SG) in Mathematics,
(v) A pass of at least 50 % (D symbol) at the higher grade (HG) or 70% (B symbol) at the standard grade (SG) in Physical Science.

S1.2.3 The minimum requirements for entry into the **Consumer Sciences programmes** are:

(a) **B. Consumer Science (Extension and Rural Development):**
(i) A full matriculation endorsement, exemption or conditional exemption or its approved foreign equivalent,
(ii) A minimum of 28 matriculation points,
(iii) A pass in Biology or Physiology of at least 40% (E symbol) at the higher grade (HG) or 50% (D symbol) at the standard grade (SG),
(iv) A pass in English of at least 40% (E symbol) at the higher grade (HG) or 50% (D symbol) at the standard grade (SG).

(b) **B. Consumer Science (Hospitality and Tourism):**
(i) A full matriculation endorsement, exemption or conditional exemption or its approved foreign equivalent,
(ii) A minimum of 26 matriculation points,
(iii) A pass in English of at least 40% (E symbol) at the higher grade (HG) or 50% (D symbol) at the standard grade (SG).

S1.2.4 The minimum requirements for entry into the **B Nursing Programmes** are:

(a) **B Nursing (SBSC60) – will only be offered to existing pipeline students (*No new first year entrants - pipeline students will exit by January 2025*)**
(i) A full matriculation endorsement, exemption or conditional exemption or its approved foreign equivalent,
(ii) A minimum of 30 matriculation points,
(iii) A pass in English of at least 40% (E symbol) at the higher grade (HG) or 50% (D symbol) at the standard grade (SG),
(iv) A pass in Biology of at least 40% (E symbol) at the higher grade (HG) or 50% (D symbol) at the standard grade (SG).

(b) **B Nursing (4BSC60) – all new registrations from 2022**.
(i) A full matriculation endorsement, exemption or conditional exemption or its approved foreign equivalent,

(ii) A minimum of 30 matriculation points,
(iii) A pass in English of at least 40% (E symbol) at the higher grade (HG) or 50% (D symbol) at the standard grade (SG),
(iv) A pass in Biology of at least 40% (E symbol) at the higher grade (HG) or 50% (D symbol) at the standard grade (SG),
(v) A pass in Maths Literacy.

S1.2.5 The minimum requirements for entry into the **Diploma in Sport and Exercise Technology are:**

(i) A matriculation certificate or a school leaving certificate issued by the Joint Matriculation Board or a Senior Certificate issued by any of the authorized examining authorities.

S1.2.6 Vertical articulation from Diploma in Sport and Exercise Technology to BSc. Human Movement Science Degree:

(i) NSC with a pass of at least 50% (level 4) in Mathematics, Life Sciences and Physical Sciences,
(ii) An average of 60% for the three-year Sport and Exercise Technology diploma programme.

S1.2.7 The minimum requirements for entry into the **Diploma in Hospitality Management** are:

(i) A matriculation certificate or a school leaving certificate issued by the Joint Matriculation Board or a Senior Certificate issued by any of the authorized examining authorities,
(ii) A pass in English of at least 40% (E symbol) at the higher grade (HG) or 50% (D symbol) at the standard grade (SG).

S1.3 Under the New National Senior Certificate Examinations (as from 2008 grade 12)

S1.3.1 Minimum requirements for entry into B.Sc. programmes:

Note 1: Mathematical Literacy is not deemed acceptable for direct entry into a B.Sc. programme.

Note 2: Life Orientation is not considered when calculating entrance points.

Note 3: In a case where more than 7 subjects were taken, only the best 6 will be considered.

Note 4: Where majors are chosen from different groupings below (groups (a) to (f)), both sets of entrance criteria must be achieved.

(a) Mainstream (Applied Mathematics, Mathematics or Statistics as a major)

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies (NSC or its approved foreign equivalent),
(ii) A minimum of 28 NSC points,
(iii) A pass of at least 60% (level 5) in Mathematics,
(iv) A pass of at least 50% (level 4) in English,
(v) A pass of at least 50% (level 4) in Physical Sciences.

(b) Mainstream (Physics or Chemistry as a major)

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies (NSC or its approved foreign equivalent),
(ii) A minimum of 28 NSC points,
(iii) A pass of at least 60% (level 5) in Mathematics,
(iv) A pass of at least 50% (level 4) in English,
(v) A pass of at least 50% (level 4) in Physical Sciences.

(c) Mainstream (Biochemistry, Microbiology, Botany, Human Movement Science or Zoology as a major)

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies (NSC or its approved foreign equivalent),
(ii) A minimum of 28 NSC points,
(iii) A pass of at least 50% (level 4) in Mathematics,
(iv) A pass of at least 50% (level 4) in English,
(v) A pass of at least 50% (level 4) in Life Sciences or Agricultural Science,
(vi) A pass of at least 40% (level 3) in Physical Science.

(d) Mainstream (Agriculture)

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies (NSC or its approved foreign equivalent),
(ii) A minimum of 28 NSC points,
(iii) A pass of at least 50% (level 4) in Mathematics,
(iv) A pass of at least 50% (level 4) in English,
(v) A pass of at least 50% (level 4) in Agricultural Science or Life Sciences,
(vi) A pass of at least 40% (level 3) in Physical Science.

(e) Mainstream (Geography as a major)

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies (NSC or its approved foreign equivalent),
(ii) A minimum of 28 NSC points,
(iii) A pass of at least 50% (level 4) in Mathematics,
(iv) A pass of at least 50% (level 4) in English,
(v) A pass of at least 50% (level 4) in Life Sciences or Physical Sciences,
(vi) A pass of at least 50% (level 4) in Geography.

(f) Mainstream (Hydrology as a major)

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies (NSC or its approved foreign equivalent),
(ii) A minimum of 28 NSC points,
(iii) A pass of at least 50% (level 4) in Mathematics,
(iv) A pass of at least 50% (level 4) in English,
(v) A pass of at least 50% (level 4) in Physical Sciences,

(g) Mainstream (Computer Science as a major)

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies (NSC or its approved foreign equivalent),
(ii) A minimum of 28 NSC points,
(iii) A pass of at least 60% (level 5) in Mathematics,
(iv) A pass of at least 50% (level 4) in English,
(v) A pass of at least 50% (level 4) in Physical Sciences.

(h) Augmented Stream

Candidates who do not satisfy the requirements for direct entry to a B.Sc. programme (a-g above), but have a National Senior Certificate (NSC) (NSC or its approved foreign equivalent) with pass allowing entry to degree studies, and have at least 28 NSC points and the following:

(1) Life Science:

(i) Have attained a minimum of 40% (level 3) in Mathematics,
(ii) Have attained a minimum of 40% (level 3) in one of Agricultural Science or Life Sciences,
(iii) Have attended a minimum of 40% (level 3) in Physical Sciences,

(iv) Have attained at least 40% (level 3) in English as First Additional Language or 50% (level 4) in English Home Language.

(2) Physical Science:

(i) Have attained a minimum of 40% (level 3) in Mathematics.
(ii) Have attained a minimum of 40% (level 3) in Physical Sciences.
(iii) Have attained at least 40% (level 3) in English as First Additional Language or 50% (level 4) in English Home Language.

(i) Foundation Stream

Candidates who do not satisfy the requirements for direct entry to a B.Sc. programme (a through to h(ii) above), but do have a National Senior Certificate (NSC) (NSC or its approved foreign equivalent) with pass allowing entry to degree studies, and have at least 26 NSC points may be accepted provided they also have the following:

(i) Have at least 40% (level 3) in Mathematics,
(ii) Have at least 40% (level 3) in at least one of the following: Agricultural Science or Life Sciences,
(iii) Have at least 30% (level 2) in Physical Science,
(iv) Have attained at least 40% (level 3) in English First Additional Language or 50% (level 4) in English Home Language.

S1.3.2 Minimum requirements for entry into the Consumer Sciences programmes:

(a) B. Consumer Science (Extension and Rural Development)

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies (NSC or its approved foreign equivalent),
(ii) A minimum of 28 NSC points,
(iii) A pass of at least 50% (level 4) in English and Life Orientation,
(iv) A pass of at least 50% (level 4) in Life Sciences or Agricultural Science.

(b) B. Consumer Science (Hospitality and Tourism)

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies (NSC or its approved foreign equivalent),
(ii) A minimum of 28 NSC points,
(iii) A pass of at least 50% (level 4) in English and Life Orientation.

S1.3.3 Minimum requirements for entry into the Engineering programmes:

Electrical Engineering, Mechanical Engineering, Electrical & Computer Engineering and Mechatronic Engineering:

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies (NSC or its approved foreign equivalent),
(ii) A minimum of 30 NSC points,
(iii) A pass of at least 65% (level 5) in Mathematics,
(iv) A pass of at least 50% (level 4) in English Home Language or English First Additional Language,
(v) A pass of at least 60% (level 5) in Physical Sciences.

S1.3.3.1 Additional Entry Requirements to widen access to Engineering:

a) A-level

(i) at least C for English at IGCSE/O-level,

(ii) at least C for Mathematics at A-level and D for Physics at A-level.

b) AS-level

(i) at least C for IGCSE/O-level English,

(ii) at least B for Mathematics at AS-level and C for Physics at AS-level plus two other AS- level subjects with C symbols.

c) Namibian Senior Secondary Certificate (NSSC)

At least four higher level subjects with:

(i) level 1 pass in Mathematics,

(ii) level 2 pass in Physical Science,

(iii) level 3 pass in English.

d) International Baccalaureate

Full IB Diploma with at least a Grade 6 pass at SL or a Grade 5 pass at HL for each of the subjects:

(i) Mathematics,

(ii) Physics.

Note: Mathematical Studies is not acceptable.

e) Articulation from N4 and N5 National Certificate

Applicants who fail to meet the entry requirement to the degrees at the NSC level can gain entry withpasses at the N4 + N5 level.

(i) 70% for Mathematics at N4 and N5 level,

(ii) 70% average for all subjects in N4 and 60% average in N5,

(iii) A pass of at least 50% (level 4) in English Home Language or 50% in English first additional languageat NSC or 60% at N3.

f) Articulation from other South African and overseas Engineering diplomas or degrees with credit and exemptions.

Applications will be accepted from students with a good academic record with a completed, or a part completed diploma or degree programme from a South African, or overseas higher education institute thatmeets the ECSA knowledge area requirements. Diploma students require a pass mark of 65% for each module. These modules must be passed at the first attempt. Credits and exemptions will be determined on a module-by-module basis.

g) Articulation from UNIZULU 3-year BSc degree to 4 year BEng Degree

Students who are registered in the Faculty for a BSc degree can transfer to a BEng degree if they pass the equivalent BSc modules at the first attempt. Students will be given credit and exemption for BEng modules if they have passed the equivalent BSc modules. A list of equivalent BSc modules together with the minimum pass marks is found in the table below:

Engineering Module	Equivalent Science Module
4MTH171	4MTH111 with 65% or 4LMH111 with 65%
4PHY171	4PHY111 with 65% or 4LPH111/4PHY121 with 65% or 4LPH121 with 65%
4CPS171	4CPS111 with 65%

4CHM171	4CHM111 with 65% or 4LCH111 with 65%
4MTH172	4MTH112 with 65% or 4LMH112 with 65%
4PHY172	4PHY112 with 65% or 4LPH112/4PHY122 with 65% or 4LPH122 with 65%
4CPS172*	4CPS112 with 65%
4MTH271	4MTH221 with 65%
4MTH272	4MTH222 with 65%
4PHY272*	4PHY222 with 65%

* Only offered in the BEng Electrical Engineering

h) Articulation from the UNIZULU BSc Augmented programmes

Students who are registered for a BSc Augmented programme can articulate to a BEng degree upon completion of the programme if the equivalent BSc Augmented module is passed at the first attempt. Students will be given credit and exemption for BEng modules if they have passed the equivalent BSc Augmented modules. A list of BSc Augmented equivalent modules together with minimum pass marks is found in the table below:

Engineering Module	Equivalent Science Module
4MTH171	4LMH111 with 65%
4PHY171	4LPH111 with 65% or 4LPH121 with 65%
4CPS171	4CPS111 with 65%
4CHM171	4LCH111 with 65%
4MTH172	4LMH112 with 65%
4PHY172	4LPH112 with 65% or 4LPH122 with 65%
4CPS172*	4CPS112 with 65%
4MTH271	4MTH221 with 65%
4MTH272	4MTH222 with 65%
4PHY272*	4PHY222 with 65%

* Only offered in the BEng Electrical Engineering

S1.3.4 Minimum requirements for entry into Nursing programme:

B Nursing (4BSC60):

(i) A National Senior Certificate (NSC) with passes allowing entry to degree studies is required. (NSC or its approved foreign equivalent)
(ii) A minimum of 30 NSC points,
(iii) A pass of at least 50% (level 4) in English Home Language or English First Additional Language,
(iv) A pass of at least 50% (level 4) in Life Sciences,
(v) A pass of at least 50% in Mathematics literacy or Mathematics.

S1.3.5 Minimum requirements for entry into Diploma programmes:

(a) Diploma in Sport and Exercise Technology

(i) A pass in the National Senior Certificate (NSC-Dip) with at least 26 NSC points,
(ii) A pass of at least 40% (level 3) in four recognized NSC 20-credit subjects,
(iii) A pass of at least 40% (level 3) for English as First Additional Language or a pass of at least 50% (level 4) for English as Home language.

(b) Diploma in Hospitality Management

(i) A pass in the National Senior Certificate (NSC-Dip) with at least 26 NSC points,
(ii) A pass of at least 40% (level 3) in four recognized NSC 20-credit subjects,
(iii) A pass of at least 50% (level 4) for English and Life Orientation.

S2. REGISTRATION RESTRICTIONS

(a) Candidates may register for a module only if all prerequisite requirements for that module have been satisfied.

(b) In all semesters of registration, for undergraduate degree programs, the maximum load will be 64 credits (4 modules of 16 credits each). Students who have passed at least 7 modules in their previous academic year, and require only one additional module to complete their degree, may register for one additional module in one of the semesters of their final year of study. Any deviation from this will require the approval of the Dean. Please note that the compulsory Computer Literacy modules, where they are included in the first year curricula, do not contribute to the maximum number of modules stated above. The exception is the B. Nursing degree, in which the Computer Literacy modules do contribute to the maximum number of modules.

(c) For augmented programmes candidates may not register for more than 3 modules (16 credits each) per semester for the first two years and may not repeat a module more than once.

(d) Students may only register for:

(i) Year-level 2 modules after they have obtained at least 64 credits at year-level 1 including 32 credits which are compulsory for their chosen programme or major,
(ii) Year-level 3 modules after they have passed all year-level 1 modules and at least four year-level 2 modules (64 credits) including 32 credits which are compulsory for their chosen programme or major.

At registration, students must register for outstanding year-level 1 modules before they register for any year-level 2 modules and they must register for outstanding year-level 2 modules before they register for any year-level 3 modules. In B. Nursing (SBSC60 and 4BSC60), students must complete all pre-requisites for each year level and clinical competencies OR work integrated learning.

(e) Students who have failed any module more than once will need the approval of the Dean before they can register for this module for a further attempt.

(f) Any module published in this prospectus may, in any particular year, not be offered if the demand for the module does not warrant it or if qualified staff to teach it are not available. Students may defer their registration for this module to the following year or an appropriate module will be officially offered in its place.

S3 ASSESSMENT

(a) Assessment types

(i) Continuous assessment marks (CAM) derived from assignments, practicals, tests and other activities while a module is being taught,
(ii) Final examinations conducted at the end of a module,
(iii) Re-examinations conducted subject to admittance after the final mark of a module is determined,
(iv) Aegrotat examinations held if special circumstances prevented a student from attending final examinations,
(v) Special examinations held to enable a student to graduate if the examination is passed.

(b) Continuous assessment mark (CAM)

The components that contribute to the CAM for each module and the requirements for admittance to the final examination, *the Duly Performed (DP) requirement*, for each module are indicated in the syllabi of each module.

(c) Final Examinations

There shall be two periods for final examinations, one at the end of each semester.

(i) The final examinations for a module normally comprise a final written or computer based examination. Some modules may include a final practical examination, while research based modules are assessed through the production of a research report.
(ii) A subminimum of 40% is required for each of the final examinations in a module.

(d) Re-Examinations

Re-examinations are held to allow a student who failed a module by a small margin to re-attempt the examination. The primary purpose of such an examination is to confirm whether a student has or has not met the outcomes specified for the module. The exam is treated as a separate entity and the continuous assessment mark is not used in the determination of the final mark.

There shall be a re-examination period each semester after the final examinations have been completed. These examinations are normally written but may include oral and/or practical components.

(i) Candidates who fail a module with a final mark of between 40% and 48% shall be permitted to write a re-examination in that module.
(ii) Students who write re-examinations in a module may not be awarded a final mark for that module of more than 50 %.
(iii) Students who write re-examinations will have their re-examination mark recorded separately on their academic record.
(iv) No further examination (re-examination or aegrotat examination) will be granted after the completion of the re-examinations period (i.e. the module must be registered again in a subsequent year).

(e) Aegrotat examinations

The General rules for admission to an aegrotat examination apply.

(f) Special Re-examinations

Please refer to the General rules.

(g) Final Mark Calculations

(i) The final mark for a module is derived from the CAM and the final examination (or aegrotat examination) mark.
(ii) The CAM may not comprise more that 50% of the final mark.
(iii) A final mark of below 50% constitutes a fail.

(iv) Re-examinations and Special Re-examinations may not result in a final mark of more than 50%.

(v) The General Rules that relate to the classification of the final mark of a module (distinction, merit. pass) apply.

S4 ATTAINMENT AND CONFERMENT OF DEGREE

(a) A qualification must be completed in no more than two years beyond the minimum prescribed time for that qualification. Only years that have been registered are used in determining the number of years taken by a student.

(b) Students who have satisfied all of the academic requirements of a programme, including all of the compulsory modules specified for that qualification, will be deemed to have completed the degree. In the case of Nursing, students' academic requirements include the Work Integrated Learning (WIL) component with its workbooks, midwifery registers and attendance both for theory and work integrated learning placements.

(c) The conferral of the degree at a graduation ceremony will only occur once all administrative and financial requirements have been met in addition to the academic requirements.

(d) The General Rules that relate to the classification of a degree (distinction, first class etc.) apply.

(e) The General Rules that relate to the attainment and conferment of degrees apply.

S5 EXCLUSION RULES

Students who fail to obtain the minimum number of credits at the end of each semester, as tabulated below, and are unable to propose an academic plan acceptable to the Dean to address their slow progress, shall be excluded from the Faculty.

SEM	MAINSTREAM	AUGMENTED	YEAR
1 2	32 (2 semester modules) 64 (4 semester modules)	32 (2 semester modules) 64 (4 semester modules)	1
3 4	96 (6 semester modules) 144 (9 semester modules)	96 (6 semester modules) 128 (8 semester modules)	2
5 6	177 (11 semester modules) 224 (14 semester modules) *(64 at level-2)*	160 (10 semester modules) 192 (12 semester modules) *(32 at level-2)*	3
7 8	256 (16 semester modules) 304 (19 semester modules) *(96 at level-2 and 48 at level-3)*	224 (14 semester modules) 256 (16 semester modules) *(96 at level-2 or level-3)*	4
9 10	336 (21 semester modules) 384 (24 semester modules) **(3-year qualification complete)** *(4-year qualification: 90 at level-3)*	288 (18 semester modules) 320 (20 semester modules) *(64 at level-3)*	5
11 12	420 (28 semester modules) 480 (32 semester modules) **(4-year qualification complete)**	330 (22 semester modules) 384 (24 semester modules) **(3-year qualification complete)** *(4-year qualification: 90 at level-3)*	6
13 14		420 (28 semester modules) 480 (32 semester modules) **(4-year qualification complete)**	7

Exclusion Rule – Engineering Programmes:

Semester	Credits
1 2	32 72
3 4	108 160
5 6	192 252 *(108 at 2nd year level)*
7 8	288 352 *(64 at 3rd year level)*
9 10	378 432 *(108 at 3rd year level)*
11 12	504 576 **(qualification complete)**

NOTE:
- (i) The number of semesters spent in other universities or faculties may be used in the above calculations.
- (ii) The University General rules apply for any appeals of exclusion

S6 TRANSITION FROM PRE-2007 to POST-2008 QUALIFICATIONS

The Faculty has phased out all qualifications based on term-length 8 credit modules that were offered prior to 2008. As from 2008, these have been replaced by qualifications based on semester-length 16 credit modules. Since the pre-2008 qualifications are no longer accredited, students who wish to register will have to do so under the new qualifications, starting from the first year.

S7 STRUCTURE OF QUALIFICATIONS

The structure of qualifications in the Faculty as outlined below follow the Higher Education Qualifications Framework (HEQF) as published in the Government Gazette (30 August 2013).

S7.1 Undergraduate Diplomas

(a) The minimum duration of a three-year diploma is six semesters.

(b) The total credit value of a diploma is at least 360 credits provided that at least 120 credits are at NQF level 6.

(c) The exit level of the Diploma is NQF 6.

S7.2 Undergraduate Degrees

(a) The minimum duration of a three-year qualification is six semesters.

The total credit value of a three-year qualification is at least 384 credits, provided that at least 120 credits are at NQF level 7.
The exit level of these qualification is NQF Level 7.

(b) The minimum duration of a four-year qualification is eight semesters.
The total credit value of a four-year qualification is at least 480 credits, provided that at least 120 credits are at NQF level 8.
The exit level of these qualifications is NQF level 8.

(c) Within any undergraduate degree offered by the Faculty, credits gained for the modules indicated in Column A in the table below may not be used together with credits gained for the paired modules indicated in Column B.

COLUMN A		COLUMN B	
4CHM111	General Chemistry 111	4CHM121	Basic Chemistry 121
		4CHM132	Chemistry for Consumer Sciences
4CHM112	General Chemistry 112	4CHM122	Basic Chemistry 122
		4CHM132	Chemistry for Consumer Sciences
4CHM121	Basic Chemistry 121	4CHM132	Chemistry for Consumer Sciences
4CHM122	Basic Chemistry 122	4CHM132	Chemistry for Consumer Sciences
4MTH111	Calculus I	4MTH122	Mathematics and Statistics for the Earth and Life Sciences
		4STT121	Mathematics and Statistics for Commerce Students
4MTH112	Calculus II	4MTH122	Mathematics and Statistics for the Earth and Life Sciences
		4STT121	Mathematics and Statistics for Commerce Students
4MTH122	Mathematics and Statistics for the Earth and Life Sciences	4STT121	Mathematics and Statistics for Commerce Students
4PHY111	Classical Mechanics and Properties of Matter	4PHY121	Classical Mechanics and Properties of Matter for Biological Sciences
		4PHY131	Physics for Consumer Sciences
4PHY112	Nuclear Physics, Electromagnetism, Modern Physics	4PHY122	Nuclear Physics, Electromagnetism, Modern Physics for Biological Sciences
		4PHY131	Physics for Consumer Sciences
4PHY121	Classical Mechanics and Properties of Matter for Biological Sciences	4PHY131	Physics for Consumer Sciences
4PHY122	Nuclear Physics, Electromagnetism, Modern Physics for Biological Sciences	4PHY131	Physics for Consumer Sciences

4STT111	Elementary Statistics for Science Students	4STT121	Mathematics and Statistics for Commerce Students
		4STT122	Elementary Statistics for Commerce Students

S8 EXTERNAL CREDITS

Modules passed at another university, if deemed equivalent by the Faculty Board, may count for up to a maximum of 50% of the candidate's curriculum**.** However, year-level 3 modules may not be substituted for those passed at any another University.

S9 COMMON CURRICULUM (DEGREE BASED ON MAJORS)

Programmes offered in the Faculty are divided into three broad groups, the Life Sciences, the Physical & Mathematical Sciences and the Earth Sciences. In many cases students will pursue a qualification having majors that are in the same broad group but it is also possible for students to have majors from two different groups, provided that this combination is deemed acceptable by the Faculty and that it is possible to study the subjects within the timetable.

The Life Sciences group incorporates the disciplines of Biochemistry, Botany, Human Movement Science, Microbiology and Zoology.

The Physical and Mathematical Sciences group incorporates the disciplines of Applied Mathematics, Chemistry, Computer Sciences, Mathematics, Physics and Statistics.

The Earth Sciences group incorporates the disciplines of Geography and Hydrology.

S10 STRUCTURE OF DEGREE BASED ON MAJORS

(a) 64 year-level 3 credits (NQF level 7) shall be in modules for each major subject.

(b) At least 32 year-level 2 credits (NQF level 6) must be specified for each major.

S11 MAJOR SUBJECTS OFFERED BY THE FACULTY FOR DOUBLE MAJORS

Applied Mathematics
Biochemistry
Human Movement Science
Botany
Chemistry
Computer Science
Geography
Hydrology
Mathematics
Microbiology
Physics
Statistics
Zoology

S12 RULES FOR COMBINATION OF MAJORS

The Faculty of Science, Agriculture and Engineering recommends 37 double major combinations as outlined below. No other combinations will be allowed.

Applied Mathematics and	Computer Science, Hydrology, Mathematics, Physics, or Statistics
Biochemistry and	Botany, Chemistry, Human Movement Science, Microbiology, or Zoology.
Botany and	Biochemistry, Geography, Hydrology, Microbiology, or Zoology.
Chemistry and	Biochemistry, Computer Science, Hydrology, Mathematics, Physics or Zoology.
Computer Science and	Applied Mathematics, Chemistry, Hydrology, Mathematics, Physics or Statistics.
Geography and	Botany, Hydrology, Physics, Statistics or Zoology.
Human Movement and	Biochemistry, Microbiology or Physics Science.
Hydrology and	Applied Mathematics, Botany, Chemistry, Computer Science, Geography, Microbiology, Physics, Statistics or Zoology.
Mathematics and	Applied Mathematics, Chemistry, Computer Science, Physics or Statistics.
Microbiology and	Biochemistry, Botany, Human Movement Science, Hydrology or Zoology.
Physics and	Applied Mathematics, Chemistry, Computer Science, Geography, Hydrology, Human Movement Science, or Mathematics
Statistics and	Applied Mathematics, Computer Science, Geography, Hydrology or Mathematics.
Zoology and	Biochemistry, Botany, Chemistry, Geography, Hydrology or Microbiology.

S13 CURRICULA FOR RECOMMENDED DOUBLE MAJOR COMBINATIONS

The following tables outline the curricula of the 37 recommended double major combinations. Where elective choices are indicated by shading, a choice must be made between the specified options. No other module may be used instead. Students are advised to choose their elective subjects taking into account their academic background and their interests.

Pre-requisites and Co-requisites are indicated and these must be adhered to.

The following substitute modules, for modules indicated in the curricula as both modules to be taken and modules that are pre- and co- requisites, are applied wherever they appear in degree programmes:

Module	Substitute Module(s)
4BOT111	4LBT111
4BOT112	4LBT112
4CHM121	4LCH121/4CHM111
4CHM122	4LCH122/4CHM112
4MTH111	4LMH111
4MTH112	4LMH112
4MTH122	4LMH122/4MTH111/4MTH112/4LMH111/4LMH112
4PHY111	4LPH111/4PHY121 with 60%/4LPH121 with 60%
4PHY112	4LPH112/4PHY122 with 60%/4LPH122 with 60%
4PHY121	4LPH121/4PHY111/4LPH111
4PHY122	4PHY112/4LPH112
4ZOL111	4LZL111
4ZOL112	4LZL112
4LBT111	4BOT111
4LBT112	4BOT112
4LCH121	4CHM121/4CHM111
4LCH122	4CHM122/4CHM112
4LMH111	4MTH111
4LMH112	4MTH112
4LMH122	4MTH122/4MTH111/4LMH111/4MTH112/4LMH112
4LPH111	4PHY111/4PHY121 with 60%/4LPH121 with 60%
4LPH112	4PHY112/4PHY122 with 60%/4LPH122 with 60%
4LPH121	4PHY121/4PHY111/4LPH111
4LZL111	4ZOL111
4LZL112	4ZOL112

In addition to these, if a module is in brackets in the tables below, it is a substitute module that may be used in place of the module immediately preceding it.

The timetable group for each module is indicated by a letter immediately after the module code. Students may not register for modules that clash on the timetable (i.e. the lower year level module must be registered)

M = Major subject
C = Compulsory module
E = Elective module

4BSC01 APPLIED MATHEMATICS AND COMPUTER SCIENCE		
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**	
DEPARTMENTS:	MATHEMATICAL SCIENCES AND COMPUTER SCIENCE	
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE	
QUALIFIER		
MAJORS	**APPLIED MATHEMATICS**	**COMPUTER SCIENCE**
ABBREVIATION	BSC	
QUALIFICATION CODE (SAQF)		
UNIZULU CODE	4BSC01	
EXIT NQF LEVEL	7	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE OR INFO TECHNOLOGY	
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS	
MINIMUM DURATION OF STUDIES	3 YEARS	
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES	
INTAKE FOR THE QUALIFICATION:	JANUARY	
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY	
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES	
TOTAL CREDITS TO GRADUATE:	416	

SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
DISCRETE MATHEMATICS	4AMT111 G	M	16	5		4MTH111
CALCULUS I	4MTH111 F	C	16	5		
INTRODUCTORY COMPUTING	4CPS111 B	M	16	5		
EITHER CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	E	16	5		4MTH111
OR ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	E	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
FURTHER DISCRETE MATHEMATICS	4AMT122 G	M	16	6		4MTH112 4AMT111
CALCULUS II	4MTH112 F	C	16	6		4MTH111

INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	M	16	6		4CPS111
EITHER ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	E	16	6		
OR STATISTICS FOR SCIENCE STUDENTS	4STT112 E	E	16	6		4STT111 4MTH112
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
DYNAMICAL SYSTEMS & MATHEMATICAL MODELLING	4AMT211 E	M	16	6	4AMT122 4MTH111 4AMT111 4MTH112	4MTH221
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
DATA STRUCTURES AND ALGORITHMS	4CPS211 D	M	16	6	4CPS111 4CPS112	
COMPUTER COMMUNICATIONS & NETWORKS	4CPS231 A	C	16	6	4CPS111	
SECOND YEAR SEMESTER 2						
INTRO TO OPERATIONS RESEARCH	4AMT212 E	M	16	6	4AMT112	4MTH222
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
SOFTWARE ENGINEERING	4CPS212 D	M	16	6	4CPS112	4CPS211
DATABASE INFORMATION MANAGEMENT I	4CPS232 A	C	16	6	4CPS111	
THIRD YEAR SEMESTER 1						
TENSOR ANALYSIS	4AMT331 B	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
APPLIED MATHEMATICAL METHODS	4AMT321 D	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
ADVANCED PROGRAMMING TECHNIQUES	4CPS311 E	M	16	7	4CPS211 4CPS212	
SYSTEMS PROGRAMMING (OS & COMPILERS)	4CPS321 G	M	16	7	4CPS211 4CPS212	
THIRD YEAR SEMESTER 2						

ADVANCED CLASSICAL MECHANICS	4AMT312 B	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
NUMERICAL METHODS	4AMT322 D	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
DISTRIBUTED SYSTEMS DEVELOPMENT	4CPS312 E	M	16	7	4CPS211 4CPS212	
FINAL YEAR PROJECT	4CPS322 G	M	16	7	4CPS211 4CPS212	4CPS311 4CPS321

4BSC02 APPLIED MATHEMATICS AND HYDROLOGY						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	MATHEMATICAL SCIENCES AND HYDROLOGY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
MAJORS	**APPLIED MATHEMATICS**				**HYDROLOGY**	
ABBREVIATION	BSC					
UNIZULU CODE	4BSC02					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	C	16	5		
CALCULUS I	4MTH111 F	C	16	5		
DISCRETE MATHEMATICS	4AMT111 G	M	16	5		4MTH111
CLASSICAL MECHANICS AND PROPERTIES OF MATTER	4PHY111 A	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO GEOLOGY	4HYD112 D	M	16	6		
CALCULUS II	4MTH112 F	C	16	6		4MTH111
FURTHER DISCRETE MATHEMATICS	4AMT122 G	M	16	6		4MTH112 4AMT111
ELEMENTARY STATISTICS FOR COMMERCE STUDENTS	4STT122 C	C	16	6		
COMPUTER LITERACY II	4CPS122 X	C	16	5		

SECOND YEAR SEMESTER 1						
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	M	16	6	4GES111	
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
DYNAMICAL SYSTEMS & MATHEMATICAL MODELLING	4AMT211 E	M	16	6	4AMT122 4MTH111 4AMT111 4MTH112	4MTH221
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	C	16	6	4GES111	
SECOND YEAR SEMESTER 2						
INTRO TO SUBSURFACE HYDROLOGY	4HYD212 F	M	16	6	4HYD112	
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
INTRO TO OPERATIONS RESEARCH	4AMT212 E	M	16	6	4AMT122	4MTH222
GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	C	16	6		4GES211
THIRD YEAR SEMESTER 1						
SURFACE WATER HYDROLOGY	4HYD311 A	M	16	7	4HYD211 4STT122	
GROUNDWATER HYDROLOGY	4HYD321 C	M	16	7	4HYD212	
TENSOR ANALYSIS	4AMT331 B	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
APPLIED MATHEMATICAL METHODS	4AMT321 D	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
THIRD YEAR SEMESTER 2						
HYDROLOGICAL MODELLING	4HYD332 A	M	16	7	4HYD211 4HYD212	
WATER RESOURCES MANAGEMENT	4HYD342 C	M	16	7	4HYD211	
ADVANCED CLASSICAL MECHANICS	4AMT312 B	M	16	7	LEVEL 1: 4MTH111,	

					4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
NUMERICAL METHODS	4AMT322 D	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	

4BSC03 APPLIED MATHEMATICS AND MATHEMATICS		
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**	
DEPARTMENTS:	MATHEMATICAL SCIENCES	
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE	
QUALIFIER		
MAJORS	**APPLIED MATHEMATICS**	**MATHEMATICS**
ABBREVIATION	BSC	
QUALIFICATION CODE (SAQF)		
UNIZULU CODE	4BSC03	
EXIT NQF LEVEL	7	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE OR INFO TECHNOLOGY OR LIFE SCIENCES	
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS	
MINIMUM DURATION OF STUDIES	3 YEARS	
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES	
INTAKE FOR THE QUALIFICATION:	JANUARY	
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY	
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES	
TOTAL CREDITS TO GRADUATE:	416	

SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
CALCULUS I	4MTH111F	M	16	5		
DISCRETE MATHEMATICS	4AMT111G	M	16	5		4MTH111
INTRODUCTORY COMPUTING	4CPS111B	E	16	5		
EITHER CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111A	E	16	5		4MTH111
OR GENERAL CHEMISTRY 111	4CHM111E	E	16	5		
COMPUTER LITERACY I	4CPS121X	C	16	5		
FIRST YEAR SEMESTER 2						
FURTHER DISCRETE MATHEMATICS	4AMT122G	M	16	6		4MTH112 4AMT111

CALCULUS II	4MTH112F	M	16	6		4MTH111
INTRO TO SYSTEMS PROGRAMMING	4CPS112B	C	16	6		4CPS111
EITHER ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112A	E	16	6		
OR GENERAL CHEMISTRY 112	4CHM112E	E	16	6		4CHM111
COMPUTER LITERACY II	4CPS122X	C	16	5		
SECOND YEAR SEMESTER 1						
DYNAMICAL SYSTEMS & MATHEMATICAL MODELLING	4AMT211E	M	16	6	4AMT122 4MTH111 4AMT111 4MTH112	4MTH221
ADVANCED CALCULUS	4MTH221H	M	16	6	4MTH112	
EITHER DATA STRUCTURES AND ALGORITHMS	4CPS211D	E	16	6	4CPS111	
OR COMPUTER COMMUNICATIONS NETWORKS	4CPS231A	E	16	6		4CPS111
EITHER MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211C	E	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
OR ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211G	E	16	6	4CHM111,4CHM112 4MTH111	
SECOND YEAR SEMESTER 2						
INTRO TO OPERATIONS RESEARCH	4AMT212E	M	16	6	4AMT122	4MTH222
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222H	M	16	6	4MTH112 4MTH111	
EITHER SOFTWARE ENGINEERING	4CPS212D	E	16	6	4CPS112	4CPS211
OR DATABASE INFORMATION MANAGEMENT I	4CPS232A	E	16	6		4CPS111
EITHER MODERN PHYSICS, PHOTONICS AND WAVES	4PHY212C	E	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
OR ORGANIC & PHYSICAL CHEMISTRY 2	4CHM212G	E	16	6	4CHM111 4CHM112 4MTH111	
THIRD YEAR SEMESTER 1						
TENSOR ANALYSIS	4AMT331B	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	

APPLIED MATHEMATICAL METHODS	4AMT321D	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
ABSTRACT ALGEBRA	4MTH311A	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
REAL ANALYSIS	4MTH321C	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
THIRD YEAR SEMESTER 2						
ADVANCED CLASSICAL MECHANICS	4AMT312B	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
NUMERICAL METHODS	4AMT322D	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
GRAPH THEORY	4MTH312A	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	

COMPLEX ANALYSIS	4MTH322 C	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	

4BSC04 APPLIED MATHEMATICS AND PHYSICS		
FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING	
DEPARTMENTS:	MATHEMATICAL SCIENCES AND PHYSICS	
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE	
QUALIFIER		
MAJORS	APPLIED MATHEMATICS	PHYSICS
ABBREVIATION	BSC	
QUALIFICATION CODE (SAQF)		
UNIZULU CODE	4BSC04	
EXIT NQF LEVEL	7	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE	
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS	
MINIMUM DURATION OF STUDIES	3 YEARS	
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES	
INTAKE FOR THE QUALIFICATION:	JANUARY	
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY	
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES	
TOTAL CREDITS TO GRADUATE:	416	

SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
CALCULUS I	4MTH111 F	M	16	5		
DISCRETE MATHEMATICS	4AMT111 G	C	16	5		4MTH111
CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	M	16	5		4MTH111
EITHER INTRODUCTORY COMPUTING	4CPS111 B	E	16	5		
OR GENERAL CHEMISTRY 111	4CHM111 E	E	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
FURTHER DISCRETE MATHEMATICS	4AMT122 G	M	16	6		4MTH112 4AMT111
CALCULUS II	4MTH112 F	C	16	6		4MTH111

ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	M	16	6		
EITHER INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	E	16	6		4CPS111
OR ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM112 G	E	16	6	4CHM111 4CHM112 4MTH111	
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
DYNAMICAL SYSTEMS & MATHEMATICAL MODELLING	4AMT211 E	M	16	6	4AMT122 4MTH111 4AMT111 4MTH112	4MTH221
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
EITHER DATA STRUCTURES AND ALGORITHMS	4CPS211 D	E	16	6	4CPS111	
OR ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211 G	E	16	6	4CHM111 4CHM112 4MTH111	
SECOND YEAR SEMESTER 2						
INTRO TO OPERATIONS RESEARCH	4AMT212 E	M	16	6	4AMT122	4MTH222
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
MODERN PHYSICS , PHOTONICS & WAVES	4PHY212 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
ELECTROMAGNETISM	4PHY222 A	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
THIRD YEAR SEMESTER 1						
TENSOR ANALYSIS	4AMT331 B	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
APPLIED MATHEMATICAL METHODS	4AMT321 D	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
QUANTUM AND STATISTICAL PHYSICS	4PHY311 H	M	16	7	4PHY212	
ELECTRONIC CIRCUITS AND DEVICES	4PHY321 F	M	16	7	4PHY211 4PHY212 4PHY222	

THIRD YEAR SEMESTER 2						
ADVANCED CLASSICAL MECHANICS	4AMT312 B	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
NUMERICAL METHODS	4AMT322 D	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
NUCLEAR PHYSICS AND APPLICATIONS	4PHY312 H	M	16	7	4PHY211 4PHY212	
SOLID STATE PHYSICS & MATERIAL SCIENCE	4PHY322 F	M	16	7	4PHY211 4PHY212	

4BSC05 APPLIED MATHEMATICS AND STATISTICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	MATHEMATICAL SCIENCES					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**APPLIED MATHEMATICS**				**STATISTICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC05					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE OR INFO TECHNOLOGY OR LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
CALCULUS I	4MTH111 F	C	16	5		
DISCRETE MATHEMATICS	4AMT111 G	M	16	5		4MTH111
INTRODUCTORY COMPUTING	4CPS111 B	C	16	5		
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	M	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
FURTHER DISCRETE MATHEMATICS	4AMT122 G	M	16	6		4MTH112 4AMT111
CALCULUS II	4MTH112 F	C	16	6		4MTH111
INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	C	16	6		4CPS111
STATISTICS FOR SCIENCE STUDENTS	4STT112 E	M	16	6		4STT111 4MTH112
COMPUTER LITERACY II	4CPS122 X	C	16	5		

SECOND YEAR SEMESTER 1						
DYNAMICAL SYSTEMS & MATHEMATICAL MODELLING	4AMT211 E	M	16	6	4AMT122	4MTH221
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
DATA STRUCTURES AND ALGORITHMS	4CPS211 D	C	16	6	4CPS111	
DISTRIBUTION THEORY	4STT211 C	M	16	6	4STT112	4MTH221
SECOND YEAR SEMESTER 2						
INTRO TO OPERATIONS RESEARCH	4AMT212 E	M	16	6	4AMT122	4MTH222
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
SOFTWARE ENGINEERING	4CPS212 D	C	16	6	4CPS112	4CPS211
STATISTICAL INFERENCE	4STT212 C	M	16	6	4STT112	4STT211 4MTH221
THIRD YEAR SEMESTER 1						
TENSOR ANALYSIS	4AMT331 B	M	16	7	4AMT212	
APPLIED MATHEMATICAL METHODS	4AMT321 D	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
RANDOM PROCESSES	4STT311 F	M	16	7	4STT211 4STT212	
EXPERIMENTAL DESIGN	4STT321 H	M	16	7	4STT211 4STT212	
THIRD YEAR SEMESTER 2						
ADVANCED CLASSICAL MECHANICS	4AMT312 B	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
NUMERICAL METHODS	4AMT322 D	M	16	7	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	
LINEAR MODELS	4STT312 F	M	16	7	4STT211 4STT212	
TIME SERIES	4STT322 H	M	16	7	4STT211 4STT212	

4BSC06 BIOCHEMISTRY AND BOTANY						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	BIOCHEMISTRY & MICROBIOLOGY AND BOTANY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
MAJORS	**BIOCHEMISTRY**				**BOTANY**	
ABBREVIATION	BSC					
UNIZULU CODE	4BSC06					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	M	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	M	16	6		4BOT111
INTRO TO ZOOLOGY II	4ZOL112 A	C	16	6		4ZOL111
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						

BIOMOLECULES & ENZYMOLOGY	4BCH211 H	M	16	6	4CHM121 4CHM122	
PROKARYOTES STRUCTURE AND ENVIRONMENTAL MICROBIOLOGY	4MCB221 A	C	16	6	4CHM121 4CHM122	
PLANT GROWTH & DEVELOPMENT	4BOT211 G	M	16	6	4BOT111 4BOT112	
PROKARYOTES CLASSIFICATION & MICROBIAL TECHNIQUES	4MCB211 D	C	16	6	4CHM121 4CHM122	
SECOND YEAR SEMESTER 2						
METABOLISM	4BCH212 H	M	16	6	4CHM121 4CHM122	
BIOCHEMISTRY: PRINCIPLES & TECHNIQUES	4BCH222 A	M	16	6	4CHM121 4CHM122	
PLANT ANATOMY & BIODIVERSITY	4BOT212 G	M	16	6	4BOT111 4BOT112	
MICROBIAL GROWTH & MEDICAL MICROBIOLOGY	4MCB212 D	C	16	6	4CHM121 4CHM122	4MCB211
THIRD YEAR SEMESTER 1						
GENE EXPRESSION AND REPLICATION	4BCH311 A	M	16	7	4BCH212	
METABOLIC REGULATION	4BCH321 C	M	16	7	4BCH212	
CYTOLOGY GENETICS AND PLANT BIOCHEMISTRY	4BOT311 B	M	16	7	4BOT211 4BOT212	
PLANT ECOPHYSIOLOGY	4BOT331 D	M	16	7	4BOT211 4BOT212	
THIRD YEAR SEMESTER 2						
RECOMBINANT DNA TECHNOLOGY	4BCH312 A	M	16	7	4BCH211	
BIOCHEMISTRY OF NUTRITION	4BCH322 C	M	16	7	4BCH212 4BCH211	
PEOPLE & PLANTS	4BOT312 B	M	16	7	4BOT211 4BOT212	
PLANT CONSERVATION AND MANAGEMENT & TERRESTRIAL ECOLOGY	4BOT322 D	M	16	7	4BOT211 4BOT212	

4BSC07 BIOCHEMISTRY AND CHEMISTRY						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	BIOCHEMISTRY & MICROBIOLOGY AND CHEMISTRY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
MAJORS	**BIOCHEMISTRY**				**CHEMISTRY**	
ABBREVIATION	BSC					
UNIZULU CODE	4BSC07					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
GENERAL CHEMISTRY 111	4CHM111 E	M	16	5		
CALCULUS I	4MTH111 F	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
GENERAL CHEMISTRY 112	4CHM112 E	M	16	6		4CHM111
CALCULUS II	4MTH112 F	C	16	6		4MTH111
ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS(BIO)	4PHY122 C	C	16	6		
INTRO TO ZOOLOGY II	4ZOL112 A	C	16	6		4ZOL111
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						

BIOMOLECULES & ENZYMOLOGY	4BCH211 H	M	16	6	4CHM111 4CHM112	
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	C	16	5		
ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211 G	M	16	6	4CHM111 4CHM112 4MTH111	
ANIMAL ANATOMY & PHYSIOLOGY	4ZOL211 C	C	16	6	4ZOL111 4ZOL112	
SECOND YEAR SEMESTER 2						
METABOLISM	4BCH212 H	M	16	6	4CHM111 4CHM112	
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	C	16	6		4BOT111
ORGANIC & PHYSICAL CHEMISTRY 2	4CHM212 G	M	16	6	4CHM111 4CHM112 4MTH111	
BIOCHEMISTRY: PRINCIPLES & TECHNIQUES	4BCH222 A	M	16	6	4CHM111 4CHM112	
THIRD YEAR SEMESTER 1						
GENE EXPRESSION AND REPLICATION	4BCH311 A	M	16	7	4BCH212	
METABOLIC REGULATION	4BCH321 C	M	16	7	4BCH212	
ORGANIC CHEMISTRY 3	4CHM311 B	M	16	7	4CHM212 4MTH112	
PHYSICAL CHEMISTRY 3	4CHM321 D	M	16	7	4CHM212 4MTH112	
THIRD YEAR SEMESTER 2						
INORGANIC CHEMISTRY 3	4CHM312 B	M	16	7	4CHM211 4MTH112	
ANALYTICAL CHEMISTRY 3	4CHM322 D	M	16	7	4CHM211 4MTH112	
RECOMBINANT DNA TECHNOLOGY	4BCH312 A	M	16	7	4BCH211	
BIOCHEMISTRY OF NUTRITION	4BCH322 C	M	16	7	4BCH212	

4BSC08 BIOCHEMISTRY AND HUMAN MOVEMENT SCIENCE						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	BIOCHEMISTRY & MICROBIOLOGY AND BIOKINETICS & SPORT SCIENCE					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**BIOCHEMISTRY**				**HUMAN MOVEMENT SCIENCE**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC08					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
HUMAN MOVEMENT SCIENCE 1A	4HMS111 H	M	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
HUMAN MOVEMENT SCIENCE 1B	4HMS112 H	M	16	6		
INTRO TO ZOOLOGY II	4ZOL112 A	C	16	6		4ZOL111

COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
BIOMOLECULES & ENZYMOLOGY	4BCH211 H	M	16	6	4CHM121 4CHM122	
PROKARYOTES CLASSIFICATION & MICROBIAL TECHNIQUES	4MCB211 D	C	16	6	4CHM121 4CHM122	
HUMAN MOVEMENT SCIENCE 2A	4HMS211 F	M	16	6	4HMS111 4HMS112	
HUMAN ANATOMY & PHYSIOLOGY I	4ZOL121 B	C	16	5		
SECOND YEAR SEMESTER 2						
METABOLISM	4BCH212 H	M	16	6	4CHM121 4CHM122	
BIOCHEMISTRY: PRINCIPLES & TECHNIQUES	4BCH222 A	M	16	6	4CHM121 4CHM122	
HUMAN MOVEMENT SCIENCE 2B	4HMS212 F	M	16	6	4HMS111 4HMS112	
HUMAN ANATOMY & PHYSIOLOGY II	4ZOL122 B	C	16	6		
THIRD YEAR SEMESTER 1						
GENE EXPRESSION AND REPLICATION	4BCH311 A	M	16	7	4BCH212	
METABOLIC REGULATION	4BCH321 C	M	16	7	4BCH212	
HUMAN MOVEMENT SCIENCE 3A	4HMS311 B	M	16	7	4HMS211 4HMS212	
HUMAN MOVEMENT SCIENCE 3C	4HMS321 D	M	16	7	4HMS211 4HMS212	
THIRD YEAR SEMESTER 2						
RECOMBINANT DNA TECHNOLOGY	4BCH312 A	M	16	7	4BCH211	
BIOCHEMISTRY OF NUTRITION	4BCH322 C	M	16	7	4BCH212 4BCH211	
HUMAN MOVEMENT SCIENCE 3B	4HMS312 B	M	16	7	4HMS211 4HMS212	
HUMAN MOVEMENT SCIENCE 3D	4HMS322 D	M	16	7	4HMS211 4HMS212	

4BSC09 BIOCHEMISTRY AND MICROBIOLOGY						
FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING					
DEPARTMENTS:	BIOCHEMISTRY & MICROBIOLOGY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
MAJORS	BIOCHEMISTRY			MICROBIOLOGY		
ABBREVIATION	BSC					
UNIZULU CODE	4BSC09					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
BASIC CHEMISTRY 121	4CHM121G	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121C	C	16	5		
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111E	C	16	5		
INTRO TO ZOOLOGY I	4ZOL111A	C	16	5		
COMPUTER LITERACY I	4CPS121X	C	16	5		
FIRST YEAR SEMESTER 2						
BASIC CHEMISTRY 122	4CHM122G	C	16	6		
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122C	C	16	5		
PLANT MORPHOLOGY & TEXONOMY	4BOT112E	C	16	6		4BOT111
INTRO TO ZOOLOGY II	4ZOL112A	C	16	6		4ZOL111
COMPUTER LITERACY II	4CPS122X	C	16	5		
SECOND YEAR SEMESTER 1						

BIOMOLECULES & ENZYMOLOGY	4BCH211 H	M	16	6	4CHM121 4CHM122	
PROKARYOTES CLASSIFICATION & MICROBIAL TECHNIQUES	4MCB211 D	M	16	6	4CHM121 4CHM122	
PROKARYOTES STRUCTURE AND ENVIRONMENTAL MICROBIOLOGY	4MCB221 A	M	16	6	4CHM121 4CHM122	
EITHER PLANT GROWTH & DEVELOPMENT	4BOT211 G	E	16	6	4BOT111 4BOT112	
OR HUMAN ANATOMY & PHYSIOLOGY I	4ZOL121 B	E	16	5		
SECOND YEAR SEMESTER 2						
METABOLISM	4BCH212 H	M	16	6	4CHM121 4CHM122	
BIOCHEMISTRY: PRINCIPLES & TECHNIQUES	4BCH222 A	M	16	6	4CHM121 4CHM122	
MICROBIAL GROWTH & MEDICAL MICROBIOLOGY	4MCB212 D	M	16	6	4CHM121 4CHM122	4MCB211
EITHER PLANT ANATOMY & BIODIVERSITY	4BOT212 G	E	16	6	4BOT111 4BOT112	
OR HUMAN ANATOMY & PHYSIOLOGY II	4ZOL122 B	E	16	6		
THIRD YEAR SEMESTER 1						
GENE EXPRESSION AND REPLICATION	4BCH311 A	M	16	7	4BCH212	
METABOLIC REGULATION	4BCH321 C	M	16	7	4BCH212	
FOOD MICROBIOLOGY	4MCB311 E	M	16	7	4MCB212	
EPIDEMIOLOGY	4MCB321 G	M	16	7	4MCB212	
THIRD YEAR SEMESTER 2						
RECOMBINANT DNA TECHNOLOGY	4BCH312 A	M	16	7	4BCH211	
BIOCHEMISTRY OF NUTRITION	4BCH322 C	M	16	7	4BCH212 4BCH211	
ENVIRONMENTAL INFLUENCES ON MICRO-ORGANISMS & INDUSTRIAL MICROBIOLOGY	4MCB312 E	M	16	7	4MCB212	
BIOTECHNOLOGY	4MCB322 G	M	16	7	4MCB212	

4BSC10 BIOCHEMISTRY AND ZOOLOGY

FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**	
DEPARTMENTS:	BIOCHEMISTRY & MICROBIOLOGY AND ZOOLOGY	
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE	
MAJORS	**BIOCHEMISTRY**	**ZOOLOGY**
ABBREVIATION	BSC	
UNIZULU CODE	4BSC10	
EXIT NQF LEVEL	7	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES	
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS	
MINIMUM DURATION OF STUDIES	3 YEARS	
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES	
INTAKE FOR THE QUALIFICATION:	JANUARY	
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY	
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES	
TOTAL CREDITS TO GRADUATE:	416	

SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	C	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	M	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	C	16	6		4BOT111
INTRO TO ZOOLOGY II	4ZOL112 A	M	16	6		4ZOL111
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
BIOMOLECULES & ENZYMOLOGY	4BCH211 H	M	16	6	4CHM121 4CHM122	

PROKARYOTES CLASSIFICATION & MICROBIAL TECHNIQUES	4MCB211 D	C	16	6	4CHM121 4CHM122	
ANIMAL ANATOMY & PHYSIOLOGY	4ZOL211 C	M	16	6	4ZOL111 4ZOL112	
EITHER PROKARYOTES& EUKARYOTES	4MCB221 A	E	16	6	4CHM121 4CHM122	
OR PLANT GROWTH & DEVELOPMENT	4BOT211 G	E	16	6	4BOT111 4BOT112	
SECOND YEAR SEMESTER 2						
METABOLISM	4BCH212 H	M	16	6	4CHM121 4CHM122	
MICROBIAL GROWTH & MEDICAL MICROBIOLOGY	4MCB212 D	C	16	6	4CHM121 4CHM122	4MCB211
ANIMAL DIVERSITY	4ZOL212 C	M	16	6	4ZOL111 4ZOL112	
EITHER BIOCHEMISTRY: PRINCIPLES AND TECHNIQUES	4BCH222 A	E	16	6	4CHM121 4CHM122	
OR PLANT ANATOMY & BIODIVERSITY	4BOT212 G	E	16	6	4BOT111 4BOT112	
THIRD YEAR SEMESTER 1						
GENE EXPRESSION AND REPLICATION	4BCH311 A	M	16	7	4BCH212	
METABOLIC REGULATION	4BCH321 C	M	16	7	4BCH212	
ANIMAL ECOLOGY I	4ZOL311 F	M	16	7	4ZOL212	
ECOPHYSIOLOGY & ECOTOXICOLOGY	4ZOL321 H	M	16	7	4ZOL211	
THIRD YEAR SEMESTER 2						
RECOMBINANT DNA TECHNOLOGY	4BCH312 A	M	16	7	4MCB212	
BIOCHEMISTRY OF NUTRITION	4BCH322 C	M	16	7	4BCH211 4BCH212	
ANIMAL ECOLOGY II	4ZOL312 F	M	16	7	4ZOL212	
RESEARCH DESIGN & APPLICATION	4ZOL322 H	M	16	7	4ZOL211	

4BSC11 BOTANY AND GEOGRAPHY						
FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING					
DEPARTMENTS:	BOTANY AND GEOGRAPHY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
MAJORS	BOTANY				GEOGRAPHY	
ABBREVIATION	BSC					
UNIZULU CODE	4BSC11					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN GEOGRAPHY					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	384					
SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	M	16	5		
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	M	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	M	16	6		4BOT111
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
HUMAN GEOGRAPHY	4GES112 H	M	16	6		

BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
PLANT GROWTH & DEVELOPMENT	4BOT211 G	M	16	6	4BOT111 4BOT112	
INTRO TO ZOOLOGY I	4ZOL111 A	C	16	5		
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	M	16	6	4GES111	
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	C	16	6		4GES111
SECOND YEAR SEMESTER 2						
PLANT ANATOMY & BIODIVERSITY	4BOT212 G	M	16	6	4BOT111 4BOT112	
INTRO TO ZOOLOGY II	4ZOL112 A	C	16	6		4ZOL111
GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	C	16	6		4GES211
HYDROMETEOROLOGY	4GES222 B	M	16	6	4GES111	
THIRD YEAR SEMESTER 1						
CYTOLOGY GENETICS AND PLANT BIOCHEMISTRY	4BOT311 B	M	16	7	4BOT211 4BOT212	
PLANT ECOPHYSIOLOGY	4BOT331 D	M	16	7	4BOT211 4BOT212	
EITHER URBAN ENVIRONMENT & RECREATION PLANNING	4GES311 A	EM	16	7	4GES212	
OR ATMOSPHERIC PROCESSES AND POLLUTION	4GES321 E	EM	16	7	4GES222	
EITHER LAND USE AND NATURAL RESOURCE MANAGEMENT	4GES331 C	EM	16	7	4GES211	
OR CLIMATE DYNAMICS & WEATHER VARIABILITY AND PREDICTION	4GES341 G	EM	16	7	4GES222	
THIRD YEAR SEMESTER 2						
PEOPLE & PLANTS	4BOT312 B	M	16	7	4BOT211 4BOT212	
PLANT CONSERVATION AND MANAGEMENT & TERRESTRIAL ECOLOGY	4BOT322 D	M	16	7	4BOT211 4BOT212	
ENVIRONMENTAL MANAGEMENT	4GES312 E	M	16	7	4GES222 4GES212	
ENVIRONMENTAL FIELDWORK AND RESEARCH	4GES322 G	M	16	7	4GES211 4GES222 4GES212	

4BSC12 BOTANY AND HYDROLOGY						
FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING					
DEPARTMENTS:	BOTANY AND HYDROLOGY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
MAJORS	BOTANY				HYDROLOGY	
ABBREVIATION	BSC					
UNIZULU CODE	4BSC12					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	C	16	5		
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	M	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO GEOLOGY	4HYD112 D	M	16	6		
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	M	16	6		4BOT111
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						

INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	M	16	6	4GES111	
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	C	16	5		
PLANT GROWTH & DEVELOPMENT	4BOT211 G	M	16	6	4BOT111 4BOT112	
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	C	16	6	4GES111	
SECOND YEAR SEMESTER 2						
INTRO TO SUBSURFACE HYDROLOGY	4HYD212 F	M	16	6	4HYD112	
PLANT ANATOMY & BIODIVERSITY	4BOT212 G	M	16	6	4BOT111 4BOT112	
HYDROMETEOROLOGY	4GES222 B	C	16	6	4GES111	
GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	C	16	6		4GES211
THIRD YEAR SEMESTER 1						
SURFACE WATER HYDROLOGY	4HYD311 A	M	16	7	4HYD211 4STT122	
GROUNDWATER HYDROLOGY	4HYD321 C	M	16	7	4HYD212	
CYTOLOGY GENETICS AND PLANT BIOCHEMISTRY	4BOT311 B	M	16	7	4BOT211 4BOT212	
PLANT ECOPHYSIOLOGY	4BOT331 D	M	16	7	4BOT211 4BOT212	
THIRD YEAR SEMESTER 2						
HYDROLOGICAL MODELLING	4HYD332 A	M	16	7	4HYD211 4HYD212	
WATER RESOURCES MANAGEMENT	4HYD342 C	M	16	7	4HYD211	
PEOPLE & PLANTS	4BOT312 B	M	16	7	4BOT211 4BOT212	
PLANT CONSERVATION AND MANAGEMENT & TERRESTRIAL ECOLOGY	4BOT322 D	M	16	7	4BOT211 4BOT212	

4BSC13 BOTANY AND MICROBIOLOGY							
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**						
DEPARTMENTS:	BOTANY AND BIOCHEMMISTRY & MICROBIOLOGY						
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE						
MAJORS	**BOTANY**				**MICROBIOLOGY**		
ABBREVIATION	BSC						
UNIZULU CODE	4BSC13						
EXIT NQF LEVEL	7						
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS						
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH						
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES						
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS						
MINIMUM DURATION OF STUDIES	3 YEARS						
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES						
INTAKE FOR THE QUALIFICATION:	JANUARY						
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY						
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES						
TOTAL CREDITS TO GRADUATE:	416						
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**	
FIRST YEAR SEMESTER 1							
BASIC CHEMISTRY 121	4CHM121 G	C	16	5			
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5			
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	M	16	5			
INTRO TO ZOOLOGY I	4ZOL111 A	C	16	5			
COMPUTER LITERACY I	4CPS121 X	C	16	5			
FIRST YEAR SEMESTER 2							
BASIC CHEMISTRY 122	4CHM122 G	C	16	6			
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5			
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	M	16	6		4BOT111	
INTRO TO ZOOLOGY II	4ZOL112 A	C	16	6		4ZOL111	
COMPUTER LITERACY II	4CPS122 X	C	16	5			
SECOND YEAR SEMESTER 1							
PLANT GROWTH & DEVELOPMENT	4BOT211 G	M	16	6	4BOT111 4BOT112		

BIOMOLECULES & ENZYMOLOGY	4BCH211 H	C	16	6	4CHM121 4CHM122	
PROKARYOTES STRUCTURE AND ENVIRONMENTAL MICROBIOLOGY	4MCB221 A	M	16	6	4CHM121 4CHM122	
PROKARYOTES CLASSIFICATION & MICROBIAL TECHNIQUES	4MCB211 D	M	16	6	4CHM121 4CHM122	
SECOND YEAR SEMESTER 2						
PLANT ANATOMY & BIODIVERSITY	4BOT212 G	M	16	6	4BOT111 4BOT112	
METABOLISM	4BCH212 H	C	16	6	4CHM121 4CHM122	
BIOCHEMISTRY: PRINCIPLES & TECHNIQUES	4BCH222 A	C	16	6	4CHM121 4CHM122	
MICROBIAL GROWTH & MEDICAL MICROBIOLOGY	4MCB212 D	M	16	6	4CHM121 4CHM122	4MCB211
THIRD YEAR SEMESTER 1						
CYTOLOGY GENETICS AND PLANT BIOCHEMISTRY	4BOT311 B	M	16	7	4BOT211 4BOT212	
PLANT ECOPHYSIOLOGY	4BOT331 D	M	16	7	4BOT211 4BOT212	
FOOD MICROBIOLOGY	4MCB311 E	M	16	7	4MCB212	
EPIDEMIOLOGY	4MCB321 G	M	16	7	4MCB212	
THIRD YEAR SEMESTER 2						
PEOPLE & PLANTS	4BOT312 B	M	16	7	4BOT211 4BOT212	
PLANT CONSERVATION AND MANAGEMENT & TERRESTRIAL ECOLOGY	4BOT322 D	M	16	7	4BOT211 4BOT212	
ENVIRONMENTAL INFLUENCES ON MICRO-ORGANISMS & INDUSTRIAL MICROBIOLOGY	4MCB312 E	M	16	7	4MCB212	
BIOTECHNOLOGY	4MCB322 G	M	16	7	4MCB212	

4BSC14 BOTANY AND ZOOLOGY						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	BOTANY AND ZOOLOGY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**BOTANY**				**ZOOLOGY**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC14					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	M	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	M	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	M	16	6		4BOT111
INTRO TO ZOOLOGY II	4ZOL112 A	M	16	6		4ZOL111
COMPUTER LITERACY II	4CPS122 X	C	16	5		

SECOND YEAR SEMESTER 1						
PLANT GROWTH & DEVELOPMENT	4BOT211 G	M	16	6	4BOT111 4BOT112	
ANIMAL ANATOMY & PHYSIOLOGY	4ZOL211 C	M	16	6	4ZOL111 4ZOL112	
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	C	16	5		
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	C	16	6		4GES11
SECOND YEAR SEMESTER 2						
PLANT ANATOMY & BIODIVERSITY	4BOT212 G	M	16	6	4BOT111 4BOT112	
ANIMAL DIVERSITY	4ZOL212 C	M	16	6	4ZOL111 4ZOL112	
HYDROMETEOROLOGY	4GES222 B	C	16	6	4GES111	
GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	C	16	6		4GES211
THIRD YEAR SEMESTER 1						
CYTOLOGY GENETICS AND PLANT BIOCHEMISTRY	4BOT311 B	M	16	7	4BOT211 4BOT212	
PLANT ECOPHYSIOLOGY	4BOT331 D	M	16	7	4BOT211 4BOT212	
ANIMAL ECOLOGY 1	4ZOL311 F	M	16	7	4ZOL212	
ECOPHYSIOLOGY & ECOTOXICOLOGY	4ZOL321 H	M	16	7	4ZOL211	
THIRD YEAR SEMESTER 2						
PEOPLE & PLANTS	4BOT312 B	M	16	7	4BOT211 4BOT212	
PLANT CONSERVATION AND MANAGEMENT & TERRESTRIAL ECOLOGY	4BOT322 D	M	16	7	4BOT211 4BOT212	
ANIMAL ECOLOGY II	4ZOL312 F	M	16	7	4ZOL212	
RESEARCH DESIGN & APPLICATION	4ZOL322 H	M	16	7	4ZOL211	

4BSC15 CHEMISTRY AND COMPUTER SCIENCE		
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**	
DEPARTMENTS:	CHEMISTRY AND COMPUTER SCIENCE	
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE	
QUALIFIER		
MAJORS	**CHEMISTRY**	**COMPUTER SCIENCE**
ABBREVIATION	BSC	
QUALIFICATION CODE (SAQF)		
UNIZULU CODE	4BSC15	
EXIT NQF LEVEL	7	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE	
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS	
MINIMUM DURATION OF STUDIES	3 YEARS	
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES	
INTAKE FOR THE QUALIFICATION:	JANUARY	
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY	
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES	
TOTAL CREDITS TO GRADUATE:	416	

SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
GENERAL CHEMISTRY 111	4CHM111 E	M	16	5		
CALCULUS I	4MTH111 F	C	16	5		
INTRODUCTORY COMPUTING	4CPS111 B	M	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	C	16	5		4MTH111
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
GENERAL CHEMISTRY 112	4CHM112 E	M	16	6		4CHM111
CALCULUS II	4MTH112 F	C	16	6		4MTH111
INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	M	16	6		4CPS111
ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	C	16	6		

COMPUTER LITERACY II	4CPS122X	C	16	5		
SECOND YEAR SEMESTER 1						
ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211G	M	16	6	4CHM111 4CHM112 4MTH111	
COMPUTER COMMUNICATIONS & NETWORKS	4CPS231A	C	16	6	4CPS111	
DATA STRUCTURES AND ALGORITHMS	4CPS211D	M	16	6	4CPS111 4CPS112	
EITHER ADVANCED CALCULUS	4MTH221H	E	16	6	4MTH112	
OR MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211C	E	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
SECOND YEAR SEMESTER 2						
ORGANIC & PHYSICAL CHEMISTRY 2	4CHM212G	M	16	6	4CHM111 4CHM112 4MTH111	
DATABASE INFORMATION MANAGEMENT I	4CPS232A	C	16	6	4CPS111	
SOFTWARE ENGINEERING	4CPS212D	M	16	6	4CPS112	
EITHER LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222H	E	16	6		4MTH221
OR MODERN PHYSICS, PHOTONICS & WAVES	4PHY212C	E	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
THIRD YEAR SEMESTER 1						
ORGANIC CHEMISTRY 3	4CHM311B	M	16	7	4CHM212 4MTH112	
PHYSICAL CHEMISTRY 3	4CHM321D	M	16	7	4CHM212 4MTH112	
ADVANCED PROGRAMMING TECHNIQUES	4CPS311E	M	16	7	4CPS211 4CPS212	
SYSTEMS PROGRAMMING (OS & COMPILERS)	4CPS321G	M	16	7	4CPS211 4CPS212	
THIRD YEAR SEMESTER 2						
INORGANIC CHEMISTRY 3	4CHM312B	M	16	7	4CHM211 4MTH112	
ANALYTICAL CHEMISTRY 3	4CHM322D	M	16	7	4CHM211 4MTH112	
DISTRIBUTED SYSTEMS DEVELOPMENT	4CPS312E	M	16	7	4CPS211 4CPS212	
FINAL YEAR PROJECT	4CPS322G	M	16	7	4CPS211 4CPS212	4CPS311 4CPS321

4BSC16 CHEMISTRY AND HYDROLOGY		
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**	
DEPARTMENTS:	CHEMISTRY AND HYDROLOGY	
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE	
QUALIFIER		
MAJORS	**CHEMISTRY**	**HYDROLOGY**
ABBREVIATION	BSC	
QUALIFICATION CODE (SAQF)		
UNIZULU CODE	4BSC16	
EXIT NQF LEVEL	7	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE	
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS	
MINIMUM DURATION OF STUDIES	3 YEARS	
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES	
INTAKE FOR THE QUALIFICATION:	JANUARY	
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY	
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES	
TOTAL CREDITS TO GRADUATE:	416	

SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	C	16	5		
CALCULUS I	4MTH111 F	C	16	5		
GENERAL CHEMISTRY 111	4CHM111 E	M	16	5		
EITHER CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	E	16	5		4MTH111
OR CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	E	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO GEOLOGY	4HYD112 D	M	16	6		

CALCULUS II	4MTH112 F	C	16	6		4MTH111
GENERAL CHEMISTRY 112	4CHM112 E	C	16	6		4CHM111
EITHER ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	E	16	6		
OR ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS(BIO)	4PHY122 C	E	16	6		
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	M	16	6	4GES111	
ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211 G	M	16	6	4CHM111 4CHM112 4MTH111	
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	C	16	5		
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	C	16	6	4GES111	
SECOND YEAR SEMESTER 2						
INTRO TO SUBSURFACE HYDROLOGY	4HYD212 F	M	16	6	4HYD112	
ORGANIC & PHYSICAL CHEMISTRY 2	4CHM212 G	M	16	6	4CHM111 4CHM112 4MTH111	
HYDROMETEOROLOGY	4GES222 B	C	16	6	4GES111	
GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	C	16	6		4GES211
THIRD YEAR SEMESTER 1						
SURFACE WATER HYDROLOGY	4HYD311 A	M	16	7	4HYD211 4STT122	
GROUNDWATER HYDROLOGY	4HYD321 C	M	16	7	4HYD212	
ORGANIC CHEMISTRY 3	4CHM311 B	M	16	7	4CHM212 4MTH112	
PHYSICAL CHEMISTRY 3	4CHM321 D	M	16	7	4CHM212 4MTH112	
THIRD YEAR SEMESTER 2						
HYDROLOGICAL MODELLING	4HYD332 A	M	16	7	4HYD211 4HYD212	
WATER RESOURCES MANAGEMENT	4HYD342 C	M	16	7	4HYD211	
INORGANIC CHEMISTRY 3	4CHM312 B	M	16	7	4CHM211 4MTH112	
ANALYTICAL CHEMISTRY 3	4CHM322 D	M	16	7	4CHM211 4MTH112	

4BSC17 CHEMISTRY AND MATHEMATICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	CHEMISTRY AND MATHEMATICAL SCIENCES					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**CHEMISTRY**				**MATHEMATICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC17					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
GENERAL CHEMISTRY 111	4CHM111 E	M	16	5		
CALCULUS I	4MTH111 F	M	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	C	16	5		4MTH111
EITHER DISCRETE MATHEMATICS	4AMT111 G	E	16	5		4MTH111
OR INTRODUCTORY COMPUTING	4CPS111 B	E	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
GENERAL CHEMISTRY 112	4CHM112 E	M	16	6		4CHM111
CALCULUS II	4MTH112 F	M	16	6		4MTH111

ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112A	C	16	6		
EITHER FURTHER DISCRETE MATHEMATICS	4AMT122G	E	16	6		4MTH122 4AMT111
OR INTRO TO SYSTEMS PROGRAMMING	4CPS112B	E	16	6		4CPS111
COMPUTER LITERACY II	4CPS122X	C	16	5		
SECOND YEAR SEMESTER 1						
ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211G	M	16	6	4CHM111 4CHM112 4MTH111	
MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211C	C	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
ADVANCED CALCULUS	4MTH221H	M	16	6	4MTH112	
EITHER DYNAMICAL SYSTEMS & MATHEMATICAL MODELLING	4AMT211E	E	16	6	4AMT122	4MTH221
OR DATA STRUCTURES AND ALGORITHMS	4CPS211D	E	16	6	4CPS111	
SECOND YEAR SEMESTER 2						
ORGANIC & PHYSICAL CHEMISTRY 2	4CHM212G	M	16	6	4CHM111 4CHM112 4MTH111	
MODERN PHYSICS, PHOTONICS & WAVES	4PHY212C	C	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222H	M	16	6	4MTH112 4MTH111	
EITHER INTRO TO OPERATIONS RESEARCH	4AMT212E	E	16	6	4AMT122	4MTH222
OR SOFTWARE ENGINEERING	4CPS212D	E	16	6	4CPS112	4CPS211
OR ELECTROMAGNETISM	4PHY222A	E	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
THIRD YEAR SEMESTER 1						
ORGANIC CHEMISTRY 3	4CHM311B	M	16	7	4CHM212 4MTH112	
PHYSICAL CHEMISTRY 3	4CHM321D	M	16	7	4CHM212 4MTH111 4MTH112	
ABSTRACT ALGEBRA	4MTH311A	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
REAL ANALYSIS	4MTH321C	M	16	7	LEVEL 1: 4MTH111, 4MTH112,	

					OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
THIRD YEAR SEMESTER 2						
INORGANIC CHEMISTRY 3	4CHM312 B	M	16	7	4CHM211 4MTH112	
ANALYTICAL CHEMISTRY 3	4CHM322 D	M	16	7	4CHM211 4MTH112	
GRAPH THEORY	4MTH312 A	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
COMPLEX ANALYSIS	4MTH322 C	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	

4BSC18 CHEMISTRY AND PHYSICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	CHEMISTRY AND PHYSICS					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**CHEMISTRY**				**PHYSICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC18					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
GENERAL CHEMISTRY 111	4CHM111E	M	16	5		
CALCULUS I	4MTH111F	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111A	M	16	5		4MTH111
EITHER DISCRETE MATHEMATICS	4AMT111G	E	16	5		4MTH111
OR INTRODUCTORY COMPUTING	4CPS111B	E	16	5		
COMPUTER LITERACY I	4CPS121X	C	16	5		
FIRST YEAR SEMESTER 2						
GENERAL CHEMISTRY 112	4CHM112E	M	16	6		4CHM111
CALCULUS II	4MTH112F	C	16	6		4MTH111

ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	M	16	6		
EITHER FURTHER DISCRETE MATHEMATICS	4AMT122 G	E	16	6		4MTH112 4AMT111
OR INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	E	16	6		4CPS111
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211 G	M	16	6	4CHM111 4CHM112 4MTH111	
MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
EITHER DYNAMICAL SYSTEMS & MATHEMATICAL MODELLING	4AMT211 E	E	16	6	4AMT122	4MTH221
OR DATA STRUCTURES AND ALGORITHMS	4CPS211 D	E	16	6	4CPS111	
SECOND YEAR SEMESTER 2						
ORGANIC & PHYSICAL CHEMISTRY 2	4CHM212 G	M	16	6	4CHM111 4CHM112 4MTH111	
MODERN PHYSICS, PHOTONICS & WAVES	4PHY212 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
ELECTROMAGNETISM	4PHY222 A	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
THIRD YEAR SEMESTER 1						
ORGANIC CHEMISTRY 3	4CHM311 B	M	16	7	4CHM212 4MTH112	
PHYSICAL CHEMISTRY 3	4CHM321 D	M	16	7	4CHM212 4MTH112	
QUANTUM AND STATISTICAL PHYSICS	4PHY311 H	M	16	7	4PHY212	
ELECTRONIC CIRCUITS AND DEVICES	4PHY321 F	M	16	7	4PHY211 4PHY212 4PHY222	
THIRD YEAR SEMESTER 2						
INORGANIC CHEMISTRY 3	4CHM312 B	M	16	7	4CHM211 4MTH112	
ANALYTICAL CHEMISTRY 3	4CHM322 D	M	16	7	4CHM211 4MTH112	
NUCLEAR PHYSICS AND APPLICATIONS	4PHY312 H	M	16	7	4PHY211 4PHY212	
SOLID STATE PHYSICS & MATERIAL SCIENCE	4PHY322 F	M	16	7	4PHY211 4PHY212	

4BSC19 CHEMISTRY AND ZOOLOGY						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:						
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**CHEMISTRY**				**ZOOLOGY**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC19					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
GENERAL CHEMISTRY 111	4CHM111 E	M	16	5		
CALCULUS I	4MTH111 F	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	M	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
GENERAL CHEMISTRY 112	4CHM112 E	M	16	6		4CHM111
CALCULUS II	4MTH112 F	C	16	6		4MTH111
ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS(BIO)	4PHY122 C	C	16	6		

INTRO TO ZOOLOGY II	4ZOL112 A	M	16	6		4ZOL111
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211 G	M	16	6	4CHM111 4CHM112 4MTH111	
ANIMAL ANATOMY & PHYSIOLOGY	4ZOL211 C	M	16	6	4ZOL111 4ZOL112	
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	C	16	5		
EITHER PROKARYOTES CLASSIFICATION & MICROBIAL TECHNIQUES	4MCB211 D	E	16	6	4CHM111 4CHM112	
OR BIOMOLECULES & ENZYMOLOGY	4BCH211 H	E	16	6	4CHM111 4CHM112	
SECOND YEAR SEMESTER 2						
ORGANIC & PHYSICAL CHEMISTRY 2	4CHM212 G	M	16	6	4CHM111 4CHM112 4MTH111	
ANIMAL DIVERSITY	4ZOL212 C	M	16	6	4ZOL111 4ZOL112	
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	C	16	6		4BOT111
EITHER MICROBIAL GROWTH & MEDICAL MICROBIOLOGY	4MCB212 D	E	16	6	4CHM111 4CHM112	4MCB211
OR METABOLISM	4BCH212 H	E	16	6	4CHM111 4CHM112	
THIRD YEAR SEMESTER 1						
ORGANIC CHEMISTRY 3	4CHM311 B	M	16	7	4CHM212 4MTH112	
PHYSICAL CHEMISTRY 3	4CHM321 D	M	16	7	4CHM212 4MTH112	
ANIMAL ECOLOGY I	4ZOL311 F	M	16	7	4ZOL212	
ECOPHYSIOLOGY & ECOTOXICOLOGY	4ZOL321 H	M	16	7	4ZOL211	
THIRD YEAR SEMESTER 2						
INORGANIC CHEMISTRY 3	4CHM312 B	M	16	7	4CHM211 4MTH112	
ANALYTICAL CHEMISTRY 3	4CHM322 D	M	16	7	4CHM211 4MTH112	
ANIMAL ECOLOGY II	4ZOL312 F	M	16	7	4ZOL212	
RESEARCH DESIGN & APPLICATION	4ZOL322 H	M	16	7	4ZOL211	

4BSC20 COMPUTER SCIENCE AND HYDROLOGY						
FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING					
DEPARTMENTS:	HYDROLOGY AND COMPUTER SCIENCE					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	COMPUTER SCIENCE			HYDROLOGY		
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC20					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	C	16	5		
INTRODUCTORY COMPUTING	4CPS111 B	M	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
CALCULUS I	4MTH111 F	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO GEOLOGY	4HYD112 D	M	16	6		
INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	M	16	6		4CPS111
ELEMENTARY STATISTICS FOR COMMERCE STUDENTS	4STT122 C	C	16	5		

CALCULUS II	4MTH112 F	C	16	6		4MTH111
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	M	16	6	4GES111	
DATA STRUCTURES AND ALGORITHMS	4CPS211 D	M	16	6	4CPS111	
COMPUTER COMMUNICATIONS & NETWORKS	4CPS231 A	C	16	6	4CPS111	
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	E	16	6	4GES111	
SECOND YEAR SEMESTER 2						
INTRO TO SUBSURFACE HYDROLOGY	4HYD212 F	M	16	6	4HYD112	
SOFTWARE ENGINEERING	4CPS212 D	M	16	6	4CPS112	4CPS211
DATABASE INFORMATION MANAGEMENT I	4CPS232 A	C	16	6	4CPS111	
GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	E	16	6		4GES211
THIRD YEAR SEMESTER 1						
SURFACE WATER HYDROLOGY	4HYD311 A	M	16	7	4HYD211 4STT122	
GROUNDWATER HYDROLOGY	4HYD321 C	M	16	7	4HYD212	
ADVANCED PROGRAMMING TECHNIQUES	4CPS311 E	M	16	7	4CPS211	4CPS212
SYSTEMS PROGRAMMING (OS & COMPILERS)	4CPS321 G	M	16	7	4CPS211 4CPS212	
THIRD YEAR SEMESTER 2						
HYDROLOGICAL MODELLING	4HYD332 A	M	16	7	4HYD211 4HYD212	
WATER RESOURCES MANAGEMENT	4HYD342 C	M	16	7	4HYD211	
DISTRIBUTED SYSTEMS DEVELOPMENT	4CPS312 E	M	16	7	4CPS211 4CPS212	
FINAL YEAR PROJECT	4CPS322 G	M	16	7	4CPS211 4CPS212	4CPS311 4CPS321

4BSC21 COMPUTER SCIENCE AND MATHEMATICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	COMPUTER SCIENCE AND MATHEMATICAL SCIENCES					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**COMPUTER SCIENCE**				**MATHEMATICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC21					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE OR INFO TECHNOLOGY					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
DISCRETE MATHEMATICS	4AMT111G	C	16	5		4MTH111 (SLMH111)
CALCULUS I	4MTH111F	M	16	5		
INTRODUCTORY COMPUTING	4CPS111B	M	16	5		
FURTHER DISCRETE MATHEMATICS	4AMT122G	M	16	6		4MTH112 4AMT111
EITHER CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111A	E	16	5		4MTH111
OR ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111E	E	16	5		
COMPUTER LITERACY I	4CPS121X	C	16	5		
FIRST YEAR SEMESTER 2						
CALCULUS II	4MTH112F	M	16	6		4MTH111

INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	M	16	6		4CPS111
EITHER ELECTROMAGNETISM AND NUCLEAR PHYSICS	4PHY112 A	E	16	6		
OR STATISTICS FOR SCIENCE STUDENTS	4STT112 E	E	16	6		4STT111 4MTH112
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
ADVANCED CALCULUS	4MTH221 H	M	16	6	4MTH112 (SLMH112)	
DATA STRUCTURES AND ALGORITHMS	4CPS211 D	M	16	6	4CPS111	4CPS112
EITHER DYNAMICAL SYSTEMS & MATHEMATICAL MODELLING	4AMT211 E	E	16	6	4AMT122	4MTH221
OR COMPUTER COMMUNICATIONS & NETWORKS	4CPS231 A	E	16	6	4CPS111	
EITHER MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211 C	E	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
OR DISTRIBUTION THEORY	4STT211 C	E	16	6	4STT112	4MTH221
SECOND YEAR SEMESTER 2						
INTRO TO OPERATIONS RESEARCH	4AMT212 E	C	16	6	4AMT122	4MTH222
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	M	16	6	4MTH112 4MTH111	
SOFTWARE ENGINEERING	4CPS212 D	M	16	6	4CPS112	4CPS211
EITHER ELECTROMAGNETISM	4PHY222 A	E	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
OR INTRO TO OPERATIONS RESEARCH	4AMT212 E	E	16	6	4AMT122	4MTH222
OR DATABASE INFORMATION MANAGEMENT I	4CPS232 A	E	16	6	4CPS111	
OR STATISTICAL INFERENCE	4STT212 C	E	16	6		4STT221 4MTH222
THIRD YEAR SEMESTER 1						
ADVANCED PROGRAMMING TECHNIQUES	4CPS311 E	M	16	7	4CPS211	4CPS212
SYSTEMS PROGRAMMING (OS & COMPILERS)	4CPS321 G	M	16	7	4CPS211 4CPS212	
ABSTRACT ALGEBRA	4MTH311 A	M	16	7	LEVEL 1: 4MTH111, 4MTH112,	

					OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
REAL ANALYSIS	4MTH321 C	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
THIRD YEAR SEMESTER 2						
DISTRIBUTED SYSTEMS DEVELOPMENT	4CPS312 E	M	16	7	4CPS211 4CPS212	
FINAL YEAR PROJECT	4CPS322 G	M	16	7	4CPS211 4CPS212	4CPS311 4CPS321
GRAPH THEORY	4MTH312 A	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
COMPLEX ANALYSIS	4MTH322 C	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122	

					LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	

4BSC22 COMPUTER SCIENCE AND PHYSICS							
FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING						
DEPARTMENTS:	COMPUTER SCIENCE AND PHYSICS						
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE						
QUALIFIER							
MAJORS	COMPUTER SCIENCE				PHYSICS		
ABBREVIATION	BSC						
QUALIFICATION CODE (SAQF)							
UNIZULU CODE	4BSC22						
EXIT NQF LEVEL	7						
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS						
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH						
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE						
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS						
MINIMUM DURATION OF STUDIES	3 YEARS						
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES						
INTAKE FOR THE QUALIFICATION:	JANUARY						
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY						
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES						
TOTAL CREDITS TO GRADUATE:	416						
SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)	
FIRST YEAR SEMESTER 1							
INTRODUCTORY COMPUTING	4CPS111 B	M	16	5			
CALCULUS I	4MTH111 F	C	16	5			
CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	M	16	5		4MTH111	
EITHER DISCRETE MATHEMATICS	4AMT111 G	E	16	5		4MTH111	
OR ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	E	16	5			
COMPUTER LITERACY I	4CPS121 X	C	16	5			
FIRST YEAR SEMESTER 2							
INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	M	16	6		4CPS111	
CALCULUS II	4MTH112 F	C	16	6		4MTH111	
ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	M	16	6			
EITHER FURTHER DISCRETE MATHEMATICS	4AMT122 G	E	16	6		4MTH112 4AMT111	

OR STATISTICS FOR SCIENCE STUDENTS	4STT112 E	E	16	6		4STT111 4MTH112
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
DATA STRUCTURES AND ALGORITHMS	4CPS211 D	M	16	6	4CPS111	
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
COMPUTER COMMUNICATIONS & NETWORKS	4CPS231 A	C	16	6	4CPS111	
SECOND YEAR SEMESTER 2						
SOFTWARE ENGINEERING	4CPS212 D	M	16	6	4CPS112	4CPS211
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
MODERN PHYSICS, PHOTONICS & WAVES	4PHY212 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
ELECTROMAGNETISM	4PHY222 A	C	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
THIRD YEAR SEMESTER 1						
ADVANCED PROGRAMMING TECHNIQUES	4CPS311 E	M	16	7	4CPS211 4CPS212	
SYSTEMS PROGRAMMING (OS & COMPILERS)	4CPS321 G	M	16	7	4CPS211 4CPS212	
QUANTUM AND STATISTICAL PHYSICS	4PHY311 H	M	16	7	4PHY212	
ELECTRONIC CIRCUITS AND DEVICES	4PHY321 F	M	16	7	4PHY211 4PHY212 4PHY222	
THIRD YEAR SEMESTER 2						
DISTRIBUTED SYSTEMS DEVELOPMENT	4CPS312 E	M	16	7	4CPS211 4CPS212	
FINAL YEAR PROJECT	4CPS322 G	M	16	7	4CPS211 4CPS212	4CPS311 4CPS321
NUCLEAR PHYSICS AND APPLICATIONS	4PHY312 H	M	16	7	4PHY211 4PHY212	
SOLID STATE PHYSICS & MATERIAL SCIENCE	4PHY322 F	M	16	7	4PHY211 4PHY212	

4BSC23 COMPUTER SCIENCE AND STATISTICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	COMPUTER SCIENCE AND MATHEMATICAL SCIENCES					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**COMPUTER SCIENCE**				**STATISTICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC23					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE OR INFO TECHNOLOGY					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
INTRODUCTORY COMPUTING	4CPS111 B	M	16	5		
CALCULUS I	4MTH111 F	C	16	5		
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	M	16	5		
EITHER DISCRETE MATHEMATICS	4AMT111 G	E	16	5		4MTH111
OR CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	E	16	5		4MTH111
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	M	16	6		4CPS111
CALCULUS II	4MTH112 F	C	16	6		4MTH111
STATISTICS FOR SCIENCE STUDENTS	4STT112 E	M	16	6		4STT111 4MTH112

EITHER FURTHER DISCRETE MATHEMATICS	4AMT122 G	E	16	6		4MTH112 4AMT111
OR ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	E	16	6		
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
DATA STRUCTURES AND ALGORITHMS	4CPS211 D	M	16	6	4CPS111 4CPS112	
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
DISTRIBUTION THEORY	4STT211 C	M	16	6	4STT111	4MTH221
COMPUTER COMMUNICATIONS & NETWORKS	4CPS231 A	C	16	6	4CPS111	
SECOND YEAR SEMESTER 2						
SOFTWARE ENGINEERING	4CPS212 D	M	16	6	4CPS112	
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
STATISTICAL INFERENCE	4STT212 C	M	16	6	4STT112	4STT211 4MTH222
DATABASE INFORMATION MANAGEMENT I	4CPS232 A	C	16	6	4CPS111	
THIRD YEAR SEMESTER 1						
ADVANCED PROGRAMMING TECHNIQUES	4CPS311 E	M	16	7	4CPS211 4CPS212	
SYSTEMS PROGRAMMING (OS & COMPILERS)	4CPS321 G	M	16	7	4CPS211 4CPS212	
RANDOM PROCESSES	4STT311 F	M	16	7	4STT211 4STT212	
EXPERIMENTAL DESIGN	4STT321 H	M	16	7	4STT211 4STT212	
THIRD YEAR SEMESTER 2						
DISTRIBUTED SYSTEMS DEVELOPMENT	4CPS312 E	M	16	7	4CPS211 4CPS212	
FINAL YEAR PROJECT	4CPS322 G	M	16	7	4CPS211 4CPS212	4CPS311 4CPS321
LINEAR MODELS	4STT312 F	M	16	7	4STT211 4STT212	
TIME SERIES	4STT322 H	M	16	7	4STT211 4STT212	

4BSC24 GEOGRAPHY AND HYDROLOGY						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	GEOGRAPHY AND HYDROLOGY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**GEOGRAPHY**				**HYDROLOGY**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	**4BSC24**					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN GEOGRAPHY					
ADMISSION REQUIREMENTS	A PASS OF AT LEASE 60% (LEVEL 5) IN MATHEMATICS (CALCULUS ELECTIVE) OR AT LEAST 50% (LEVEL 4) IN MATHEMATICS (OTHER ELECTIVES)					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	M	16	5		
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	C	16	5		
EITHER CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
OR CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	E	16	5		4MTH111

EITHER CALCULUS I	4MTH111 F	E	16	5		
OR INTRO TO ZOOLOGY I	4ZOL111 A	E	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO GEOLOGY	4HYD112 D	M	16	6		
INTRO TO HUMAN GEOGRAPHY	4GES112 H	M	16	6		
EITHER CALCULUS II	4MTH112 F	E	16	6		4MTH111
OR MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	E	16	5		
EITHER ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	E	16	6		
OR INTRO TO ZOOLOGY II	4ZOL112 A	E	16	6		4ZOL111
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	M	16	6	4GES111	
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	M	16	6	4GES111	
EITHER INTRO TO SOIL SCIENCE	4AAG211 E	E	16	6		
OR MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211 C	E	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
OR INTRO TO EXTENSION & RURAL DEV	4AAE211 D	E	16	6		
EITHER ADVANCED CALCULUS	4MTH221 H	E	16	6	4MTH112	
OR ANIMAL ANATOMY & PHYSIOLOGY	4ZOL211 C	E	16	6	4ZOL111 4ZOL112	
SECOND YEAR SEMESTER 2						
INTRO TO SUBSURFACE HYDROLOGY	4HYD212 F	M	16	6	4HYD112	
HYDROMETEOROLOGY	4GES222 B	M	16	6	4GES111	
EITHER GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	E	16	6		4GES211
OR LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	E	16	6	4MTH112 4MTH111	

EITHER DEMOGRAPHICS, HEALTH & SUSTAINABLE DEVELOPMENT	4GES212 C/D	E	16	6	4GES112	
OR MODERN PHYSICS, PHOTONICS & WAVES	4PHY212 C	E	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
THIRD YEAR SEMESTER 1						
SURFACE WATER HYDROLOGY	4HYD311 A	M	16	7	4HYD211 4STT122	
GROUNDWATER HYDROLOGY	4HYD321 C	M	16	7	4HYD212	
ATMOSPHERIC PROCESSES & POLLUTION	4GES321 E	M	16	7	4GES222	
CLIMATE DYNAMICS & WEATHER VARIABILITY AND PREDICTION	4GES341 G	M	16	7	4GES222	
THIRD YEAR SEMESTER 2						
HYDROLOGICAL MODELLING	4HYD332 A	M	16	7	4HYD211 4HYD212	
WATER RESOURCES MANAGEMENT	4HYD342 C	M	16	7	4HYD211	
ENVIRONMENTAL MANAGEMENT	4GES312 E	M	16	7	4GES222(4GES212)	
ENVIRONMENTAL FIELDWORK AND RESEARCH	4GES322 G	M	16	7	4GES211 4GES222(4GES212)	

4BSC25 GEOGRAPHY AND PHYSICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	GEOGRAPHY AND PHYSICS					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**GEOGRAPHY**				**PHYSICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC25					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN GEOGRAPHY					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	M	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	M	16	5		4MTH111
CALCULUS I	4MTH111 F	C	16	5		
EITHER GENERAL CHEMISTRY 111	4CHM111 E	E	16	5		
OR ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	E	16	5		
OR INTRODUCTORY COMPUTING	4CPS111 B	E	16	5		

COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO HUMAN GEOGRAPHY	4GES112 H	M	16	6		
ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	M	16	6		
CALCULUS II	4MTH112 F	C	16	6		4MTH111
EITHER GENERAL CHEMISTRY 112	4CHM112 E	E	16	6		4CHM111
OR STATISTICS FOR SCIENCE STUDENTS	4STT112 E	E	16	6		4STT111 4MTH112
OR INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	E	16	6		4CPS111
OR INTRO TO GEOLOGY	4HYD112 D	E	16	6		
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	M	16	6	4GES111	
MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
EITHER ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211 G	E	16	6	4CHM111 4CHM112 4MTH111	
OR INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	E	16	6		4GES111
SECOND YEAR SEMESTER 2						
HYDROMETEOROLOGY	4GES222 B	M	16	6	4GES111	
MODERN PHYSICS, PHOTONICS & WAVES	4PHY212 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
ELECTROMAGNETISM	4PHY222 A	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
THIRD YEAR SEMESTER 1						
EITHER URBAN ENVIRONMENT & RECREATION PLANNING	4GES311 A	EM	16	7	4GES212	
OR ATMOSPHERIC PROCESSES AND POLLUTION	4GES321 E	EM	16	7	4GES222	
EITHER LAND USE AND NATURAL RESOURCE MANAGEMENT	4GES331 C	EM	16	7	4GES211	
OR CLIMATE DYNAMICS & WEATHER	4GES341 G	EM	16	7	4GES222	

VARIABILITY AND PREDICTION						
QUANTUM AND STATISTICAL PHYSICS	4PHY311 H	M	16	7	4PHY212	
ELECTRONIC CIRCUITS AND DEVICES	4PHY321 F	M	16	7	4PHY211 4PHY212 4PHY222	
THIRD YEAR SEMESTER 2						
ENVIRONMENTAL MANAGEMENT	4GES312 E	M	16	7	4GES222(4GES212)	
ENVIRONMENTAL FIELDWORK AND RESEARCH	4GES322 G	M	16	7	4GES211 4GES222(4GES212)	
NUCLEAR PHYSICS AND APPLICATIONS	4PHY312 H	M	16	7	4PHY211 4PHY212	
SOLID STATE PHYSICS & MATERIAL SCIENCE	4PHY322 F	M	16	7	4PHY211 4PHY212	

4BSC26 GEOGRAPHY AND STATISTICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	GEOGRAPHY AND MATHEMATICAL SCIENCES					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**GEOGRAPHY**				**STATISTICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC26					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN GEOGRAPHY					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111H	M	16	5		
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111E	M	16	5		
CALCULUS I	4MTH111F	C	16	5		
EITHER CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111A	E	16	5		4MTH111
OR CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121C	E	16	5		
COMPUTER LITERACY I	4CPS121X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO HUMAN GEOGRAPHY	4GES112H	M	16	6		

STATISTICS FOR SCIENCE STUDENTS	4STT112 E	M	16	6		4STT111 4MTH112
CALCULUS II	4MTH112 F	C	16	6		4MTH111
EITHER ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	E	16	6		
OR INTRO TO GEOLOGY	4HYD112 D	E	16	6		
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 B	M	16	6	4GES111	
DISTRIBUTION THEORY	4STT211 C	M	16	6	4STT112	4MTH221
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	E	16	6		4GES111
SECOND YEAR SEMESTER 2						
HYDROMETEOROLOGY	4GES222 B	M	16	6	4GES111	
STATISTICAL INFERENCE	4STT212 C	M	16	6	4STT112	4STT221 4MTH222
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
EITHER DEMOGRAPHICS, HEALTH & SUSTAINABLE DEVELOPMENT	4GES212 D	E	16	6	4GES112	
OR INTRO TO SUBSURFACE HYDROLOGY	4HYD212 F	E	16	6		4HYD112
THIRD YEAR SEMESTER 1						
EITHER URBAN ENVIRONMENT & RECREATION PLANNING	4GES311 A	EM	16	7	4GES212	
OR ATMOSPHERIC PROCESSES AND POLLUTION	4GES321 E	EM	16	7	4GES222	
EITHER LAND USE AND NATURAL RESOURCE MANAGEMENT	4GES331 C	EM	16	7	4GES211	
OR CLIMATE DYNAMICS & WEATHER VARIABILITY AND PREDICTION	4GES341 G	EM	16	7	4GES222	
RANDOM PROCESSES	4STT311 F	M	16	7	4STT211 4STT212	
EXPERIMENTAL DESIGN	4STT321 H	M	16	7	4STT211 4STT212	
THIRD YEAR SEMESTER 2						
ENVIRONMENTAL MANAGEMENT	4GES312 E	M	16	7	4GES222 4GES212	

ENVIRONMENTAL FIELDWORK AND RESEARCH	4GES322 G	M	16	7	4GES211 4GES222 4GES212	
LINEAR MODELS	4STT312 F	M	16	7	4STT211 4STT212	
TIME SERIES	4STT322 H	M	16	7	4STT211 4STT212	

4BSC27 GEOGRAPHY AND ZOOLOGY						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	GEOGRAPHY AND ZOOLOGY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**GEOGRAPHY**				**ZOOLOGY**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC27					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	M	16	5		
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	M	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO HUMAN GEOGRAPHY	4GES112 H	M	16	6		
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
INTRO TO ZOOLOGY II	4ZOL112 A	M	16	6		4ZOL111
COMPUTER LITERACY II	4CPS122 X	C	16	5		

SECOND YEAR SEMESTER 1						
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	M	16	6	4GES111	
ANIMAL ANATOMY & PHYSIOLOGY	4ZOL211 C	M	16	6	4ZOL111 4ZOL112	
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	C	16	6		4GES111
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	C	16	5		
SECOND YEAR SEMESTER 2						
HYDROMETEOROLOGY	4GES222 B	M	16	6	4GES111	
ANIMAL DIVERSITY	4ZOL212 C	M	16	6	4ZOL111 4ZOL112	
GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	C	16	6		4GES211
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	C	16	6		4BOT111
THIRD YEAR SEMESTER 1						
EITHER URBAN ENVIRONMENT & RECREATION PLANNING	4GES311 A	EM	16	7	4GES212	
OR ATMOSPHERIC PROCESSES AND POLLUTION	4GES321 E	EM	16	7	4GES222	
EITHER LAND USE AND NATURAL RESOURCE MANAGEMENT	4GES331 C	EM	16	7	4GES211	
OR CLIMATE DYNAMICS & WEATHER VARIABILITY AND PREDICTION	4GES341 G	EM	16	7	4GES222	
ANIMAL ECOLOGY I	4ZOL311 F	M	16	7	4ZOL212	
ECOPHYSIOLOGY & ECOTOXICOLOGY	4ZOL321 H	M	16	7	4ZOL211	
THIRD YEAR SEMESTER 2						
ENVIRONMENTAL MANAGEMENT	4GES312 E	M	16	7	4GES222 (4GES212)	
ENVIRONMENTAL FIELDWORK AND RESEARCH	4GES322 G	M	16	7	4GES211 4GES222(4GES212)	
ANIMAL ECOLOGY II	4ZOL312 F	M	16	7	4ZOL212	
RESEARCH DESIGN & APPLICATION	4ZOL322 H	M	16	7	4ZOL211	

4BSC28 HUMAN MOVEMENT SCIENCE AND PHYSICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	BIOKINETICS & SPORT SCIENCE AND PHYSICS					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**HUMAN MOVEMENT SCIENCE**				**PHYSICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC28					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
HUMAN MOVEMENT SCIENCE 1A	4HMS111H	M	16	5		
INTRODUCTORY COMPUTING	4CPS111B	C	16	5		
CALCULUS I	4MTH111F	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111A	M	16	5		4MTH111
COMPUTER LITERACY I	4CPS121X	C	16	5		
FIRST YEAR SEMESTER 2						
HUMAN MOVEMENT SCIENCE 1B	4HMS112H	M	16	6		
INTRO TO SYSTEMS PROGRAMMING	4CPS112B	C	16	6		4CPS111
CALCULUS II	4MTH112F	C	16	6		4MTH111

ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	M	16	6		
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
HUMAN MOVEMENT SCIENCE 2A	4HMS211 F	M	16	6	4HMS111 4HMS112	
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
HUMAN ANATOMY & PHYSIOLOGY I	4ZOL121 B	C	16	5		
MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
SECOND YEAR SEMESTER 2						
HUMAN MOVEMENT SCIENCE 2B	4HMS212 F	M	16	6	4HMS111 4HMS112	
HUMAN ANATOMY & PHYSIOLOGY II	4ZOL122 B	C	16	6		
MODERN PHYSICS, PHOTONICS & WAVES	4PHY212 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
ELECTROMAGNETISM	4PHY222 A	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
THIRD YEAR SEMESTER 1						
HUMAN MOVEMENT SCIENCE 3A	4HMS311 B	M	16	7	4HMS211 4HMS212	
HUMAN MOVEMENT SCIENCE 3C	4HMS321 D	M	16	7	4HMS211 4HMS212	
QUANTUM AND STATISTICAL PHYSICS	4PHY311 H	M	16	7	4PHY212	
ELECTRONIC CIRCUITS AND DEVICES	4PHY321 F	M	16	7	4PHY211 4PHY212 4PHY222	
THIRD YEAR SEMESTER 2						
HUMAN MOVEMENT SCIENCE 3B	4HMS312 B	M	16	7	4HMS211 4HMS212	
HUMAN MOVEMENT SCIENCE 3D	4HMS322 D	M	16	7	4HMS211 4HMS212	
NUCLEAR PHYSICS AND APPLICATIONS	4PHY312 H	M	16	7	4PHY211 4PHY212	
SOLID STATE PHYSICS & MATERIAL SCIENCE	4PHY322 F	M	16	7	4PHY211 4PHY212	

4BSC29 HUMAN MOVEMENT SCIENCE AND ZOOLOGY (NOT OFFERED)		
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**	
DEPARTMENTS:	BIOKINETICS & SPORT SCIENCE AND ZOOLOGY	
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE	
QUALIFIER		
MAJORS	**HUMAN MOVEMENT SCIENCE**	**ZOOLOGY**
ABBREVIATION	BSC	
QUALIFICATION CODE (SAQF)		
UNIZULU CODE	4BSC29	
EXIT NQF LEVEL	7	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE	
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES	
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS	
MINIMUM DURATION OF STUDIES	3 YEARS	
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES	
INTAKE FOR THE QUALIFICATION:	JANUARY	
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY	
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES	
TOTAL CREDITS TO GRADUATE:	416	

SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
HUMAN MOVEMENT SCIENCE 1A	4HMS111 H	M	16	5		
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	M	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
HUMAN MOVEMENT SCIENCE 1B	4HMS112 H	M	16	6		
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
INTRO TO ZOOLOGY II	4ZOL112 A	M	16	6		4ZOL111

COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
HUMAN MOVEMENT SCIENCE 2A	4HMS211 F	M	16	6	4HMS111 4HMS112	
ANIMAL ANATOMY & PHYSIOLOGY	4ZOL211 C	M	16	6	4ZOL111 4ZOL112	
HUMAN ANATOMY & PHYSIOLOGY I	4ZOL121 B	C	16	5		
BIOMOLECULES & ENZYMOLOGY	4BCH211 H	C	16	6	4CHM121 4CHM122	
SECOND YEAR SEMESTER 2						
HUMAN MOVEMENT SCIENCE 2B	4HMS212 F	M	16	6	4HMS111 4HMS112	
ANIMAL DIVERSITY	4ZOL212 C	M	16	6	4ZOL111 4ZOL112	
HUMAN ANATOMY & PHYSIOLOGY II	4ZOL122 B	C	16	6		
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	C	16	6		
THIRD YEAR SEMESTER 1						
HUMAN MOVEMENT SCIENCE 3A	4HMS311 B	M	16	7	4HMS211 4HMS212	
HUMAN MOVEMENT SCIENCE 3C	4HMS321 D	M	16	7	4HMS211 4HMS212	
ANIMAL ECOLOGY I	4ZOL311 F	M	16	7	4ZOL212	
ECOPHYSIOLOGY & ECOTOXICOLOGY	4ZOL321 H	M	16	7	4ZOL211	
THIRD YEAR SEMESTER 2						
HUMAN MOVEMENT SCIENCE 3B	4HMS312 B	M	16	7	4HMS211 4HMS212	
HUMAN MOVEMENT SCIENCE 3D	4HMS322 D	M	16	7	4HMS211 4HMS212	
ANIMAL ECOLOGY II	4ZOL312 F	M	16	7	4ZOL212	
RESEARCH DESIGN & APPLICATION	4ZOL322 H	M	16	7	4ZOL211	

4BSC30 HYDROLOGY AND MICROBIOLOGY						
FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING					
DEPARTMENTS:	HYDROLOGY AND BIOCHEMISTRY & MICROBIOLOGY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	HYDROLOGY				MICROBIOLOGY	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC30					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	C	16	5		
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
EITHER INTRO TO ZOOLOGY I	4ZOL111 A	E	16	5		
OR INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	E	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						

INTRO TO GEOLOGY	4HYD112 D	M	16	6		
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
EITHER INTRO TO ZOOLOGY II	4ZOL112 A	E	16	6		4ZOL111
OR PLANT MORPHOLOGY & TAXONOMY	4BOT112 E	E	16	6		4BOT111
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	M	16	6	4GES111	
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	C	16	5		
PROKARYOTES CLASSIFICATION & MICROBIAL TECHNIQUES	4MCB211 D	M	16	6	4CHM121 4CHM122	
PROKARYOTES STRUCTURE AND ENVIRONMENTAL MICROBIOLOGY	4MCB221 A	M	16	6	4CHM121 4CHM122	
SECOND YEAR SEMESTER 2						
INTRO TO SUBSURFACE HYDROLOGY	4HYD212 F	M	16	6	4HYD112	
MICROBIAL GROWTH & MEDICAL MICROBIOLOGY	4MCB212 D	M	16	6	4CHM121 4CHM122	4MCB211
GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	C	16	6		
HYDROMETEOROLOGY	4GES222 B	C	16	6	4GES111	
THIRD YEAR SEMESTER 1						
SURFACE WATER HYDROLOGY	4HYD311 A	M	16	7	4HYD211 4STT122	
GROUNDWATER HYDROLOGY	4HYD321 C	M	16	7	4HYD212	
FOOD MICROBIOLOGY	4MCB311 E	M	16	7	4MCB212	
EPIDEMIOLOGY	4MCB321 G	M	16	7	4MCB212	
THIRD YEAR SEMESTER 2						
HYDROLOGICAL MODELLING	4HYD332 A	M	16	7	4HYD211 4HYD212	
WATER RESOURCES MANAGEMENT	4HYD342 C	M	16	7	4HYD211	
ENVIRONMENTAL INFLUENCES ON MICRO-ORGANISMS & INDUSTRIAL MICROBIOLOGY	4MCB312 E	M	16	7	4MCB212	
BIOTECHNOLOGY	4MCB322 G	M	16	7	4MCB212	

4BSC31 HYDROLOGY AND PHYSICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	HYDROLOGY AND PHYSICS					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**HYDROLOGY**				**PHYSICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC31					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	C	16	5		
CALCULUS I	4MTH111 F	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	M	16	5		4MTH111
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO GEOLOGY	4HYD112 D	M	16	6		
CALCULUS II	4MTH112 F	C	16	6		4MTH111
ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	M	16	6		

STATISTICS FOR SCIENCE STUDENTS	4STT112 E	C	16	6		4STT111 4MTH112
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	M	16	6	4GES111	
MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112 4MTH111	
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	C	16	6	4GES111	
SECOND YEAR SEMESTER 2						
INTRO TO SUBSURFACE HYDROLOGY	4HYD212 F	M	16	6	4HYD112	
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
MODERN PHYSICS, PHOTONICS & WAVES	4PHY212 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
ELECTROMAGNETISM	4PHY222 A	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
GEOGRAPHICAL INFORMATION SYSTEMS (OPTIONAL ADDITIONAL MODULE)*	4HYD222	E	16	6		4GES211
THIRD YEAR SEMESTER 1						
SURFACE WATER HYDROLOGY	4HYD311 A	M	16	7	4HYD211 4STT122	
GROUNDWATER HYDROLOGY	4HYD321 C	M	16	7	4HYD212	
QUANTUM AND STATISTICAL PHYSICS	4PHY311 H	M	16	7	4PHY212	
ELECTRONIC CIRCUITS AND DEVICES	4PHY321 F	M	16	7	4PHY211 4PHY212 4PHY222	
THIRD YEAR SEMESTER 2						
HYDROLOGICAL MODELLING	4HYD332 A	M	16	7	4HYD211 4HYD212	
WATER RESOURCES MANAGEMENT	4HYD342 C	M	16	7	4HYD211	
NUCLEAR PHYSICS AND APPLICATIONS	4PHY312 H	M	16	7	4PHY211 4PHY212	
SOLID STATE PHYSICS & MATERIAL SCIENCE	4PHY322 F	M	16	7	4PHY211 4PHY212	

*4HYD222 (geographical information systems) is included in this programme as an optional module for students who wish to progress to hydrology honours, and those who want to add GIS to their studies. The module does not count towards the completion of the programme

4BSC32 HYDROLOGY AND STATISTICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	HYDROLOGY AND MATHEMATICAL SCIENCES					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**HYDROLOGY**				**STATISTICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC32					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	C	16	5		
CALCULUS I	4MTH111 F	C	16	5		
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	M	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO GEOLOGY	4HYD112 D	M	16	6		
CALCULUS II	4MTH112 F	C	16	6		4MTH111
INTRO HUMAN GEOGRAPHY	4GES112 H	C	16	6		

STATISTICS FOR SCIENCE STUDENTS	4STT112 E	M	16	6		4STT111 4MTH112
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	M	16	6	4GES111	
DISTRIBUTION THEORY	4STT211 C	M	16	6	4STT112	4MTH221
ADVANCED CALCULUS	4MTH221 H	C	16	6	4MTH112	
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	C	16	6	4GES111	
SECOND YEAR SEMESTER 2						
INTRO TO SUBSURFACE HYDROLOGY	4HYD212 F	M	16	6	4HYD112	
STATISTICAL INFERENCE	4STT212 C	M	16	6	4STT112	4STT221 4MTH222
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	C	16	6	4MTH112 4MTH111	
GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	C	16	6		4GES211
THIRD YEAR SEMESTER 1						
SURFACE WATER HYDROLOGY	4HYD311 A	M	16	7	4HYD211 4STT122	
GROUNDWATER HYDROLOGY	4HYD321 C	M	16	7	4HYD212	
RANDOM PROCESSES	4STT311 F	M	16	7	4STT211 4STT212	
EXPERIMENTAL DESIGN	4STT321 H	M	16	7	4STT211 4STT212	
THIRD YEAR SEMESTER 2						
HYDROLOGICAL MODELLING	4HYD332 A	M	16	7	4HYD211 4HYD212	
WATER RESOURCES MANAGEMENT	4HYD342 C	M	16	7	4HYD211	
LINEAR MODELS	4STT312 F	M	16	7	4STT211 4STT212	
TIME SERIES	4STT322 H	M	16	7	4STT211 4STT212	

4BSC33 HYDROLOGY AND ZOOLOGY						
FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING					
DEPARTMENTS:	HYDROLOGY AND ZOOLOGY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	HYDROLOGY				ZOOLOGY	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC33					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
INTRO TO PHYSICAL & ENVIRONMENTAL GEOGRAPHY	4GES111 H	C	16	5		
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	M	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
INTRO TO GEOLOGY	4HYD112 D	M	16	6		
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		

INTRO TO ZOOLOGY II	4ZOL112 A	M	16	6		4ZOL111
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
INTRO TO SURFACE WATER HYDROLOGY	4HYD211 F	M	16	6	4GES111	
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E (4STT122)	C	16	5		
ANIMAL ANATOMY & PHYSIOLOGY	4ZOL211 C	M	16	6	4ZOL111 4ZOL112	
GLOBAL LANDFORMS & CARTOGRAPHY	4GES211 C/D	C	16	6	4GES111	
SECOND YEAR SEMESTER 2						
INTRO TO SUBSURFACE HYDROLOGY	4HYD212 F	M	16	6	4HYD112	
ANIMAL DIVERSITY	4ZOL212 C	M	16	6	4ZOL111 4ZOL112	
PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	C	16	6		
GEOGRAPHICAL INFORMATION SYSTEMS	4HYD222 PE/PH	C	16	6		4GES211
THIRD YEAR SEMESTER 1						
SURFACE WATER HYDROLOGY	4HYD311 A	M	16	7	4HYD211 4STT122	
GROUNDWATER HYDROLOGY	4HYD321 C	M	16	7	4HYD212	
ANIMAL ECOLOGY I	4ZOL311 F	M	16	7	4ZOL212	
ECOPHYSIOLOGY & ECOTOXICOLOGY	4ZOL321 H	M	16	7	4ZOL211	
THIRD YEAR SEMESTER 2						
HYDROLOGICAL MODELLING	4HYD332 A	M	16	7	4HYD211 4HYD212	
WATER RESOURCES MANAGEMENT	4HYD342 C	M	16	7	4HYD211	
ANIMAL ECOLOGY II	4ZOL312 F	M	16	7	4ZOL212	
RESEARCH DESIGN & APPLICATION	4ZOL322 H	M	16	7	4ZOL211	

4BSC34 MATHEMATICS AND PHYSICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	MATHEMATICAL SCIENCES AND PHYSICS					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**MATHEMATICS**				**PHYSICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC34					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
CALCULUS I	4MTH111 F	M	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	M	16	5		4MTH111
EITHER DISCRETE MATHEMATICS	4AMT111 G	C	16	5		4MTH111
EITHER INTRODUCTORY COMPUTING	4CPS111 B	E	16	5		
OR GENERAL CHEMISTRY 111	4CHM111 E	E	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
CALCULUS II	4MTH112 F	M	16	6		4MTH111
ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	M	16	6		
FURTHER DISCRETE MATHEMATICS	4AMT122 G	C	16	6		4MTH112, 4AMT111

EITHER INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	E	16	6		4CPS111
OR GENERAL CHEMISTRY 112	4CHM112 E	E	16	6		4CHM111
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
MECHANICS SPECIAL RELATIVITY & PROPERTIES OF MATTER	4PHY211 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
ADVANCED CALCULUS	4MTH221 H	M	16	6	4MTH112	
DYNAMICAL SYSTEMS & MATHEMATICAL MODELLING	4AMT211 E	E	16	6	4AMT122	4MTH221
EITHER DATA STRUCTURES AND ALGORITHMS	4CPS211 D	E	16	6	4CPS111	
OR ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211 G	E	16	6	4CHM111 4CHM112 4MTH111	
SECOND YEAR SEMESTER 2						
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	M	16	6	4MTH112 4MTH111	
MODERN PHYSICS, PHOTONICS & WAVES	4PHY212 C	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
ELECTROMAGNETISM	4PHY222 A	M	16	6	4PHY111 4PHY112 4MTH111 4MTH112	
EITHER INTRO TO OPERATIONS RESEARCH	4AMT212 E	E	16	6	4AMT122	4MTH222
OR SOFTWARE ENGINEERING	4CPS212 D	E	16	6	4CPS112	4CPS211
OR ORGANIC & PHYSICAL CHEMISTRY 2	4CHM212 G	E	16	6	4CHM111 4CHM112 4MTH111	
THIRD YEAR SEMESTER 1						
ABSTRACT ALGEBRA	4MTH311 A	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	

REAL ANALYSIS	4MTH321C	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
QUANTUM AND STATISTICAL PHYSICS	4PHY311H	M	16	7	4PHY212	
ELECTRONIC CIRCUITS AND DEVICES	4PHY321F	M	16	7	4PHY211 4PHY212 4PHY222	

THIRD YEAR SEMESTER 2						
GRAPH THEORY	4MTH312A	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
COMPLEX ANALYSIS	4MTH322C	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
NUCLEAR PHYSICS AND APPLICATIONS	4PHY312H	M	16	7	4PHY211 4PHY212	

SOLID STATE PHYSICS & MATERIAL SCIENCE	4PHY322 F	M	16	7	4PHY211 4PHY212	

4BSC35 MATHEMATICS AND STATISTICS						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	MATHEMATICAL SCIENCES					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**MATHEMATICS**				**STATISTICS**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC35					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 60% (LEVEL 5) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE OR INFO TECHNOLOGY OR LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
CALCULUS I	4MTH111 F	M	16	5		
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	M	16	5		
EITHER DISCRETE MATHEMATICS	4AMT111 G	E	16	5		4MTH111
OR INTRODUCTORY COMPUTING	4CPS111 B	E	16	5		
EITHER GENERAL CHEMISTRY 111	4CHM111 E	E	16	5		
OR CLASSICAL MECHANICS & PROPERTIES OF MATTER	4PHY111 A	E	16	5		4MTH111
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
CALCULUS II	4MTH112 F	M	16	6		4MTH111

STATISTICS FOR SCIENCE STUDENTS	4STT112 E	M	16	6		4STT111 4MTH112
EITHER FURTHER DISCRETE MATHEMATICS	4AMT122 G	E	16	6		4MTH112 4AMT111
OR INTRO TO SYSTEMS PROGRAMMING	4CPS112 B	E	16	6		4CPS111
EITHER GENERAL CHEMISTRY 112	4CHM112 E	E	16	6		4CHM111
OR ELECTROMAGNETISM, NUCLEAR & MODERN PHYSICS	4PHY112 A	E	16	6		
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
ADVANCED CALCULUS	4MTH221 H	M	16	6	4MTH112	
DISTRIBUTION THEORY	4STT211 C	M	16	6	4STT112	4MTH221
DYNAMICAL SYSTEMS & MATHEMATICAL MODELLING	4AMT211 E	C	16	6	4AMT122	4MTH221
EITHER DATA STRUCTURES AND ALGORITHMS	4CPS211 D	E	16	6	4CPS111	
OR ANALYTICAL & INORGANIC CHEMISTRY 2	4CHM211 G	E	16	6	4CHM111 4CHM112 4MTH111	
SECOND YEAR SEMESTER 2						
LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS	4MTH222 H	M	16	6	4MTH112 4MTH111	
STATISTICAL INFERENCE	4STT212 C	M	16	6	4STT112	4STT2111 4MTH222
EITHER INTRO TO OPERATIONS RESEARCH	4AMT212 E	C	16	6	4AMT122	4MTH222
EITHER SOFTWARE ENGINEERING	4CPS212 D	E	16	6	4CPS112	4CPS211
OR ORGANIC & PHYSICAL CHEMISTRY 2	4CHM212 G	E	16	6	4CHM111 4CHM112 4MTH111	
THIRD YEAR SEMESTER 1						
ABSTRACT ALGEBRA	4MTH311 A	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222,	

					OPTIONAL: 4AMT211, 4AMT212	
REAL ANALYSIS	4MTH321 C	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
RANDOM PROCESSES	4STT311 F	M	16	7	4STT211 4MTH222	
EXPERIMENTAL DESIGN	4STT321 H	M	16	7	4STT211 4STT212	
THIRD YEAR SEMESTER 2						
GRAPH THEORY	4MTH312 A	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
COMPLEX ANALYSIS	4MTH322 C	M	16	7	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	
LINEAR MODELS	4STT312 F	M	16	7	4STT212	
TIME SERIES	4STT322 H	M	16	7	4STT211 4STT212	

4BSC36 MICROBIOLOGY AND ZOOLOGY						
FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING					
DEPARTMENTS:	BIOCHEMISTRY & MICROBIOLOGY AND ZOOLOGY					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	MICROBIOLOGY				ZOOLOGY	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC36					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
INTRODUCTION TO PLANT PHYSIOLOGY & GENETICS	4BOT111 E	C	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	M	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		

PLANT MORPHOLOGY & TEXONOMY	4BOT112 E	C	16	6		4BOT111
INTRO TO ZOOLOGY II	4ZOL112 A	M	16	6		4ZOL111
COMPUTER LITERACY II	4CPS122 X	C	16	5		
SECOND YEAR SEMESTER 1						
PROKARYOTES CLASSIFICATION & MICROBIAL TECHNIQUES	4MCB211 D	M	16	6	4CHM121 4CHM122	
ANIMAL ANATOMY & PHYSIOLOGY	4ZOL211 C	M	16	6	4ZOL111 4ZOL112	
PROKARYOTES STRUCTURE AND ENVIRONMENTAL MICROBIOLOGY	4MCB221 A	M	16	6	4CHM121 4CHM122	
EITHER BIOMOLECULES & ENZYMOLOGY	4BCH211 H	E	16	6	4CHM121 4CHM122	
OR PLANT GROWTH & DEVELOPMENT	4BOT211 G	E	16	6	4BOT111 4BOT112	
SECOND YEAR SEMESTER 2						
MICROBIAL GROWTH & MEDICAL MICROBIOLOGY	4MCB212 D	M	16	6	4CHM121 4CHM122	4MCB211
ANIMAL DIVERSITY	4ZOL212 C	M	16	6	4ZOL111 4ZOL112	
METABOLISM	4BCH212 H	C	16	6	4CHM121 4CHM122	
EITHER BIOCHEMISTRY: PRINCIPLES AND TECHNIQUES	4BCH222 A	E	16	6	4CHM121 4CHM122	
OR PLANT ANATOMY & BIODIVERSITY	4BOT212 G	E	16	6	4BOT111 4BOT112	
THIRD YEAR SEMESTER 1						
FOOD MICROBIOLOGY	4MCB311 E	M	16	7	4MCB212	
EPIDEMIOLOGY	4MCB321 G	M	16	7	4MCB212	
ANIMAL ECOLOGY I	4ZOL311 F	M	16	7	4ZOL212	
ECOPHYSIOLOGY & ECOTOXICOLOGY	4ZOL321 H	M	16	7	4ZOL211	
THIRD YEAR SEMESTER 2						
ENVIRONMENTAL INFLUENCES ON MICRO-ORGANISMS & INDUSTRIAL MICROBIOLOGY	4MCB312 E	M	16	7	4MCB212	
BIOTECHNOLOGY	4MCB322 G	M	16	7	4MCB212	
ANIMAL ECOLOGY II	4ZOL312 F	M	16	7	4ZOL212	4ZOL321
RESEARCH DESIGN & APPLICATION	4ZOL322 H	M	16	7	4ZOL211	

4BSC37 MICROBIOLOGY AND HUMAN MOVEMENT SCIENCE						
FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**					
DEPARTMENTS:	BIOCHEMISTRY & MICROBIOLOGY AND BIOKINETICS & SPORT SCIENCE					
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE					
QUALIFIER						
MAJORS	**MICROBIOLOGY**				**HUMAN MOVEMENT SCIENCE**	
ABBREVIATION	BSC					
QUALIFICATION CODE (SAQF)						
UNIZULU CODE	4BSC37					
EXIT NQF LEVEL	7					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN ENGLISH					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN MATHEMATICS					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN PHYSICAL SCIENCE					
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 50% (LEVEL 4) IN LIFE SCIENCES					
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS					
MINIMUM DURATION OF STUDIES	3 YEARS					
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES					
INTAKE FOR THE QUALIFICATION:	JANUARY					
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY					
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES					
TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
BASIC CHEMISTRY 121	4CHM121 G	C	16	5		
HUMAN MOVEMENT SCIENCE 1A	4HMS111 H	M	16	5		
INTRO TO ZOOLOGY I	4ZOL111 A	C	16	5		
CLASSICAL MECHANICS & PROPERTIES OF MATTER(BIO)	4PHY121 C	C	16	5		
COMPUTER LITERACY I	4CPS121 X	C	16	5		
FIRST YEAR SEMESTER 2						
BASIC CHEMISTRY 122	4CHM122 G	C	16	6		
HUMAN MOVEMENT SCIENCE 1B	4HMS112 H	M	16	6		
INTRO TO ZOOLOGY II	4ZOL112 A	C	16	6		4ZOL111
MATHS & STATS FOR EARTH & LIFE SCIENCES	4MTH122 C	C	16	5		
COMPUTER LITERACY II	4CPS122 X	C	16	5		

SECOND YEAR SEMESTER 1						
PROCARYOTES CLASSIFICATION & MICROBIAL TECHNIQUES	4MCB211 D	M	16	6	4CHM121 4CHM122	
HUMAN MOVEMENT SCIENCE 2A	4HMS211 F	M	16	6	4HMS111 4HMS112	
HUMAN ANATOMY & PHYSIOLOGY I	4ZOL121 B	C	16	5		
BIOMOLECULES & ENZYMOLOGY	4BCH211 H	C	16	6	4CHM121 4CHM122	
SECOND YEAR SEMESTER 2						
MICROBIAL GROWTH & MEDICAL MICROBIOLOGY	4MCB212 D	M	16	6	4CHM121 4CHM122	4MCB211
HUMAN MOVEMENT SCIENCE 2B	4HMS212 F	M	16	6	4HMS111 4HMS112	
HUMAN ANATOMY & PHYSIOLOGY II	4ZOL122 B	C	16	6		
METABOLISM	4BCH212 H	C	16	6	4CHM121 4CHM122	
THIRD YEAR SEMESTER 1						
FOOD MICROBIOLOGY	4MCB311 E	M	16	7	4MCB212	
EPIDEMIOLOGY	4MCB321 G	M	16	7	4MCB212	
HUMAN MOVEMENT SCIENCE 3A	4HMS311 B	M	16	7	4HMS211 4HMS212	
HUMAN MOVEMENT SCIENCE 3C	4HMS321 D	M	16	7	4HMS211 4HMS212	
THIRD YEAR SEMESTER 2						
ENVIRONMENTAL INFLUENCES ON MICRO-ORGANISMS & INDUSTRIAL MICROBIOLOGY	4MCB312 E	M	16	7	4MCB212	
BIOTECHNOLOGY	4MCB322 G	M	16	7	4MCB212	
HUMAN MOVEMENT SCIENCE 3B	4HMS312 B	M	16	7	4HMS211 4HMS212	
HUMAN MOVEMENT SCIENCE 3D	4HMS322 D	M	16	7	4HMS211 4HMS212	

S14 FOCUSSED PROGRAMMES

The following tables give the programmes of study for focussed programmes offered by the Faculty.

(a) Agriculture Department

BACHELOR OF SCIENCE (AGRICULTURE) ANIMAL SCIENCE 4BSC50

FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING				
DEPARTMENT:	AGRICULTURE				
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE				
QUALIFIER	(AGRICULTURE)				
MAJORS	**ANIMAL SCIENCE**				
ABBREVIATION	BSC AGRIC				
QUALIFICATION CODE (SAQF)					
UNIZULU CODE	**4BSC50**				
EXIT NQF LEVEL	8				
ADMISSION REQUIREMENTS	ENGLISH 4 (50%)				
ADMISSION REQUIREMENTS	MATHEMATICS 4 (50%)				
ADMISSION REQUIREMENTS	AGRICULTURAL SCIENCE OR LIFE SCIENCE 4 (50%)				
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT AND WITH 28 NSC POINTS				
MINIMUM DURATION OF STUDIES	4 YEARS				
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES				
INTAKE FOR THE QUALIFICATION:	JANUARY				
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY				
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES				
TOTAL CREDITS TO GRADUATE:	544				
SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
		FIRST YEAR SEMESTER 1			
BASIC CHEMISTRY 121	4CHM121	16	5		
CLASSICAL MECHANICS BIO	4PHY121	16	5		
CYTOLOGY, GENETICS AND PHYSIOLOGY	4BOT111	16	5		
INTRODUCTION TO ZOOLOGY I	4ZOL111	16	5		

COMPUTER LITERACY I	4CPS121 X	16	5		
FIRST YEAR SEMESTER 2					
BASIC CHEMISTRY	4CHM122	16	6		4CHM121
MATHS AND STATS FOR EARTH AND LIFE SCIENCE	4MTH122	16	5		
PLANT MORPHOLOGY & TEXONOMY	4BOT112	16	6		
INTRODUCTION TO ZOOLOGY II	4ZOL112	16	6		4ZOL111
COMPUTER LITERACY II	4CPS122 X	16	5		
TOTAL		**160**			
SEMESTER 1 SECOND YEAR					
INTRODUCTION TO ANIMAL SCIENCE	4AAS211	16	6		4ZOL111
INTRODUCTION TO EXTENSION AND RURAL DEVELOPMENT	4AAE211	16	6		
INTRODUCTION TO SOIL SCIENCE	4AAG211	16	6		
BIOMOLECULES AND ENZYMOLOGY	4BCH211	16	6	4CHM121, 4CHM122	
SEMESTER 2 SECOND YEAR					
PRINCIPLES OF ANIMAL PRODUCTION	4AAS212	16	6		4ZOL112
INTRODUCTION TO AGRICULTURAL ECONOMICS & FARM MANAGEMENT	4AAE212	16	6		
INTRODUCTION TO CROP PRODUCTION	4AAG212	16	6	4BOT111, 4BOT112	
METABOLISM	4BCH212	16	6	4CHM121, 4CHM122	
TOTAL		**128**			
THIRD YEAR SEMESTER 1					
FARM ANIMAL AND PHYSIOLOGY	4AAS311	16	7		4ZOL112 4AAS212
ANIMAL BREEDING	4AAS321	16	7	4AAS211, 4AAS212	
ANIMAL NUTRITION	4AAS331	16	7	4AAS211, 4AAS212	
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111	16	5		
THIRD YEAR SEMESTER 2					
DIGESTIVE PHYSIOLOGY	4AAS312	16	7		4AAS211, 4AAS212
ANIMAL HEALTH	4AAS322	16	7	4AAS211, 4AAS212	
PIG AND POULTRY PRODUCTION	4AAS332	16	7		4AAS211, 4AAS212
PRINCIPLES OF PRODUCTION ECONOMICS	4AAE322	16	7	4AAS211, 4AAG212, 4AAE211	

TOTAL		**128**			
FOURTH YEAR SEMESTER 1					
PASTURE ECOLOGY	4AAS411	16	8	4AAS211, 4AAS212	
ANIMAL REPRODUCTION	4AAS421	16	8	4AAS322	4AAS311
APPLIED ANIMAL NUTRITION	4AAS431	16	8	4AA331,4AAS312	
ANIMAL SCIENCE RESEARCH I	4AAS441	16	8	4AAS211, 4AAS212, 4STT111,	4AAS331, 4AAS332
FOURTH YEAR SEMESTER 2					
APPLIED PIG AND POULTRY PRODUCTION	4AAS412	16	8	4AAS332	
APPLIED RUMINANT PRODUCTION	4AAS422	16	8	4AAS211, 4AAS212	
APPLIED ANIMAL SCIENCE	4AAS432	16	8	4AAS211, 4AAS212	
ANIMAL SCIENCE RESEARCH II	4AAS442	16	8	4AAS211, 4AAS212, 4STT111	4AAS331 4AAS322, 4AAS332
TOTAL		**128**			

BACHELOR OF SCIENCE (AGRICULTURE) AGRIBUSINESS 4BSC51

FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING				
DEPARTMENT:	AGRICULTURE				
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE				
QUALIFIER	AGRICULTURE				
MAJORS	AGRIBUSINESS AGRICULTURAL BUSINESS AND MANAGEMENT				
ABBREVIATION	BSC AGRIC				
QUALIFICATION CODE (SAQF)					
UNIZULU CODE	**4BSC51**				
EXIT NQF LEVEL	8				
ADMISSION REQUIREMENTS	ENGLISH 4 (50%)				
ADMISSION REQUIREMENTS	MATHEMATICS 4 (50%)				
ADMISSION REQUIREMENTS	AGRICULTURAL SCIENCE OR LIFE SCIENCE 4 (50%)				
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT AND WITH 28 NSC POINTS				
MINIMUM DURATION OF STUDIES	4 YEARS				
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES				
INTAKE FOR THE QUALIFICATION:	JANUARY				
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY				
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES				
TOTAL CREDITS TO GRADUATE:	544				
SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1					
BASIC CHEMISTRY 121	4CHM121	16	5		
CLASSICAL MECHANICS BIO	4PHY121	16	5		
CYTOLOGY, GENETICS AND PHYSIOLOGY	4BOT111	16	5		
INTRODUCTION TO ZOOLOGY I	4ZOL111	16	5		
COMPUTER LITERACY I	4CPS121 X	16	5		
FIRST YEAR SEMESTER 2					
BASIC CHEMISTRY	4CHM122	16	6		4CHM121
MATHS AND STATS FOR EARTH AND LIFE SCIENCE	4MTH122	16	5		
PLANT MORPHOLOGY & TEXONOMY	4BOT112	16	6		
INTRODUCTION TO ZOOLOGY II	4ZOL112	16	6		4ZOL111

COMPUTER LITERACY II	4CPS122 X	16	5		
TOTAL		**160**			
SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
SECOND YEAR SEMESTER 1					
INTRODUCTION TO ANIMAL SCIENCE	4AAS211	16	6		4ZOL111
INTRODUCTION TO EXTENSION AND RURAL DEVELOPMENT	4AAE211	16	6		
INTRODUCTION TO SOIL SCIENCE	4AAG211	16	6		
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111	16	5		
SECOND YEAR SEMESTER 2					
PRINCIPLES OF ANIMAL PRODUCTION	4AAS212	16	6		4ZOL112
INTRODUCTION TO AGRICULTURAL ECONOMICS & FARM MANAGEMENT	4AAE212	16	6		
INTRODUCTION TO CROP PRODUCTION	4AAG212	16	6		
EXTENSION METHODS	4AAE222	16	6		
TOTAL		**128**			
THIRD YEAR SEMESTER 1					
FARM MANAGEMENT AND RECORD KEEPING SYSTEMS	4AAE311	16	7	4AAE212	
LAND USE AND NATURAL RESOURCES MANAGEMENT	4GES331	16	7		
INTERMEDIATE MICROECONOMICS	2ECN201	16	6		
FINANCIAL MANAGEMENT	2BMG201	16	6		
THIRD YEAR SEMESTER 2					
ENTREPRENEURSHIP, CO-OPS AND OTHER FORMS OF BUSINESS	4AAE312	16	7		
PRINCIPLES OF PRODUCTION ECONOMICS	4AAE322	16	7	4AAS211, 4AAG212, 4AAE212	
PRINCIPLES OF MACROECONOMICS	2ECN102	16	6		
FINANCIAL MANAGEMENT	2BMG202	16	6		
TOTAL		**128**			
FOURTH YEAR SEMESTER 1					

AGRIBUSINESS MANAGEMENT AND MARKETING	4AAE411	16	8	4AAE212	4AAE312
RISK MANAGEMENT	4AAE421	16	8		4AAE311 4AAE312
FINANCIAL MANAGEMENT	2BMG301	16	7		
AGRIBUSINESS RESEARCH PROJECT I	4AAE441	16	8	4AAE211, 4AAE212, 4AAE222, 4STT111	4AAE311, 4AAE312, 4AAE322
FOURTH YEAR SEMESTER 2					
FARM PLANNING	4AAE412	16	8	4AAS211 4AAE212 4AAG212, 4AAS212	4AAE311 4GES331
AGRICULTURAL POLICY AND INTERNATIONAL TRADE	4AAE422	16	8		2ECN201, 2ECN102
ENVIRONMENTAL MANAGEMENT	4GES312	16	7		
AGRIBUSINESS RESEARCH PROJECT II	4AAE442	16	8	4AAE211, 4AAE212, 4AAE222, 4STT111	4AAE311, 4AAE312, 4AAE322, 4AAE441
TOTAL		**128**			

BACHELOR OF SCIENCE (AGRICULTURE) AGRONOMY 4BSC52

FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING
DEPARTMENT:	AGRICULTURE
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE
QUALIFIER	AGRICULTURE
MAJORS	PLANT SCIENCES
ABBREVIATION	BSC AGRIC
QUALIFICATION CODE (SAQF)	
UNIZULU CODE	**4BSC52**
EXIT NQF LEVEL	8
ADMISSION REQUIREMENTS	ENGLISH 4 (50%)
ADMISSION REQUIREMENTS	MATHEMATICS 4 (50%)
ADMISSION REQUIREMENTS	AGRICULTURAL SCIENCE OR LIFE SCIENCE 4 (50%)
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT AND WITH 28 NSC POINTS
MINIMUM DURATION OF STUDIES	4 YEARS
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES
INTAKE FOR THE QUALIFICATION:	JANUARY
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES
TOTAL CREDITS TO GRADUATE:	544

SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1					
BASIC CHEMISTRY	4CHM121	16	5		
CLASSICAL MECHANICS AND PROPERTIES OF MATTER	4PHY121	16	5		
CYTOLOGY, GENETICS AND PHYSIOLOGY	4BOT111	16	5		
INTRODUCTION TO ZOOLOGY I	4ZOL111	16	5		
COMPUTER LITERACY I	4CPS121 X	16	5		

FIRST YEAR SEMESTER 2					
BASIC CHEMISTRY	4CHM122	16	6		
MATHEMATICS & STATISTICS FOR LIFE AND EARTH SCIENCE	4MTH122	16	5		
PLANT MORPHOLOGY & TEXONOMY	4BOT112	16	6		4BOT111
INTRODUCTION TO ZOOLOGY II	4ZOL112	16	6		
COMPUTER LITERACY II	4CPS122 X	16	6		
TOTAL		**160**			
SECOND YEAR SEMESTER 1					
INTRODUCTION TO EXTENSION AND RURAL DEVELOPMENT	4AAE211	16	6		
INTRODUCTION TO SOIL SCIENCE	4AAG211	16	6		
PLANT GROWTH & DEVELOPEMNT, FLORAL PROPERTIES	4BOT211	16	6	4BOT111, 4BOT112	
AGRICULTURAL MECHANIZATION AND FARM STRUCTURE	4AAG221	16	6		
SECOND YEAR SEMESTER 2					
INTRODUCTION TO AGRICULTURAL ECONOMICS & FARM MANAGEMENT	4AAE212	16	6		
INTRODUCTION TO CROP PRODUCTION	4AAG212	16	6	4BOT111, 4BOT112	
PLANT ANATOMY, TAXONOMY & BIODIVERSITY	4BOT212	16	6	4BOT111, 4BOT112	
INTRODUCTION TO SOIL PHYSICS AND CONSERVATION	4AAG222	16	6		4AAG211
TOTAL		**128**			
THIRD YEAR SEMESTER 1					
CROP PROTECTION 3A	4AAG321	16	7	4AAG212	
PLANT PROPAGATION	4AAG311	16	7	4BOT211, 4BOT212, 4AAG212	

CYTOLOGY, GENETICS & PLANT BIOCHEMISTRY	4BOT311	16	7	4BOT211, 4BOT212,	
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111	16	5		
THIRD YEAR SEMESTER 2					
ENTERP, CO-OPS, &OTHER FORMS OF BUSINESS	4AAE312	16	7		
PLANT BREEDING	4AAG312	16	7	4BOT211, 4BOT212	4BOT311
CROP PROTECTION 3B	4AAG352	16	7		4AAG321
PRINCIPLES OF PRODUCTION ECONOMICS	4AAE322	16	7	4AAG212, 4AAE211	
TOTAL		**128**			
SEMESTER 1 FOURTH YEAR					
SOIL FERTILITY MANAGEMENT & CONSERVATION	4AAG411	16	8	4AAG211, 4AAG212	
FLORICULTURE AND VEGETABLE CROP PRODUCTION	4AAG451	16	8	4AAG212, 4AAG311	
SEED SCIENCE AND TECHNOLOGY	4AAG431	16	8	4AAG312, 4AAG311	
AGRONOMY RESEARCH PROJECT I	4AAG441	16	8	4AAG211, 4AAG212, 4AAG221 4AAG222	4AAG311, 4AAG312, 4AAG352 4AAG321 4STT111
SEMESTER 1 SEMESTER 2					
FRUIT PRODUCTION	4AAG452	16	8	4AAG212 4AAG311	
APPLIED PLANT BREEDING	4AAG422	16	8	4AAG311, 4AAG312	
FIELD CROP PRODUCTION	4AAG432	16	8	4AAG212 4AAG311	4AAG411
AGRONOMY RESEARCH PROJECT II	4AAG442	16	8	4AAG211, 4AAG212, 4AAG221 4AAG222	4AAG311, 4AAG312, 4AAG321 4AAG352 4AAG441 4STT111
TOTAL		**128**			

(b) Department of Consumer Sciences

BACHELOR OF CONSUMER SCIENCE (EXTENSION AND RURAL DEVELOPMENT) 4BSC55

FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING
DEPARTMENTS:	CONSUMER SCIENCES
DEGREE(DESIGNATOR)	BACHELOR OF CONSUMER SCIENCE (EXTENSION AND RURAL DEVELOPMENT)
QUALIFIER	EXTENSION & RURAL DEVELOPMENT
ABBREVIATION	B CONS SC
QUALIFICATION CODE (SAQF)	
UNIZULU CODE	4BSC55
EXIT NQF LEVEL	7
ADMISSION REQUIREMENTS	NSC WITH DEGREE ENDORSEMENT
ADMISSION REQUIREMENTS	MINIMUM OF 28 POINTS
ADMISSION REQUIREMENTS	ENGLISH 4 POINTS AND LIFE SCIENCES 4 POINTS
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT AND WITH 28 NSC POINTS
MINIMUM DURATION OF STUDIES	4 YEARS
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES
INTAKE FOR THE QUALIFICATION:	JANUARY
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES
TOTAL CREDITS TO GRADUATE:	**507**

SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1					
PRACTICAL ENGLISH 1A	1ENG121	16	5		
HUMAN ANATOMY AND PHYSIOLOGY	4ZOL121	16	5		
PHYSICS FOR CONSUMER SCIENCES	4PHY131	8	5		
INTRODUCTION TO HOUSEHOLD & CONSUMER STUDIES	4CNS111	15	5		
FIRST YEAR SEMESTER 2					
FOOD SAFETY & HYGIENE	4CFH112	15	6		
HUMAN ANATOMY AND PHYSIOLOGY	4ZOL122	16	6		
CHEMISTRY FOR CONSUMER SCIENCE	4CHM132	8	6		
INTRODUCTION TO FOOD SCIENCE	4CFS112	15	6		4CFH112
INTRODUCTION TO HUMAN NUTRITION	4CNU112	15	6		

TOTAL		**124**			
SECOND YEAR SEMESTER 1					
INTRODUCTION TO EXTENSION & RURAL DEVELOPMENT	4AAE211	16	6		
HOUSEHOLD RESOURCE MANAGEMENT	4CNS21 1	15	6	4CNS111	
NGO SECTOR, DEVELOPMENT & UNDERDEVELOPMENT	1DEV111	16	5		
MEAL PLANNING & MANAGEMENT	4CFD211	15	6	4CFS112, 4CFH112	
NUTRITION IN THE LIFECYCLE	4CNU21 1	15	6	4CNU112	
SECOND YEAR SEMESTER 2					
EXTENSION METHODS	4AAE222	16	6		
CONSUMER & THE MARKET	4CNS21 2	15	6		
COMMUNITY PROJECT DEVELOPMENT & FACILITATION	1DEV112	16	6		
INTRODUCTION TO AGRICULTURAL ECONOMICS & FARM MANAGEMENT PRINCIPLES OF DESIGN & INTERIORS	4AAE212 OR 4CHC21 2	15 16	6	NONE NONE	NONE NONE
TOTAL		**139**			
SEMESTER 1 THIRD YEAR					
COMMUNITY NUTRITION & FOOD SECURITY	4CNU31 1	15	7	4CNU112	
FOOD PROCESSING TECHNOLOGIES	4CFS211	15	6	4CFS112 4CFH112	
DEVELOPMENT CONCEPTS: ECONOMIC & SOCIAL	1DEV211	16	6		
NUTRITION EDUCATION & TRAINING	4CNU33 1	15	7	4CNU211	
THIRD YEAR SEMESTER 2					
GENDER, DEVELOPMENT & TECHNOLOGY	4CNS31 2	15	7	4CNS211	
FOOD MARKETING	4CFD312	15	7	4CFS112, 4CNU112, 4CNS212	
INTEGRATED RURAL DEVELOPMENT	1DEV222	16	6		
QUANTITY FOOD PRODUCTION OR CLOTHING & TEXTILE 1	4CFD212 OR 4CTC212	15	6	4CFS112 & 4CFH112 NONE	4CFD211 NONE

TOTAL		**122**			
FOURTH YEAR SEMESTER 1					
RESEARCH METHODS IN CONSUMER SCIENCE	4CRM311	15	7		
FOOD PRODUCT DEVELOPMENT	4CFS311	15	7	4CFS211, 4CNS212	
INTEGRATED URBAN DEVELOPMENT	1DEV311	16	7		
INTERNSHIP FOR EXTENSION & RURAL DEVELOPMENT	4CIN419	15	8		1DEV211 1DEV222, 4AAE211
FOURTH YEAR SEMESTER 2					
RESEARCH PROJECT & ORAL/ SEMINAR	4CRM422	15	8		
MANAGEMENT OF COMMUNITY PROGRAMS	4CNS412	15	8	4CNS211	
PROJECT MANAGEMENT & EVALUATION	1DEV312	16	7		
CLOTHING & TEXTILE 2 ENTREPRENEURSHIP, CO-OPS & OTHER FORMS OF BUSINESS OWNERSHIP HOUSING EDUCATION	4CTC312 OR 4AAE312 OR 4CHC312	15 16 15	7	4CTC212 NONE 4CNS111	NONE NONE NONE
TOTAL		**122**			

BACHELOR OF CONSUMER SCIENCE (HOSPITALITY AND TOURISM) 4BSC56

FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING
DEPARTMENTS:	CONSUMER SCIENCE
DEGREE (DESIGNATOR)	BACHELOR OF CONSUMER SCIENCE (HOSPITALITY AND TOURISM)
QUALIFIER	CONSUMER SCIENCE & HOSPITALITY
ABBREVIATION	B CONS SC
QUALIFICATION CODE (SAQF)	
UNIZULU CODE	4BSC56
EXIT NQF LEVEL	7
ADMISSION REQUIREMENTS	NSC WITH DEGREE ENDORSEMENT
ADMISSION REQUIREMENTS	28 POINTS
ADMISSION REQUIREMENTS	ENGLISH AT LEVEL 4
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT AND WITH 28 NSC POINTS
MINIMUM DURATION OF STUDIES	3 YEARS
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES
INTAKE FOR THE QUALIFICATION:	JANUARY
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES
TOTAL CREDITS TO GRADUATE:	**387**

FIRST YEAR

SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
SEMESTER 1					
PRACTICAL ENGLISH 1A	1ENG121	16	5		
COMPUTER LITERACY 1	4CPS121	16	5		
INTRODUCTION TO TOURISM	1RTO111	16	5		
INTRODUCTION TO HOSPITALITY MANAGEMENT	4CHT111	15	5		
SEMESTER 2					
INTRODUCTION TO HUMAN NUTRITION	4CNU112	15	6		
FOOD HYGIENE & SAFETY	4CFH112	15	6		

BUSINESS TOURISM & ENTREPRENEURSHIP	1RTO112	16	6		
BASIC FOOD PREPARATION & CULINARY SKILLS	4CFD112	15	6		4CFH112
COMPUTER LITERACY II	4CPS122	16	5		
TOTAL		**140**			
SECOND YEAR SEMESTER 1					
TOURISM DEVELOPMENT	1RTO121	16	6		
RECREATION & TOURISM EVENTS MANAGEMENT A	1RTO221	16	6		
MEAL PLANNING & MANAGEMENT	4CFD211	15	6	4CFD112, 4CFH112	
NUTRITION IN THE LIFE CYCLE	4CNU211	15	7	4CNU112	
SECOND YEAR SEMESTER 2					
TOURISM MANAGEMENT	1RTO122	16	6		
RECREATION & TOURISM EVENTS MANAGEMENT B	1RTO222	16	6		
QUANTITY FOOD PRODUCTION	4CFD212	15	6	4CFD112	4CFD211
ORGANISATION & MANAGEMENT OF FOOD SERVICES	4CFD222	15	6	4CFD112	4CFD211
TOTAL		**124**			
THIRD YEAR SEMESTER 1					
FOOD & BEVERAGE MANAGEMENT	4CFD311	15	7	4CFD212	
TOURISM RESEARCH A	1RTO311	16	7		
INFORMATION TECHNOLOGY & DISTRIBUTION CHANNELS IN TOURISM	1RTO321	16	7		
EXPERIENTIAL LEARNING IN HOSPITALITY	4CHT319	15	7	4CFD212	4CFD311 4CHT322 4CHT332
THIRD YEAR SEMESTER 2					
HOSPITALITY SERVICE OPERATIONS	4CHT322	15	7		4CHT319 1RTO221 1RTO222 4CHT319

HOSPITALITY LAW	4CHT332	15	7		
TOURISM RESEARCH B	1RTO322	16	7		
PRINCIPLES OF DESIGN & INTERIORS	4CHC212	15	7		
TOTAL		**123**			

Department of Engineering

The Bachelor of Engineering in Electrical Engineering, the Bachelor of Engineering in Electrical Engineering and Computer Engineering, the Bachelor of Engineering in Mechanical Engineering and the Bachelor of Engineering in Mechatronic Engineering are undergraduate degrees which will increase the number of people with high level skills in our society. This will assist in expanding the South African economy and will create employment opportunities. The four qualifications will provide opportunities for students with a suitable mathematics background to move towards acquiring an internationally accredited degree from UNIZULU as a member of the Washington Accord professional qualifications. This will enable those who achieve these qualifications to benefit from opportunities that arise within South Africa, throughout the rest of Africa and worldwide.

- BEng. (Electrical Engineering) (5EEDG1)
- BEng. (Mechanical Engineering) (5MEDG1)
- BEng. (Electrical Engineering and Computer Engineering) (5EEDG2)
- BEng. (Mechatronic Engineering) (5MEDG2)

BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) 5EEDG1

Module Code	Module name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 1 Semester 1			
4MTH171	Calculus I for Engineers	5	16	
4PHY171	General Physics A for Engineers	5	16	
4MTH181	Engineering Mechanics	5	16	
4CPS171	Introductory Computing for Engineers	5	16	
5MEC111	Engineering Drawing	5	8	
Total				
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 1 Semester 2			
4MTH172	Calculus II for Engineers	5	16	4MTH171
4PHY172	General Physics B for Engineers	5	16	4PHY171
5EEE112	Introduction to Engineering	5	16	4MTH171
4CHM172	General Chemistry for Engineers	5	16	
5MEC112	Introduction to Engineering Design	5	8	5MEC111
Total			**144**	

Module Code	Module Name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 2 Semester 1			
4MTH271	Advanced Calculus for Engineers	6	16	4MTH172
4CPS181	Introduction to Programming for Engineers	6	16	4CPS171
5EEE211	Signals and Systems I	5	16	5EEE112

5EEE221	Analogue Electronic Design	6	16	5EEE112
5MEC231	Project Management	6	8	ALL FIRST YEAR MODULES
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 2 Semester 2			
4MTH272	Linear Algebra and Differential Equations for Engineers	6	16	4MTH172
4PHY272	Electromagnetism for Engineers	6	16	4PHY171, 4PHY172
5EEE212	Introduction to Power Engineering	6	16	5EEE112
5EEE222	Embedded Systems I	6	16	5EEE112
5EEE232	Professional Communications	6	8	ALL FIRST YEAR MODULES
Total			**144**	
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 3 Semester 1			
5EEE311	Electromagnetic Engineering	7	12	4PHY272, 4MTH271
5EEE321	Electronic Devices and Circuits	7	16	5EEE231
5EEE331	Energy Conversion	7	16	5EEE212
5EEE341	Signals and Systems II	7	16	5EEE221
4STA171	Statistics for Engineers	7	12	
Module Code	Module Name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 3 Semester 2			
5EEE312	Control Engineering	7	16	4MTH272, 5EEE231
5EEE322	Power Systems	7	16	5EEE212
5EEE332	Communications and Networks	7	16	5EEE231
1ANT172	Culture and Society in Africa	5	16	
5EEE342	Electrical Engineering Design	7	8	5EEE321, 5EEE331, 5EEE341
Total			**144**	

Module Code	Module Name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 4 Semester 1			
5EEE411	Process Control and Instrumentation	8	16	5EEE312
5EEE421	Engineering Systems Design	8	16	5EEE342
5MEC461	Engineering Professionalism	8	8	ALL THIRD YEAR MODULES
	Select 2 from the following 3			
5EEE431	Power Electronics & Machines	8	16	5EEE331
5EEE441	Power Systems Engineering	8	16	5EEE322
5EEE451	Telecommunications	8	16	5EEE332
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 4 Semester 2			
5EEE412	Professional Communication Studies	8	8	5EEE241
5EEE422	New Venture Planning and Management	8	8	ALL THIRD YEAR MODULES
5MEC442	Industrial Ecology	8	8	ALL THIRD YEAR MODULES
2LMA472	Maritime Law for Engineers	8	8	ALL THIRD YEAR MODULES
5EEE432	Final Year Research Project	8	40	
Total			**144**	
	TOTAL CREDITS FOR THE DEGREE		**576**	

BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING AND COMPUTER ENGINEERING) 5EEDG2

Module Code	Module name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 1 Semester 1			
4MTH171	Calculus I for Engineers	5	16	
4PHY171	General Physics A for Engineers	5	16	
4MTH181	Engineering Mechanics	5	16	
4CPS171	Introductory Computing for Engineers	5	16	
5MEC111	Engineering Drawing	5	8	
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 1 Semester 2			
4MTH172	Calculus II for Engineers	5	16	4MTH171
4PHY172	General Physics B for Engineers	5	16	4PHY171
5EEE112	Introduction to Engineering	5	16	4MTH171
4CHM172	General Chemistry for Engineers	5	16	
5MEC112	Introduction to Engineering Design	5	8	5MEC111
Total			**144**	
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 2 Semester 1			
4MTH271	Advanced Calculus for Engineers	6	16	4MTH172
4CPS181	Introduction to Programming for Engineers	6	16	4CPS171
5EEE211	Signals and Systems I	5	16	5EEE112
5EEE221	Analogue Electronic Design	6	16	5EEE112
5MEC231	Project Management	6	8	ALL FIRST YEAR MODULES
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 2 Semester 2			
4MTH272	Linear Algebra and Differential Equations for Engineers	6	16	4MTH172
4PHY272	Electromagnetism for Engineers	6	16	4PHY171, 4PHY172
5EEE212	Introduction to Power Engineering	6	16	5EEE112

5EEE222	Embedded Systems I	6	16	5EEE112
5EEE232	Professional Communications	6	8	ALL FIRST YEAR MODULES
Total			**144**	

Module Code	Module Name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 3 Semester 1			
4CPS371	Computer Science II for Computer Engineers	7	16	4CPS181
5EEE321	Electronic Devices and Circuits	7	16	5EEE221
5EEE341	Signals and Systems II	7	16	5EEE211
5EEE351	Embedded Systems II	7	12	5EEE222
4STT171	Statistics for Engineers	7	12	

	Year 3 Semester 2			
5EEE312	Control Engineering	7	16	4MTH272 5EEE221
5EEE322	Power Systems	7	16	5EEE212
5EEE332	Communications and Networks	7	16	5EEE221
1ANT172	Culture and Society in Africa	5	16	
5EEE352	Electrical Engineering and Computer Engineering Design	7	8	5EEE321 5EEE341 5EEE351
Total			**144**	

	Year 4 Semester 1			
4CPS471	Computer Science III for Computer Engineers	8	16	4CPS371
5EEE421	Engineering Systems Design	8	16	5EEE352
5EEE451	Telecommunications	8	16	5EEE332
5EEE461	Engineering Professionalism	8	8	ALL THIRD YEAR MODULES
	Select 1 from the following 2 electives			
5EEE411	Process Control and Instrumentation	8	16	5EEE312
5EEE441	Power Systems Engineering	8	16	5EEE322
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 4 Semester 2			
5EEE412	Professional Communication Studies	8	12	5EEE232

5EEE422	New Venture Planning and Management	8	12	ALL THIRD YEAR MODULES
5EEE432	Final Year Research Project	8	40	ALL THIRD YEAR MODULES
5EEE442	Industrial Ecology	8	8	ALL THIRD YEAR MODULES
Total			**144**	
	TOTAL CREDITS FOR THE DEGREE		**576**	

BACHELOR OF ENGINEERING (MECHANICAL ENGINEERING) 5MEDG1

Module Code	Module name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 1 Semester 1			
4MTH171	Calculus I for Engineers	5	16	
4PHY171	General Physics A for Engineers	5	16	
4MTH181	Engineering Mechanics	5	16	
4CPS171	Introductory Computing for Engineers	5	16	
5MEC111	Engineering Drawing	5	8	
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 1 Semester 2			
4MTH172	Calculus II for Engineers	5	16	4MTH171
4PHY172	General Physics B for Engineers	5	16	4PHY171
5EEE112	Introduction to Engineering	5	16	4MTH171
4CHM172	General Chemistry for Engineers	5	16	
5MEC112	Introduction to Engineering Design	5	8	5MEC111
Total			**144**	

Module Code	Module Name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 2 Semester 1			
4MTH271	Advanced Calculus for Engineers	6	16	4MTH172
5EEE221	Analogue Electronic Design	6	16	5EEE112
5EEE211	Signals and Systems I	6	16	5EEE112

5MEC211	Mechanics of Solids I	6	12	4MTH172, 4MTH182
5MEC221	Materials Science in Engineering	6	12	4MTH172, 4MTH182
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 2 Semester 2			
4MTH272	Linear Algebra and Differential Equations for Engineers	6	16	4MTH172
5MEC212	Thermofluids I	6	12	4MTH172, 4MTH182
5MEC222	Dynamics I	6	16	4MTH172, 4MTH182
5MEC232	Mechanical Engineering Machine Element Design I	6	12	5MEC112, 5MEC122
5EEE212	Introduction to Power Engineering	6	16	5EEE112
Total			**144**	
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 3 Semester 1			
5MEC311	Mechanics of solids II	7	12	5MEC211
5MEC321	Thermofluids II	7	20	5MEC212
5MEC331	Mechanical Engineering Machine Element Design II	7	8	5MEC232
4STT171	Statistics for Engineers	5	12	
5MEC341	Experimental Methods	7	12	ALL SECOND YEAR MODULES
5MEC351	Materials under Stress	7	8	5MEC221
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 3 Semester 2			
5MEC312	Mechanical Engineering Machine Element Des III	7	12	5MEC331
5MEC322	Dynamics II	7	16	5MEC222
5MEC332	Thermofluids III	7	12	5MEC321
5MEC242	Project Management	6	8	ALL SECOND YEAR MODULES
5MEC342	Professional Communication Studies	7	8	ALL SEOND YEAR MODULES
1ANT172	Culture and Society in Africa	5	16	
Total			**144**	
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 4 Semester 1			
5MEC411	Mechanical Vibrations	8	12	5MEC322

5MEC421	Product Design	8	12	5MEC312
5MEC431	Finite Element Analysis	8	12	5MEC311
5MEC461	Industrial Ecology	8	12	ALL THIRD YEAR MODULES
5MEC441	Fundamentals of Control Systems	8	12	ALL THIRD YEAR MODULES
5MEC471	Engineering Professionalism	8	12	

Module Code	**Module Name**	**NQF Level**	**Credit Value**	
	Year 4 Semester 2			
5MEC412	System Design	8	12	5MEC421
5MEC432	Final Year Research Project	8	40	
5MEC422	New Venture Planning and Management	8	12	ALL THIRD YEAR MODULES
2LMA472	Maritime Law for Engineers	8	8	ALL THIRD YEAR MODULES
Total			**144**	
	TOTAL CREDITS FOR THE DEGREE		**576**	

BACHELOR OF ENGINEERING (MECHATRONIC ENGINEERING) 5MEDG2

Module Code	Module name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 1 Semester 1			
4MTH171	Calculus I for Engineers	5	16	
4PHY171	General Physics A for Engineers	5	16	
4MTH181	Engineering Mechanics	5	16	
4CPS171	Introductory Computing for Engineers	5	16	
5MEC111	Engineering Drawing	5	8	
Total			**72**	
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 1 Semester 2			
4MTH172	Calculus II for Engineers	5	16	4MTH171
4PHY172	General Physics B for Engineers	5	16	4PHY171
5EEE112	Introduction to Engineering	5	16	4MTH171
4CHM172	General Chemistry for Engineers	5	16	
5MEC112	Introduction to Engineering Design	5	8	5MEC111
Total			**72**	

Module Code	Module Name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 2 Semester 1			
4MTH271	Advanced Calculus for Engineers	6	16	4MTH172
5EEE221	Analogue Electronic Design	6	16	5EEE112
5EEE211	Signals and Systems I	6	16	5EEE112
5MEC211	Mechanics of Solids I	6	12	4MTH172, 4MTH182
5MEC221	Materials Science in Engineering	6	12	4MTH172, 4MTH182
Total			**72**	
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 2 Semester 2			
4MTH272	Linear Algebra and Diff Equations for Engineers	6	16	4MTH172
5MEC212	Thermofluids I	6	12	4MTH172, 4MTH181
5MEC222	Dynamics I	6	16	4MTH172, 4MTH181
5MEC232	Mechanical Engineering Machine Element Design I	6	12	5MEC112, 5MEC122

5EEE212	Introduction to Power Engineering	6	16	5EEE112
Total			**72**	

Module Code	Module Name	NQF Level	Credit Value	Prerequisite Subject(s)
	Year 3 Semester 1			
5MEC311	Mechanics of solids II	7	12	5MEC211
5MEC321	Thermofluids II	7	16	5MEC212
5MEC331	Mechanical Engineering Machine Element Design II	7	8	5MEC232
5EEE331	Energy Conversion	7	16	5EEE212
5MEC231	Project Management	6	8	ALL SECOND YEAR MODULES
4STT171	Statistics for Engineers	5	12	
Total			**72**	
	Year 3 Semester 2			
5MEC322	Dynamics II	7	16	5MEC222
5EEE222	Embedded Systems I	6	16	ALL SECOND YEAR MODULES
5EEE232	Professional Communications	6	8	ALL SECOND YEAR MODULES
5EEE312	Control Engineering	7	16	4MTH272 5EEE221
1ANT172	Culture and Society in Africa	5	16	
Total			**72**	
Module Code	**Module Name**	**NQF Level**	**Credit Value**	**Prerequisite Subject(s)**
	Year 4 Semester 1			
5MEC411	Mechanical Vibrations	8	12	5MEC322
5MEC421	Product Design	8	12	5MEC312
5MEC431	System Design	8	12	5MEC312
5MEC461	Engineering Professionalism	8	8	ALL THIRD YEAR MODULES
5MEC471	Mechatronic Control and Instrumentation	8	12	5EEE312
5EEE431	Machines and Power Electronics	8	16	5EEE331
Total			**72**	
	Year 4 Semester 2			
5MEC412	Professional Communication Studies	8	12	ALL THIRD YEAR MODULES
5MEC422	New Venture Planning and Management	8	12	ALL THIRD YEAR MODULES

5MEC432	Final Year Research Project	8	40	ALL THIRD YEAR MODULES
5MEC442	Industrial Ecology	8	8	ALL THIRD YEAR MODULES
Total			**72**	
	TOTAL CREDITS FOR THE DEGREE		**576**	

S15 DIPLOMA COURSES

The following tables give the programmes of study for diploma programmes offered by the Faculty.

(a) Department of Biokinetics and Sport Science

DIPLOMA IN SPORT & EXERCISE TECHNOLOGY 4NDP01

This qualification is aimed at producing graduates who intend pursuing a career in the field of sport and exercise technology. Graduates who have achieved this qualification will be able to design, implement and manage a physical activity programme for all groups including special populations. They will screen, assess, monitor and manage health-related fitness, lifestyle and wellness programmes. Graduates will be able to provide personal training or lead and instruct safe and effective physical activity participation to meet participants' fitness requirements as well as provide educated advice on lifestyle change for improved well-being. In addition, graduates will have the knowledge for the appropriate referral to other healthcare providers. Employment opportunities include sport coach; sport organiser; health and fitness instructor; fitness adviser for sport teams; sport and fitness/gym manager; lifestyle consultant; school physical education and sport instructor.

FACULTY	Science and Agriculture
DEPARTMENT:	Biokinetics and Sport Science
Qualifier	Diploma in Sports and Exercise Technology
MAJORS	Sport and Exercise Technology 1,2,3; Sport and Physical Recreation Studies 1, Exercise Physiology 2 and 3
UNIZULU Code	4NDP01
NQF EXIT Level	6
Presentation mode of subjects:	Day classes
Intake for the qualification:	January
Registration cycle for the subjects:	January
Total credits to graduate:	360

FIRST YEAR				
SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**
SEMESTER 1				
Sport Didactics and Coaching 1	4HMD119	30	5	
Sport Management 1	4HMD129	30	5	
Sport & Exercise Technology 1	4HMD139	30	5	
Sport & Physical Recreation Studies 1	4HMD149	30	5	
TOTAL		**120**		
SECOND YEAR				
SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**
SEMESTER 1				
Human Movement Studies	4HMD219	30	5	
Kinesiology	4HMD239	30	5	
Exercise Physiology II	4HMD229	30	5	4HMD149
Sport & Exercise Technology II	4HMD249	30	5	4HMD139
TOTAL		**120**		
THIRD YEAR				
SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**
SEMESTER 1				

Health Sciences	4HMD329	30	5	4HMD119, 4HMD129, 4HMD139, 4HMD149
Sport & Exercise Technology III	4HMD349	30	5	4HMD249, 4HMD119, 4HMD129, 4HMD139, 4HMD149
Sport Psychology	4HMD319	30	5	4HMD119, 4HMD129, 4HMD139, 4HMD149
Exercise Physiology III	4HMD339	30	5	4HMD229, 4HMD119, 4HMD129, 4HMD139, 4HMD149
TOTAL		**120**		

(b) Department of Consumer Sciences

This program offers training to students who are keen to enter the hospitality industry and seek employment in a variety of lodging and guest service occupations as owners or managers. Graduates of the Diploma Hospitality Management will be equipped with supervisory and managerial skills in areas such as hotels and restaurants, accommodation management, food and beverage management, front office, banqueting or as entrepreneurs where they will be responsible for quality control, effective use of equipment, hygiene and safety, stock control, compilation and adhering to budget procedures, problem identification and resolution as well as liaising with different divisions of an organization and industry.

Teaching of a high standard is offered, and students have the use of sophisticated and well-equipped kitchens and a dining area. Students will do six months Work Integrated Learning in their third year to prepare them for their career in the hospitality industry.

DIPLOMA HOSPITALITY MANAGEMENT 4DIP02

FACULTY	Science and Agriculture
DEPARTMENT:	Consumer Sciences
Qualifier	Diploma in Hospitality Management
Majors	Food and Beverage Studies 1,2 Culinary Studies 1,2,3, 4 Hospitality Operations 1,2,3 Hospitality Management 2,3 Work Integrated Learning
UNIZULU Code	4SDIP02
NQF EXIT Level	6
Presentation mode of subjects:	Day classes
Intake for the qualification:	January
Registration cycle for the subjects:	January
Total credits to graduate:	360
FIRST YEAR	

SUBJECT NAME	SUBJECT CODE	SUBJECT CREDITS	SUBJECT LEVEL	PREREQUISITE SUBJECT(S)
SEMESTER 1				
Accounting for Hospitality	4HHA111	15	5	Phased out Equivalent to 4HMC111
Hospitality Communications	4HHC111	8	5	None
Hotel Health And Safety	4HMG111	15	5	None
Hospitality Information Systems 1	4HMI111	8	5	None
Hospitality Operations 1 - Accommodation	4HMP111	8	6	None
Food And Beverage Studies 1	4HMB111	15	6	Equivalent to 4HMB112
Culinary Studies 1	4HMC111	15	5	Equivalent to 4HHA111
SEMESTER 2				
Culinary Studies 2	4HMC112	15	5	None
Hospitality Information Systems 2	4HMI112	8	6	None
Hospitality Management 1 - Applied Principles	4HMM112	8	5	None
Hospitality Financial Management 1	4HMF112	8	6	Equivalent to 2CHM112
Nutrition	4HMG112	8	5	None
Service Excellence	4HMG122	8	5	Equivalent to 4HMG121
TOTAL		**124**		
		SECOND YEAR		
SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**SUBJECT LEVEL**	**PREREQUISITE SUBJECT(S)**
SEMESTER 1				
Culinary Studies 2 (R)	4HMC211	15	5	4HMC112 Phased out 4HMC111
Culinary Studies 3	4HMC221	15	6	4HMC111 4HMC112
German For Hospitality 1	4HGH111	8	6	Equivalent to 1GHM111
Hospitality Management 2 – Human Resources	4HMM211	15	6	None
Hospitality Industry Law 1	4HML211	8	6	Equivalent to 4HML212

Hospitality Behavioural Studies	4HMG211	8	5	Equivalent to 4HMG212
SEMESTER 2				
Culinary Studies 3 (R)	4HMC212	15	5	4HMC112 Phased out 4HMC111
Culinary Studies 4	4HMC222	15	6	4HMC111, 4HMC112
Food And Beverage Studies 2	4HMB212	15	6	SHMB111/4HMB111 Equivalent to SHMB211
Events Management	4HHM212	8	6	4HMB111 4HMC111 4HMC112 Equivalent to 4HHM211
German For Hospitality 2	4HGH112	8	6	Equivalent to 1GHM112
Hospitality Operations 2 – Front Office	4HMP212	15	6	None
TOTAL		**115**		
THIRD YEAR				
SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**SUBJECT LEVEL**	**PREREQUISITE SUBJECT(S)**
SEMESTER 1				
Hospitality Financial Management 2	4HMF311	15	6	4HMF112
Hospitality Information Systems 3	4HMI311	15	6	4HMI111 4HMI112
Hospitality Industry Law 2	4HML311	8	6	None
Hospitality Management 3 – Entrepreneurship	4HMM311	8	6	None
Hospitality Operations 3- Facility Planning	4HMP311	15	6	None
SEMESTER 2				
WORK INTEGRATED LEARNING	4HMG312	60	6	All first year modules, 4HHM212 4HMB212 4HMP212
TOTAL		**121**		
TOTAL FOR DIPLOMA		360		

(C)

BACHELOR OF NURSING

FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING
DEPARTMENT:	NURSING SCIENCE
DEGREE(DESIGNATOR)	BACHELOR OF NURSING
QUALIFIER	GENERAL NURSING AND MIDWIFERY
ABBREVIATION	B NURSING
QUALIFICATION CODE (SAQSF)	BACHELOR OF NURSING
UNIZULU CODE	**4BSC60**
EXIT NQF LEVEL	**8**
ADMISSION REQUIREMENTS	NSC WITH DEGREE ENDORSEMENT
ADMISSION REQUIREMENTS	MINIMUM OF 30 POINTS
ADMISSION REQUIREMENTS	ENGLISH 4 POINTS, LIFE SCIENCES 4 POINTS AND MATHS LITERACY 4 POINTS
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT AND WITH 30 NSC POINTS
MINIMUM DURATION OF STUDIES	4 YEARS
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES
INTAKE FOR THE QUALIFICATION:	JANUARY
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY SUBSEQUENT YEAR
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES [PROVIDED THEY ARE WITHIN A FIVE-YEAR PERIOD OF THE DATE OF REGISTRATION]
TOTAL CREDITS TO GRADUATE:	512

YEAR 1 SEMESTER 1				
Semester	**Module Code**	**Module Name**	**Credits**	**Prerequisites**
1	1PSY111	Introduction to Psychology	16	N/A
1	1SGY111	Introduction to Sociology	16	N/A
1 & 2 [year module]	4NFN110	Fundamentals of Nursing	32	N/A
1	4ZOL121	Human Anatomy & Physiology 2A	16	N/A
1	4CPS111	Introductory Computing	16	N/A
YEAR 1 SEMESTER 2				
2	4NEP112	Nursing Ethos & Professional Practice	16	N/A
2	4ZOL122	Human Anatomy & Physiology 2B	16	N/A
TOTAL			**128**	

YEAR 2 SEMESTER 1				
Semester	**Module Code**	**Module Name**	**Credits**	**Prerequisites**
1	4GNS211	General Nursing Science 1A	16	4NFN110 -Fundamentals of Nursing 4ZOL121 – Human Anatomy & Physiology 4ZOL22 - Human Anatomy & Physiology
1	4NHP121	Medical Biophysics	16	4ZOL121 – Human Anatomy & Physiology 4ZOL122 – Human Anatomy & Physiology 4NFN110 – Fundamentals of Nursing
1	4NPH211	Pharmacology	16	4NFN110 – Fundamentals of Nursing 4ZOL121 – Human Anatomy & Physiology 4ZOL122 – Human Anatomy & Physiology
1	4PCN211	Primary Care Nursing 2A	16	4NFN110 -Fundamentals of Nursing
YEAR 2 SEMESTER 2				
2	4GNS212	General Nursing Science 1B	16	4NFN110 -Fundamentals of Nursing 4ZOL121 – Human Anatomy & Physiology 4ZOL22 - Human Anatomy & Physiology
2	4NHP122	Medical Biochemistry	16	4ZOL121 – Human Anatomy & Physiology 4ZOL122 – Human Anatomy & Physiology 4NFN110 - Fundamentals of Nursing
2	4PCN212	Primary Care Nursing 2B	16	4NFN110 -Fundamentals of Nursing
2	4PIC212	Professional Informatics & Communications	16	4NFN110 -Fundamentals of Nursing
TOTAL			**128**	
YEAR 3 SEMESTER 1				
Semester	**Module Code**	**Module Name**	**Credits**	**Prerequisites**
1	4NGN311	General Nursing Science 2 A	16	4GNS211 - General Nursing Science 1A 4GNS212 - General Nursing Science 1B 4NHP211 - Medical Biophysics 4NHP212 - Medical Biochemistry
1	4RHP311 -	Rural Health Care Priorities	16	4PC211 - Primary Care Nursing 1A

				4PC212 - Primary Care Nursing 1B
1	4MAT311	Maternal Health & New-Born Care 1A (Low Risk)	32	4GNS211 - General Nursing Science 1A 4GNS212 - General Nursing Science 1B 4ZOL121 - Human Anatomy & Physiology 1A 4ZOL212 - Human Anatomy & Physiology 1B
1	4RMA311 -	Research Methods & Approaches in Nursing	8	N/A
YEAR 3 SEMESTER 2				
2	4NGN312	General Nursing Science 2B	16	4GNS211 - General Nursing Science 1A 4GNS212 - General Nursing Science 1B
2	4MAT312	Maternal Health & New-Born Care 1B (High Risk)	32	4GNS211 - General Nursing Science 1A 4GNS212 - General Nursing Science 1B 4ZOL121 - Human Anatomy & Physiology 1A 4ZOL122 - Human Anatomy & Physiology 1B
2	4PPN312	Principles and Practice of Nursing	16	4NEP112 - Nursing Ethos & Professional Practice
2	4RMA312	Research Methods & Approaches in Nursing	8	N/A
TOTAL CREDITS				**144**
YEAR 4 SEMESTER 1				
Semester	**Module Code**	**Module Name**	**Credits**	**Prerequisites**
1	4NRP411	Research Proposal	8	4RMA311 – Research Methods & approaches in Nursing 4RMA312 – Research Methods & approaches in Nursing
1	4MHN411	Mental Health Nursing 1 A	16	4RHP311 – Rural Health Care Priorities 1PSY111 – Introduction to Psychology
1	4NNM411 -	Nursing Management 1 A	16	4NEP112
1	4MAT411	Maternal Health & New-Born Care 2A	32	4MAT311 -Maternal Health & New-Born Care 1A (Low Risk) 4MAT312 - Maternal Health & New-Born Care 1B (High Risk)
YEAR 4 SEMESTER 2				

2	4NRP412	Research Proposal	8	4RMA311 – Research Methods & approaches in Nursing 4RMA312 – Research Methods & approaches in Nursing
2	4NNM412	Nursing Management 1 B	16	4NEP112
2	4MHN412 -	Mental Health Nursing 1B	16	4RHP311 – Rural Health Care Priorities 1PSY111 – Introduction to Psychology
2	4MAT412 -	Maternal Health & New-born Care 2B	32	4MAT311 - Maternal Health & New-Born Care 1A (Low Risk) 4MAT312 - Maternal Health & New-Born Care 1B (High Risk)
TOTAL CREDITS				**144**
OVERALL TOTAL CREDITS				**544**

BACHELOR OF NURSING – PIPELINE DEGREE [EXISTING STUDENTS ONLY – NO NEW REGISTRATIONS ALLOWED] - QUALIFICATION ENDS ON 31 JANUARY 2025

FACULTY	Faculty Of Science and Agriculture
DEPARTMENT:	Nursing Science
DEGREE (DESIGNATOR)	Bachelor Of Nursing
QUALIFIER	GENERAL NURSING AND MIDWIFERY, Community Health Nursing And Psychiatric Nursing
ABBREVIATION	B NURSING
QUALIFICATION CODE (SAQSF)	BACHELOR OF NURSING
UNIZULU CODE	**SBSC60**
EXIT NQF LEVEL	**8**
ADMISSION REQUIREMENTS	NSC WITH DEGREE ENDORSEMENT
ADMISSION REQUIREMENTS	MINIMUM OF 30 POINTS
ADMISSION REQUIREMENTS	ENGLISH 4 POINTS AND LIFE SCIENCES 4 POINTS
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT AND WITH 30 NSC POINTS
MINIMUM DURATION OF STUDIES	4 YEARS

YEAR LEVEL 3			
General Nursing Science 3A SNGN311	Psychiatric Nursing 3A SNPN311	MIDWIFERY 3A SNMW311	PHARMACOLOGY SNPC311

GENERAL NURSING SCIENCE 3B SNGN312	PSYCHIATRIC NURSING 3B SNPN312	MIDWIFERY 3B SNMW312	
NURSING PRACTICE III SNPR319 **SNGN310; SNMW31 & SNPN310**			
YEAR LEVEL 4			
GENERAL NURSING SCIENCE 4A SNGN411	PSYCHIATRIC NURSING 4A SNPN411	MIDWIFERY 4A SNMW411	INTRODUCTION TO PSYCHOLOGY APSY111
GENERAL NURSING SCIENCE 4B SNGN412	PSYCHIATRIC NURSING 4B SNPN412	MIDWIFERY 4B SNMW412	APPLIED PSYCHOLOGY 1 & 2 APSY112
NURSING PRACTICE IV + RESEARCH PROJECT SNPR419 **SNGN410; SNMW410 & SNPN410**			

BACHELOR OF NURSING IN EDUCATION AND ADMINISTRATION
SBSC61 - ONLY FOR PIPELINE STUDENTS – NO NEW STUDENTS TO REGISTER FOR THIS PROGRAMME - QUALIFICATION ENDS ON 31 JANUARY 2024

FACULTY	FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING
DEPARTMENT:	NURSING SCIENCE
DEGREE(DESIGNATOR)	BACHELOR CURATIONIS (EDUCATION & ADMINISTRATION) (BCUR)
QUALIFIER	EDUCATION AND ADMINISTRATION
ABBREVIATION	BCUR (EDUCATION AND ADMINISTRATION)
QUALIFICATION CODE (SAQSF)	BACHELOR CURATIONIS IN EDUCATION AND ADMINISTRATION
UNIZULU CODE	**SBSC61**
EXIT NQF LEVEL	**7**
ADMISSION REQUIREMENTS	AN ADVANCED DIPLOMA OR EQUIVALENT QUALIFICATION OR A BACHELOR'S DEGREE IN NURSING AND A MINIMUM OF TWO (2) YEARS OF EXPERIENCE AFTER REGISTRATION. REGISTRATION WITH THE SOUTH AFRICAN NURSING COUNCIL (SANC) AS A GENERAL NURSE AND MIDWIFE
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT AND WITH 30 NSC POINTS
MINIMUM DURATION OF STUDIES	3 YEARS
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES
INTAKE FOR THE QUALIFICATION:	JANUARY
REGISTRATION CYCLE FOR THE SUBJECTS:	FEBRUARY
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES

TOTAL CREDITS TO GRADUATE:	384				
		THIRD YEAR			
SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**COREQUISITE SUBJECT(S)**
		SEMESTER 1			
CURRENT ISSUES & TRENDS IN NURSING EDUCATION	SNED311	16	7	SNED111, SNED112,SNED 122, SNED212, SNED211	
INTERNATIONAL VIEWPOINTS ON NURSING MANAGEMENT	SNMG311	16	7	SNMG111, SNMG112, SNMG211, SNMG212	
RESEARCH PROPOSAL & LITERATURE REVIEW	SNRS311	16	7		
INTRODUCTION TO SOCIOLOGY	1SGY111	16	5		
		SEMESTER 2			
NURSING SCHOOL MANAGEMENT	SNMG322	16	7		
NATIONAL HEALTH SYSTEM AND QUALITY ASSURANCE	SNMG312	16	7	SNMG111,SNMG112,SNMG211 SNMG212; 4NMG111, 4NMG112, 4NMG211, 4NMG212	
DATA COLLECTION & ANALYSIS. RESEARCH REPORT	SNRS312	16	7		
INDUSTRIAL SOCIETIES	1SGY112	16	6		
TOTAL		**120**			

S16 ACCESS PROGRAMMES

S16.1 BSc Augmented streams

In the Augmented streams, the first academic year of study will be spread over the first two years of registration with half of the curriculum being taken in each year. The regular first year courses in Physics, Chemistry, Mathematics, Botany and Zoology as well as the first year service courses in Physics, Chemistry and Mathematics will be taught as augmented courses. Identical material will be covered at the same pace as the mainstream courses but the augmented courses will be taught separately and will have double the contact time (6 lectures, 1 practical and 3 tutorial hours) with specific augmented stream lecturers. Close contact will be maintained between the mainstream and the augmented lectures. At the end of each semester, mainstream and augmented students will write the same final examinations. The continuous assessment marks for each group will be derived on a similar basis.

Rule S.5 (Exclusion Rules) applies to students in the augmented programme.

For administrative purposes, students will be placed in either the Life Sciences or the Physical Sciences stream depending upon which academic programme they have indicated that they wish to follow. Students in each stream will follow a common curriculum in their first year and in their second year they will take the modules relevant to their chosen academic programme. Following the completion of the augmented stream, students will register for their chosen programme and will start at the second academic year of the programme.

4BSC98 BSC AUGMENTED PHYSICAL SCIENCE	
FACULTY	**FACULTY OF SCIENCE AND AGRICULTURE**
DEPARTMENTS:	SCIENCE ACCESS
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE
QUALIFIER	
MAJORS	**PHYSICAL SCIENCES**
ABBREVIATION	BSC
QUALIFICATION CODE (SAQF)	ALIGNED WITH BSC PROGRAMMES IN UNIZULU PQM
UNIZULU CODE	4BSC98
EXIT NQF LEVEL	7
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 40% (LEVEL 3) IN MATHEMATICS
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 40% (LEVEL 3) IN ENGLISH
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 40% (LEVEL 3) IN PHYSICAL SCIENCE
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS
MINIMUM DURATION OF STUDIES	4 YEARS
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES
INTAKE FOR THE QUALIFICATION:	JANUARY
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES

TOTAL CREDITS TO GRADUATE:	416					
SUBJECT NAME	**SUBJECT CODE**		**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
FIRST YEAR SEMESTER 1						
CLASSICAL MECHANICS (AUG)	4LPH111	C	16	5		4LMH111
CALCULUS I (AUG)	4LMH111	C	16	5		
AUGMENTED COMPUTER LITERACY 1A	4LCL121	C	16	5		
TOTAL			**48**			
FIRST YEAR SEMESTER 2						
ELECTROMAGNETISM & NUCLEAR PHYSICS (AUG)	4LPH112	C	16	6		4LMH112
CALCULUS II (AUG)	4LMH112	C	16	6		4LMH111
AUGMENTED COMPUTER LITERACY 1B	4LCL122	C	16	6		
TOTAL			**48**			
SECOND YEAR SEMESTER 1						
GENERAL CHEMISTRY	4CHM111E	E	16	5		
INTRODUCTORY COMPUTING	4CPS111B	E	16	5		
DISCRETE MATHEMATICS	4AMT111G	E	16	5		
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111E	E	16	5		
INTRO TO PHYSICAL ENVIRONMENTAL GEOGRAPHY	4GES111H	E	16	5		
HUMAN MOVEMENT SCIENCE 1A	4HMS111H	E	16	5		
TOTAL			**48**			
SECOND YEAR SEMESTER 2						
GENERAL CHEMISTRY	4CHM112E	E	16	6		4CHM111
INTRO TO SYSTEMS PROGRAMMING	4CPS112B	E	16	6		4CPS111
FURTHER DISCRETE MATHEMATICS	4AMT122G	E	16	6		4LMH112 4AMT111
STATISTICS FOR SCIENCE STUDENTS	4STT112E	E	16	6		4STT111 4LMH112
INTRO TO GEOLOGY	4HYD112D	E	16	6		
INTRO TO HUMAN GEOGRAPHY	4GES112H	E	16	6		
HUMAN MOVEMENT SCIENCE 1B	4HMS112H	E	16	6		
TOTAL			**48**			

4BSC99 BSC AUGMENTED LIFE SCIENCE	
FACULTY	**FACULTY OF SCIENCE AND AGRICULTURE**
DEPARTMENTS:	SCIENCE ACCESS
DEGREE(DESIGNATOR)	BACHELOR OF SCIENCE
QUALIFIER	
MAJORS	**LIFE SCIENCES**
ABBREVIATION	BSC
QUALIFICATION CODE (SAQF)	ALIGNED WITH BSC PROGRAMMES IN UNIZULU PQM
UNIZULU CODE	4BSC99
EXIT NQF LEVEL	7/8
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 40% (LEVEL 3) IN MATHEMATICS
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 40% (LEVEL 3) IN ENGLISH
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 40% (LEVEL 3) IN LIFE SCIENCE
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 40% (LEVEL 3) IN PHYSICAL SCIENCE
MINIMUM CREDITS FOR ADMISSION	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT WITH AT LEAST 28 NSC POINTS
MINIMUM DURATION OF STUDIES	4 OR 5 YEARS
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES
INTAKE FOR THE QUALIFICATION:	JANUARY
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY
READMISSION:	SUBJECT TO PRIOR PERFORMANCE AND CURRENT APPLICABILITY OF PASSED MODULES
TOTAL CREDITS TO GRADUATE:	416 OR 544 DEPENDING ON THE PROGRAMME OF STUDY

SUBJECT NAME	SUBJECT CODE		SUBJECT CREDITS	NQF LEVEL	PREREQUISITE SUBJECT(S)	CO-REQUISITE SUBJECT(S)
FIRST YEAR SEMESTER 1						
BASIC CHEMISTRY 121 (AUG)	4LCH121	C	16	5		
CLASSICAL MECHANICS&PROPERTIES OF MATTER (AUG)	4LPH121	C	16	5		
AUGMENTED COMPUTER LITERACY 1A	4LCL121	C	16	5		

TOTAL			**48**			
FIRST YEAR SEMESTER 2						
BASIC CHEMISTRY 122 (AUG)	4LCH122	C	16	6		
MATHS&STATS FOR EARTH&LIFE SCIENCES (AUG)	4LMH122	C	16	6		
AUGMENTED COMPUTER LITERACY 1B	4LCL122	C	16	6		
TOTAL			**48**			
SECOND YEAR SEMESTER 1						
CYTOLOGY, GENETICS &PHYSIOLOGY (AUG)	4LBT111	E	16	5		
INTRODUCTION TO ZOOLOGY I (AUG)	4LZL111	E	16	6		
INTRO TO PHYSICAL& ENVIRONMENTAL GEOGRAPHY	4GES111 H	E	16	6		
HUMAN MOVEMENT SCIENCE 1A	4HMS111 H	E	16	5		
ELEMENTARY STATISTICS FOR SCIENCE STUDENTS	4STT111 E	E	16	6		
TOTAL			**48**			
SECOND YEAR SEMESTER 2						
MORPHOLOGY & TAXONOMY	4BOT112	E	16	6		4LBT11 1
INTRODUCTION TO ZOOLOGY II	4ZOL112	E	16	6		4LZL11 1
INTRO TO GEOLOGY	4HYD112 D	E	16	6		
INTRO TO HUMAN GEOGRAPHY	4GES112 H	E	16	6		
HUMAN MOVEMENT SCIENCE 1B	4HMS112 H	E	16	6		
TOTAL			**48**			

S16.2 Foundation stream

The foundation stream is incorporated into the programmes specified above, with the first academic year being devoted to the completion of four fully foundational year-length courses, in core science subjects, together with a year-length course in academic literacy. Each of the science courses will carry a credit weight of 4 credits and these will address fundamental concepts, and progress to include a component of NQF level 5 material. The academic literacy module has 16 credits and will address fundamental literacy related topics, and progress to cover specific scientific literacy concepts set at NQF level 5.

Students must pass all of the prescribed courses that comprise the foundation programme, in order to progress to the first year of degree study. Students who do not fulfil this requirement, are not eligible to repeat failed courses or to repeat the foundation year as a whole.

For administrative purposes, all students following the foundation stream will be placed under the same qualification code, but they will be required to indicate which academic programme they intend to pursue after the completion of the foundation year.

BSC FOUNDATION PROGRAMME 4BSC00

FACULTY	**FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING**
DEPARTMENTS:	SCIENCE ACCESS
DEGREE(DESIGNATOR)	FOUNDATION
UNIZULU CODE	**4BSC00**
EXIT NQF LEVEL	5
ADMISSION REQUIREMENTS	NATIONAL SENIOR CERTIFICATE WITH DEGREE ENDORSEMENT AND WITH 26 NSC POINTS
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 40% (LEVEL 3) IN MATHEMATICS
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 40% (LEVEL 3) IN ENGLISH
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 40% (LEVEL 3) IN LIFE SCIENCES
ADMISSION REQUIREMENTS	A PASS OF AT LEAST 30% (LEVEL 2) IN PHYSICAL SCIENCES
MINIMUM DURATION OF STUDIES	1 YEAR
PRESENTATION MODE OF SUBJECTS:	DAY CLASSES
INTAKE FOR THE QUALIFICATION:	JANUARY
REGISTRATION CYCLE FOR THE SUBJECTS:	JANUARY

FIRST YEAR					
SUBJECT NAME	**SUBJECT CODE**	**SUBJECT CREDITS**	**NQF LEVEL**	**PREREQUISITE SUBJECT(S)**	**CO-REQUISITE SUBJECT(S)**
YEAR LONG MODULES					
ACADEMIC LITERACY	4ACL110	16	5		
FOUNDATION BIOLOGY	4FBL119	4	5		
FOUNDATION CHEMISTRY	4FCH119	4	5		
FOUNDATION MATHEMATICS	4FMH119	4	5		

FOUNDATION PHYSICS	4FPH119	4	5		
TOTAL		**32**			

List of Modules Offered by the Faculty

All modules are semester-length and set at 16 credits except where otherwise indicated.
The timetable group that each module is in is indicated in the column on the right (X indicates that the module does not have pre-scheduled classes on the timetable)

List of Undergraduate Degree Modules

YEAR 1 SEMESTER 1				
DEPARTMENT	**CODE**	**TITLE**	**NQF**	**TT**
APPLIED MATHEMATICS	**4AMT111**	**DISCRETE MATHEMATICS**	**5**	**G**
BOTANY	4BOT111	Introduction To Plant Cytology, Genetics And Physiology	5	E
CHEMISTRY	4CHM111	General Chemistry 111	5	E
	4CHM121	Basic Chemistry 121	5	G
CONSUMER SCIENCES	4CHT111	Introduction To Hospitality Management	5	B
	4CNS111	Household And Consumer Studies	5	E
COMPUTER SCIENCE	4CPS111	Introductory Computing	5	B
	4CPS121	Computer Literacy I	5	X
GEOGRAPHY	4GES111	Introduction To Physical And Environmental Geography	5	H
HUMAN MOVEMENT	4HMS111	Human Movement Science 1a	5	H
MATHEMATICS	4MTH111	Calculus I	5	F
PHYSICS	4PHY111	Classical Mechanics And Properties Of Matter	5	A
	4PHY121	Classical Mechanics And Properties Of Matter For Biological Sciences	5	C
	4PHY131	Physics For Consumer Sciences 8 Credit Module	5	H
STATISTICS	4STT111	Elementary Statistics For Science Students	5	E
	4STT121	Mathematics And Statistics For Commerce Students	5	B/D
ZOOLOGY	4ZOL111	Introduction To Zoology I	5	A
	4ZOL121	Human Anatomy And Physiology I	5	B

YEAR 2 SEMESTER 1				
	CODE	**TITLE**	**NQF**	**TT**
AGRICULTURE	4AAE211	Introduction To Extension And Rural Development	6	D
	4AAG211	Introduction To Soil Science	6	E
	4AAS211	Introduction To Animal Science	6	B
APPLIED MATHEMATICS	4AMT211	Dynamical Systems And Mathematical Modelling	6	E
BIOCHEMISTRY	4BCH211	Biomolecules And Enzymology	6	H

BOTANY	4BOT211	Plant Growth And Development. Floral Propagation	6	G
CHEMISTRY	4CHM211	Analytical And Inorganic Chemistry 2	6	G
CONSUMER SCIENCES	4CFD211	Meal Planning And Management	6	F
	4CFS211	Food Processing Technologies	6	E
	4CNS211	Household Resource Management	6	A
	4CNU211	Nutrition In The Lifecycle	6	C
COMPUTER SCIENCE	4CPS211	Data Structures And Algorithms	6	D
	4CPS221	Computer Architecture And Assemblers	6	B
	4CPS231	Computer Communications And Networks	6	A
GEOGRAPHY	4GES211	Global Landforms And Cartography	6	C/D
HUMAN MOVEMENT SCI.	4HMS211	Human Movement Science Ii A	6	F
HYDROLOGY	4HYD211	Introduction To Surface Water Hydrology	6	F
MATHEMATICS	4MTH221	Advanced Calculus	6	H
MEDICAL SCIENCE	4MCB211	Introduction To Viruses And Hiv/Aids	6	F
MICROBIOLOGY	4MCB211	Prokaryotes Classification And Microbial Techniques	6	D
	4MCB221	Prokaryotes Structure And Environmental Microbiology	6	A
PHYSICS	4PHY211	Mechanics, Special Relativity And Properties Of Matter	6	C
STATISTICS	4STT211	Distribution Theory	6	C
ZOOLOGY	4ZOL211	Animal Anatomy And Physiology	6	C

YEAR 1 SEMESTER 2				
DEPARTMENT	**CODE**	**TITLE**	**NQF**	**TT**
APPLIED MATHEMATICS	4AMT122	Further Discrete Mathematics	6	G
BOTANY	4BOT112	Plant Morphology, Taxonomy And An Introduction To Mycology	6	E
CHEMISTRY	4CHM112	General Chemistry 112	6	E
	4CHM122	Basic Chemistry 122	6	G
	4CHM132	Chemistry For Consumer Sciences **8 Credit Module**	5	H
CONSUMER SCIENCES	4CFD112	Basic Food Preparation / Culinary Studies	6	B
	4CFH112	Food Hygiene And Safety	6	D
	4CFS112	Introduction To Food Science	6	A
	4CNU112	Introduction To Human Nutrition	6	E
COMPUTER SCIENCE	4CPS112	Introductory Systems Programming	6	B
	4CPS122	Computer Literacy Ii	5	X
GEOGRAPHY	4GES112	Introduction To Human Geography	6	H
HUMAN MOVEMENT	4HMS112	Human Movement Science 1b	6	H
HYDROLOGY	4HYD112	Introduction To Geology	6	D
MATHEMATICS	4MTH112	Calculus Ii	6	F
	4MTH122	Mathematics And Statistics For Earth And Life Sciences	5	C

PHYSICS	4PHY112	Nuclear Physics, Electromagnetism, Modern Physics	6	A
	4PHY122	Nuclear Physics, Electromagnetism, Modern Physics For Biological Sciences	6	C
STATISTICS	4STT112	Statistics For Science Students	6	E
	4STT122	Elementary Statistics For Commerce Students	5	D/ B
ZOOLOGY	4ZOL112	Introduction To Zoology Ii	6	A
	4ZOL122	Human Anatomy And Physiology Ii	6	B

YEAR 2 SEMESTER 2				
DEPARTMENT	**CODE**	**TITLE**	**NQF**	**TT**
AGRICULTURE	4AAE212	Introduction To Agricultural Economics & Farm Management	6	D
	4AAE222	Extension Methods	6	E
	4AAG212	Introduction To Crop Production	6	F
	4AAS212	Principles Of Animal Production	6	B
APPLIED MATHEMATICS	4AMT212	Introduction To Operations Research	6	E
BIOCHEMISTRY	4BCH212	Metabolism	6	H
	4BCH222	Biochemistry: Principles And Techniques	6	A
BOTANY	4BOT212	Plant Anatomy, Taxonomy And Biodiversity	6	G
CHEMISTRY	4CHM212	Organic And Physical Chemistry 2	6	G
CONSUMER SCIENCES	4CFD212	Quantity Food Production	6	F
	4CFD222	Operation And Management Of Food Services	6	G
	4CFS212	Food Product Development	6	E
	SCHC212	Principles Of Design And Interiors	6	H
	4CNS212	Consumer And The Market	6	A
	SCTC212	Clothing And Textiles I	6	C
COMPUTER SCIENCE	4CPS212	Introductory Software Engineering	6	D
	4CPS232	Database And Information Management I	6	A
	4CPS242	Visual Application Development	6	F
GEOGRAPHY	4GES212	Demographics, Health And Sustainable Development	6	C/ D
	4GES222	Hydrometeorology	6	B
HUMAN MOVEMENT SCIENCE	4HMS212	Human Movement Science Ii (Biokinetics)	6	F
HYDROLOGY	4HYD212	Introduction To Subsurface Hydrology	6	F
	4HYD222	Geographical Information Systems	6	PE P H
MATHEMATICS	4MTH222	Linear Algebra And Differential Equations	6	H

MICROBIOLOGY	4MCB212	Microbial Growth And Medical Microbiology	6	D
PHYSICS	4PHY212	Modern Physics Photonics And Waves	6	C
	4PHY222	Electromagnetism	6	A
STATISTICS	4STT212	Statistical Inference	6	C
ZOOLOGY	4ZOL212	Animal Diversity	6	C

	YEAR 3 SEMESTER 1			
DEPARTMENT	**CODE**	**TITLE**	**NQF**	**TT**
AGRICULTURE	4AAE311	Farm Management And Record Keeping Systems	7	F
	4AAG311	Plant Propagation	7	G
	4AAS311	Farm Animal And Physiology	7	A
	4AAS321	Animal Breeding	7	D
	4AAS331	Animal Nutrition	7	C
APPLIED MATHS	4AMT321	Applied Mathematical Methods	7	D
	4AMT331	Tensor Analysis	7	
BIOCHEMISTRY	4BCH311	Gene Expression And Replication	7	A
	4BCH321	Metabolic Regulation	7	C
BOTANY	4BOT311	Cytology, Genetics, And Plant Biochemistry	7	B
	4BOT321	Aquatic Botany And Lower Plant Taxonomy	7	D
CHEMISTRY	4CHM311	Organic Chemistry 3	7	B
	4CHM321	Physical Chemistry 3	7	D
CONSUMER SCIENCES	4CFD311	Food And Beverage Management	7	H
	4CFD321	Food Marketing	7	C
	4CFS311	Food Product Development	7	D
	SCHC311	Housing Education And Environment	7	G
	4CHT319	Experiential Learning In Hospitality **(Year-Length Course)**	7	X
	SCIN319	Internship For Nutrition **(Year-Length Course)**	7	X
	4CNU311	Community Nutrition And Food Security	7	A
	4CNU321	Therapeutic Nutrition	7	G
	4CNU331	Nutrition Education And Training	7	C
	SCRM311	Research Methods	7	B
COMPUTER SCIENCE	4CPS311	Advanced Programming Techniques	7	E
	4CPS321	Systems Programming (Os And Compilers)	7	G
	4CPS331	Database And Information Management Ii	7	A
GEOGRAPHY	4GES311	Urban Environment And Recreation Planning	7	A
	4GES321	Atmospheric Processes And Pollution	7	E
	4GES331	Land Use And Natural Resources Management	7	C
	4GES341	Climate Dynamics And Weather Variability And Prediction	7	G
	4HMS311	Human Movement Science Iii A	7	B

HUMAN MOVEMENT SCIENCE	4HMS321	Human Movement Science Iii C	7	D
HYDROLOGY	4HYD311	Surface Water Hydrology	7	A
	4HYD321	Groundwater Hydrology	7	C
MATHEMATICS	4MTH311	Abstract Algebra	7	A
	4MTH321	Real Analysis	7	C
MEDICAL SCIENCE	4MCB311	Epidemiology & Pathogenesis Of Infectious Diseases. Antimicrobial Chemotherapy	7	G
	4MCB321	Immunology And Serology	7	B
MICROBIOLOGY	4MCB311	Food Microbiology And Food Analysis	7	E
PHYSICS	4PHY311	Quantum And Statistical Physics	7	H
	4PHY321	Electronic Circuits And Devices	7	F
STATISTICS	4STT311	Random Processes	7	F
	4STT321	Experimental Design	7	H
ZOOLOGY	4ZOL311	Animal Ecology I	7	F
	4ZOL321	Animal Ecology Ii	7	H

YEAR 3 SEMESTER 2			**NQF**	**TT**
AGRICULTURE	4AAE312	Entrepreneurship, Co-Ops And Other Forms Of Business Ownership	7	A
	4AAE322	Principles Of Production Economics	7	F
	4AAG312	Plant Breeding	7	G
	4AAG322	Crop Protection	7	B
	4AAS312	Digestive Physiology	7	A
	4AAS322	Animal Health	7	D
	4AAS332	Pig And Poultry Production	7	C
APPLIED MATHEMATICS	4AMT312	Advanced Classical Mechanics	7	B
	4AMT322	Numerical Methods	7	D
BIOCHEMISTRY	4BCH312	Recombinant Dna Technology	7	A
	4BCH322	Biochemistry Of Nutrition	7	G
BOTANY	4BOT312	People And Plants	7	B
	4BOT322	Plant Conservation And Management, And Terrestrial Ecology	7	D
CHEMISTRY	4CHM312	Inorganic Chemistry 3	7	B
	4CHM322	Analytical Chemistry 3	7	D
CONSUMER SCIENCES	4CFD312	Food Marketing	7	A
	SCHC312	Housing Education And Environment	7	H
	4CHT322	Hospitality Service Operations	7	G
	4CNS312	Gender, Development And Technology	7	G
	4CNU312	Nutrition Education And Training	7	A
	SCTC312	Clothing And Textiles Ii	7	F
COMPUTER SCIENCE	4CPS312	Distributed Systems Development	7	E
	4CPS322	Final Year Project	7	G
	4CPS332	Client / Server Computing	7	A

FOOD SCIENCE AND TECHNOLOGY	4TFS312	Food Technology Ii (Alcoholic Fermentation)	7	B
	4TFS322	Quality Assurance And Control	7	F
GEOGRAPHY	4GES312	Environmental Management	7	E
	4GES322	Environmental Fieldwork And Research	7	G
HUMAN MOVEMENT SCIENCE	4HMS312	Human Movement Science Iii B	7	B
	4HMS322	Human Movement Science Iii D	7	D
HYDROLOGY	4HYD332	Hydrological Modelling	7	A
	4HYD342	Water Resources Management	7	C
MATHEMATICS	4MTH312	Graph Theory	7	A
	4MTH322	Complex Analysis	7	C
MEDICAL SCIENCE	4MCB312	Clinical Biochemistry	7	E
MICROBIOLOGY	4MCB312	Environmental Influences On Micro-Organisms And Principles Of Industrial Microbiology	7	E
	4MCB322	Biotechnology	7	X
PHYSICS	4PHY312	Nuclear Physics And Applications	7	H
	4PHY322	Solid State Physics And Materials Science	7	F
STATISTICS	4STT312	Linear Models	7	F
	4STT322	Time Series	7	H
ZOOLOGY	4ZOL312	Ecophysiology And Ecotoxicology	7	F
	4ZOL322	Research Design And Application	7	H
	YEAR 4 SEMESTER 1 (ALL NQF 8)			
AGRICULTURE	4AAE411	Agrifinantial Management And Marketing And Marketing	H	
	4AAE421	Risk Management	B	
	4AAE441	Agribusiness Research Project I	C	
	4AAG411	Soil Fertility Management And Conservation	E	
	4AAG421	Floriculture	D	
	4AAG441	Agronomy Research Project I	B	
	4AAS411	Pasture Ecology And Management	E	
	4AAS421	Animal Reproduction	G	
	4AAS431	Applied Animal Nutrition	F	
	4AAS441	Animal Science Research Project I	H	
CONSUMER SCIENCES	4CIN419	Internship For Extension And Rural Development **(Year-Length Course, 16 Credits)**	X	
YEAR 4 SEMESTER 2 (ALL NQF 8)				
AGRICULTURE	4AAE412	Farm Planning	H	
	4AAE422	Agricultural Policy And International Trade And International Trade	B	
	4AAE442	Agribusiness Research Project Ii	C	
	4AAG412	Horticultural Crop Production	E	
	4AAG422	Applied Plant Breeding	D	

	4AAG432	Field Crop Production	C
	4AAG442	Agronomy Research Project Ii	B
	4AAS412	Applied Pig And Poultry Production	E
	4AAS422	Applied Ruminant Production	G
	4AAS432	Applied Animal Science	F
	4AAS442	Animal Science Research Project Ii	H
CONSUMER SCIENCES	4CNS412	Management Of Community Programmes	C
	4CRM412	Nutrition Research Project	B
	4CRM422	Research Project	D

List of BSc Augmented Programme Modules

All of these modules are set at 16 credits and are directly equivalent to the mainstream modules that they correspond to (given in brackets).

AUGMENTED MODULES SEMESTER 1	4LBT111 (4BOT111)	Introduction To Plant Cytology, Genetics And Physiology (Augmented)
	4LCL121 (4CPS121)	Augmented Computer Literacy 1a
	4LCH121 (4CHM121)	Basic Chemistry 121 (Augmented)
	4LMH111 (4MTH111)	Calculus I (Augmented)
	4LPH111 (4PHY111)	Classical Mechanics And Properties Of Matter (Augmented)
	4LPH121 (4PHY121)	Classical Mechanics And Properties Of Matter For Biological Science (Augmented)
	4LZL111 (4ZOL111)	Introduction To Zoology I (Augmented)
AUGMENTED MODULES SEMESTER 2	4LBT112 (4BOT111)	Plant Morphology, Taxonomy And An Introduction To Mycology (Augmented)
	4LCH122 (4CHM122)	Basic Chemistry 122 (Augmented)
	4LMH112 (4MTH112)	Calculus Ii (Augmented)
	4LMH122 (4MTH122)	Mathematics And Statistics For Life And Earth Sciences (Augmented)
	4LPH112 (4PHY112)	Nuclear Physics, Electromagnetism, Modern Physics (Augmented)
	4LZL112 (4ZOL112)	Introduction To Zoology Ii (Augmented)
	4LCL122 (4CPS122)	Augmented Computer Literacy 1b

List of BSc Foundation Programme Modules

SCIENCE FOUNDATION PROGRAMME YEAR- LENGTH MODULES	4FBL119	Foundation Biology (4 Credits)
	4FMH119	Foundation Mathematics (4 Credits)
	4FPH119	Foundation Physics (4 Credits)
	4FCH119	Foundation Chemistry (4 Credits)

Academic Literacy Modules

The Faculty offers the Academic Literacy module which is compulsory in the Foundation Programme. The module is worth 16 credits.

ACADEMIC LITERACY (**YEAR-LENGTH MODULE)**	4ACL110	Academic Literacy

List of Diploma Modules

YEAR 1		
HUMAN MOVEMENT SCIENCE	4HMD119	Sport Didactics And Coaching I **(Year-Length Course, 16 Credits)**
	4HMD129	Sport Management I **(Year-Length Course, 24 Credits)**
	4HMD139	Sport And Exercise Technology I **(Year-Length Course, 30 Credits)**
	4HMD149	Sport And Physical Recreation Studies I **(Year-Length Course, 30 Credits)**
CONSUMER SCIENCES	**SEMESTER 1**	
	4HMG111	Hotel Health & Safety
	4HMM111	Hospitality Management I **(8 Credits)**
	4HMG121	Service Excellence **(8 Credits)**
	SEMESTER 2	
	4HMB112	Food And Beverage Studies I
	4HMC112	Culinary Studies I
	4HMP112	Hospitality Operations I **(8 Credits)**
	4HMG112	Nutrition **(8 Credits)**
YEAR 2		
HUMAN MOVEMENT SCIENCE	4HMD219	Human Movement Studies **(Year-Length Course, 30 Credits)**
	4HMD229	Exercise Physiology II **(Year-Length Course, 30 Credits)**
	4HMD239	Kinesiology **(Year-Length Course, 30 Credits)**
	4HMD249	Sport And Exercise Technology II **(Year-Length Course, 30 Credits)**
CONSUMER SCIENCES	**SEMESTER 1**	
	4HMC211	Culinary Studies II
	4HMB211	Food And Beverage Studies II
	4HMM211	Hospitality Management II
	SEMESTER 2	
	4HMC212	Culinary Studies III
	4HML212	Hospitality Industry Law I **(8 Credits)**
	4HMG212	Hospitality Behavioural Studies **(8 Credits)**
	4HMP212	Hospitality Operations II
YEAR 3		
HUMAN MOVEMENT SCIENCE	4HMD319	Sport Psychology **(Year-Length Course, 30 Credits)**
	4HMD329	Health Sciences **(Year-Length Course, 30 Credits)**
	4HMD339	Exercise Physiology III **(Year-Length Course, 30 Credits)**
	4HMD349	Sport And Exercise Technology III **(Year-Length Course, 30 Credits)**

CONSUMER SCIENCES	**SEMESTER 1**	
	4HMF311	Hospitality Financial Management
	4HMI311	Hospitality Information Systems III
	4HML311	Hospitality Industry Law II **(8 Credits)**
	4HMM311	Hospitality Management III
	4HMP311	Hospitality Operations III
	SEMESTER 2	
	4HMG312	Work Integrated Learning **(60 Credits)**

Department of Agriculture

STAFF

Professors	GE Zharare, BScHons (Crop Science) (University of Zimbabwe), MScCrop (Physiology) (Reading University, UK), PhD (Agronomy) (Queensland, AUS)
	KC Lehloenya, BSc (Agriculture) (NUL), BScAgricHons, MSc (Agriculture), PhD (Agriculture) (UFS)
Associate Professors	FN Fon, BSc (Biochemistry) (Buea, Cameroon), BScHons (Biochemistry), MSc (Agriculture), PhD (Agriculture) (UKZN)
	M Sibanda, BSc (Agriculture) (Agricultural Economics), BScHons (Agriculture) (Agricultural Economics), MSc (Agriculture) (Agriculture Economics), PhD (Agricultural Economics) (UFH); PGDipHE (UKZN); ULDP (USB); Strengthening Postgraduate Supervision (SPS); Assessor and Moderation in Higher Education Development Course (Rhodes University)
Lecturers	SP Dludla, BSc (Agriculture) (Animal Science), BScHons (Agriculture), MSc (Agriculture) (UNIZULU)
	NM Motsa, Dip (Agriculture), BSc (Agriculture) (UNISWA), MSc (Agronomy) (UP), PhD (Crop Science) (UKZN)
	ST Magwaza, Dip (Plant production) (Lowveld college of Agriculture), BSc (Crop science) (Northwest University), MSc (Crop Science), PhD (Horticulture) (UKZN)
	AM Nkomo, BSc Biotechnology (UWC), BSc (Honours) Biotechnology (UWC), MSc Biotechnology (UWC), PhD Biotechnology (UWC)
	A Mayekiso, B (Agriculture) (Agricultural Economics); B (Agriculture) Hons (Agricultural Economics) (UFH); PhD (Agriculture) (Agricultural Economics) (University of Limpopo)
	LG Buthelezi, BSc (Agriculture) (Agronomy); MSc (Botany) (UNIZULU)
nGAP Lecturers	KPM Lekola, BSc Agriculture (Animal Production); MSc Agriculture (Animal Production) (University of Limpopo)
	ZL Ndou, BSc (Agriculture) (Plant Production); MSc (Agriculture) (Crop Protection) (UNIVEN)
	NZ Khumalo, BSc (Agriculture) (Agribusiness), MSc (Agriculture) (Agribusiness) (UNIZULU)
Secretary	RT Phakathi, Dip (Pub Admin), BA (Development Studies) (UNIZULU), HDip (Community Work) (UNIZULU)
Senior Laboratory Technician	L Maupa, NDip (Analytical Chemistry) (N. Gauteng); BTech Laboratory Management (Tshwane University of Technology)
	RS Hlophe, BScHons (Biochemistry) (UNIZULU), MSc (Agriculture) (UNIZULU)
Laboratory Assistants	
Farm Manager	S Malinga, BTech (Agriculture Management) (Nelson Mandela University); Hons (Agriculture); Masters (Agriculture) (UKZN)
Farm Foreman	FM Hadebe National Diploma (Agricultural Management) (UNISA); BTech (Agricultural Management) (UNISA)
Farm Driver	MF Mathenjwa

Farm Assistants	A Biyela N Biyela H Duma B Khumalo K Khumalo SW Makhathini Z Mthiyane P Mthiyane E Ndlovu S Nzuza SL Tshabalala K Zwane

Agronomy

Title	**Introduction to Soil Science**		
Code	**4AAG211**	**Department**	**Agriculture**
Prerequisites	None	Co-requisites	None
Aim	To give an overview of the physical, chemical and biological properties of soils; soil formation, classification, use and conservation.		
Content	The course will include; the importance of soils, factors of soil formation, soil classification and survey, soil physical and chemical properties, soil biological properties, soil organic matter and amendments, significance of soil erosion, soil water and soil conservation.		
Outcomes	Upon successful completion of the course earners will be able to: ▪ identify and characterize elementary aspects of soil formation, ▪ discuss basic soil physical, chemical, biological, and morphological properties, (▪ explain behavior of soils in managed and natural landscapes, and ▪ identify soil series in South Africa.		
Assessment	50% Continuous assessment mark. 50% Final Exams Mark.		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions		

Title	**Introduction to crop production**		
Code	**4AAG212**	**Department**	**Agriculture**
Prerequisites	4BOT111, 4BOT112	Co-requisites	None
Aim	To gain basic concepts of plant science and soil science as applied to crop production		
Content	Aspects to be studied include; origins of crop production, classification of crop plants, anatomy and morphology of crop plants crop growth and development, external influences on crop growth and development, crop production systems, soil and nutrient requirements of crops, and the general practices in crop production namely land preparation, seeding, fertilization, irrigation, weeding, control of insect pest and diseases and harvesting.		
Outcomes	The learner will be expected to; understand the nomenclature in classification of crop plant,		

	be able to relate uses of crop plants to anatomy and morphology of the crop plants, understand factors affecting crop growth and importance of matching crops to their environmental requirements, Understand the general crop production practices as they relate to a crop production cycle.
Assessment	50% Continuous Assessment mark. 50% Final Exams Mark.
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions

Title	**Agricultural Mechanisation and Farm Structures**		
Code	4AAG221	Department	Agricultur e
Prerequisites	None	Co-requisites	
Aim	The aim of the module is to familiarise students with the types of farm equipment and structures and their role in the crop production.		
Content	Internal combustion engine; Machinery types and selection; Tractors and power units; cultivation equipment, crop establishment equipment and agronomic equipment, forage conservation machinery, crop harvesting, drying ,sorting and grading equipment; crop processing equipment; farm housing; and storage structures; dairy and livestock facilities and equipment;		
Outcomes	Students should be able to: ▪ Operate basic farm machinery such as knapsack sprayers ▪ Analyse the need and role of mechanisation in different farming systems ▪ Design a farm plan that strikes a balance between the need for production efficiency and the desire to prevent the replacement of humans with machines leading to loss of employment ▪ Develop a simple working plan for a farm inclusive of the appropriate machinery and structures pertinent to named crop and animal production systems.		
Assessment	50% Continuous Assessment mark 50% Final Exams Mark		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions		

Title	**Introduction to Soil Physics and Conservation**		
Code	4AAG222	Department	Agricultur e
Prerequisites	None	Co-requisites	4AAG211
Aim	To provide the learners with the basic knowledge soil physics and the causes and control of soil erosion		
Content	Water in soils: content, infiltration and surface run-off, movement in soils; soil structure and aggregation; soil compaction and consolidation; mechanics, principles and factors affecting rainfall erosion, erodibility of soils; wind erosion; soil conservation practices		
Outcomes	• By the end of the module students are expected to be able to: • Predict the behaviour or water in soils • Report on the dynamics of aggregate formation and breakdown		

	• Summarize factors affecting soil compaction/consolidation and water and wind erosion • Formulate ways to manage soil compaction/consolidation and soil and water erosion
Assessment	50% Continuous Assessment mark 50% Final Exams Mark
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions

Title	**Plant Propagation**		
Code	**4AAG311**	**Department**	**Agriculture**
Prerequisites	4AAG212, 4BOT211, 4BOT212	Co-requisites	
Aim	An introductory plant propagation and nursery management course, designed to provide an understanding of the basics of sexual and asexual propagation and micro-propagation techniques. The emphasis is to acquaint the student with the cultural practices and techniques used in plant propagation, as well as the developmental physiology (science) involved.		
Content	Sexual (seed) propagation as it relates to seed development, germination, dormancy, production handling, and the principles, biology and techniques in asexual propagation and micro propagation of plants.		
Outcomes	The learner will be expected to: ▪ gain an understanding of the basic principles, ▪ biology and methods of plant propagation as practiced in all spheres of plant production.		
Assessment	50% Continuous assessment mark. 50% Final Exams Mark		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions		

Title	**Plant breeding**		
Code	**4AAG312**	**Department**	**Agriculture**
Prerequisites	4BOT211, 4BOT212	Co-requisites	
Aim	To introduce the students to basic principles and concepts of genetic improvement of crop plants through application of basic qualitative and quantitative genetic principles.		
Content	Introduction to genetics, plant cell components, Cell division, Mendelism, gene interaction, gene and environment, linkage and crossing-over, multiple alleles, sex linkage, cytogenetics and population genetics, DNA finger printing. Theory and principles of plant breeding methodology including population improvement, selection procedures, genotypic evaluation, cultivar development and breeding strategies. Introduction to different breeding strategies for diseases and pest resistance.		
Outcomes	At the end of the course, students will be able to: ▪ Understand the basic principles of breeding crop plants ▪ Select appropriate breeding method in improving a specific crop ▪ Solve simple problems in crop plants through application of genetic and plant breeding principles ▪ Communicate knowledge related to plant breeding.		
Assessment	50% Continuous Assessment Mark		

	50% Final Exams Mark
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions

Title	**Crop Protection 3A**		
Code	**4AAG321**	**Department**	**Agriculture**
Prerequisites	4AAG212	Co-requisites	None
Aim	The aim of this module is to introduce students to the three groups of organisms (plant pathogens, pests and weeds) which cause losses in crop production and whose collective management constitute the study of Crop Protection.		
Content	Plant diseases – concept of a disease, significance of diseases, disease development, Types of plant pathogens – diseases caused by bacteria, fungi and viruses. Types of plant diseases, diagnosis of plant diseases, plant disease epidemiology. Losses caused by diseases. Insect Pests of Crops; important orders/groups of insect pests of crops (insect pest classification), economically important species of insects attacking crops grown in South Africa – Orthoptera, Hemiptera, Homoptera, Coleoptera, Lepidoptera, Diptera, Hymenoptera, Mites and ticks. Symptoms of insect attack. Losses caused pests. Weeds – concepts of a weed, classification of weeds, identification of weeds, characteristics and adaptation of weeds, weed biology and ecology. Harmful effects of weeds/Losses caused by weeds.		
Outcomes	At the end of the module students will be expected to have: ▪ Comprehension of the biology and ecology of pathogens, pests and weeds ▪ Competence in the Identification of the various plant pathogens, pests and weeds and associated harmful effects.		
Assessment	50% Continuous Assessment mark 50% Final Exams Mark		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions		

Title	**Crop Protection**		
Code	**4AAG322**	**Department**	**Agriculture**
Prerequisites	None	Co-requisites	None
Aim	To impart to student's sound concepts on pest and disease management in crop production and giving the learners practical experience on the control of important insect, pathogens and weeds through laboratory and field observations.		
Content	• Disease control: Symptoms and signs of diseases; Threshold theories in disease management; Plant disease management strategies – Chemical control, Biological control, Cultural control, Physical control, Regulatory control, Breeding for resistance; Major diseases of cereals, legumes, root crops, tubers, fibre, vegetables and fruits and their control. Integrated management. • Pest control: Chemical control methods – insecticides: types, physic-chemical characteristics, formulation, mode of action, efficacy, safety; Application of pesticides; Sprayers, calibration, application; Pesticide resistance. Non-chemical control – legislative control, resistant plants, cultural control,		

	biological control, modifying insect behaviour; Integrated Pest Management • Weed control - methods of weed control - Cultural, mechanical, biological control. Chemical - use of herbicides – Classification, structure, physiological effects, mode of action. Application of herbicides. Environmental issues in herbicide use. Non-chemical control – biological, cultural etc. Integrated Weed Management. Weed management in specific cropping systems • Integrated Crop Protection (ICP) -the concepts of Integrated Disease Management (IDM), Integrated Pest Management (IPM). ICP strategies and control tactics
Outcomes	Students should be able to ▪ Calculate the amounts of chemicals required per area of land and calibrate application equipment to apply the correct quantities ▪ Summarize and compare various pest control strategies ▪ Plan suitable pest control strategies for pests ▪ Develop strategies to prevent pesticide resistance and to ensure environmental safety ▪ Predict yield losses due pests, diseases and weeds given different climatic conditions
Assessment	50% Continuous Assessment mark 50% Final Exams Mark
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions

Title	**Crop Protection 3B**		
Code	**4AAG352**	**Department**	**Agriculture**
Prerequisites	None	Co-requisites	4AAG321
Aim	To impart to students advanced sound principles and concepts of pest and disease management in crop production and giving the learners practical experience on the control of important insect, pathogens and weeds through laboratory and field observations.		
Content	• Disease control: Symptoms and signs of diseases; Threshold theories in disease management; Plant disease management strategies – Chemical control, Biological control, Cultural control, Physical control, Regulatory control, Breeding for resistance; Major diseases of cereals, legumes, root crops, tubers, fibre, vegetables and fruits and their control. Integrated management. • Pest control: Chemical control methods – insecticides: types, physic-chemical characteristics, formulation, mode of action, efficacy, safety; Application of pesticides; Sprayers, calibration, application; Pesticide resistance. Non-chemical control – legislative control, resistant plants, cultural control, biological control, modifying insect behaviour; Integrated Pest Management • Weed control - methods of weed control - Cultural, mechanical, biological control. Chemical - use of herbicides – Classification, structure, physiological effects, mode of action. Application of herbicides. Environmental issues in herbicide use. Non-chemical control – biological, cultural etc. Integrated Weed Management. Weed management in specific cropping systems • Integrated Crop Protection (ICP) -the concepts of Integrated Disease Management (IDM), Integrated Pest Management (IPM). ICP strategies and control tactics		

Outcomes	Students should be able to ▪ Calculate the amounts of chemicals required per area of land and calibrate application equipment to apply the correct quantities ▪ Summarize and compare various pest control strategies ▪ Plan suitable pest control strategies for pests ▪ Develop strategies to prevent pesticide resistance and to ensure environmental safety ▪ Predict yield losses due pests, diseases and weeds given different climatic conditions
Assessment	50% Continuous Assessment mark 50% Final Exams Mark
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions

Title	**Soil Fertility Management**		
Code	**4AAG411**	**Department**	**Agriculture**
Prerequisites	4AAG211, 4AAG212	Co-requisites	none
Aim	To develop an understanding of soil fertility management options for sustained soil productivity.		
Content	The course will be organized into; Plant growth, nutrition and nutrients, Plant and soil analyses, interpretation and fertilizer recommendations, Fertilizers types, grades and application methods Soil acidity and liming,Soil degradation, Significance of soil erosion, Soil conservation and management		
Outcomes	The learners will gain competences in: ▪ management of soil fertility from the physical, chemical and biological points of view ▪ and to relate soil fertility management to soil conservation.		
Assessment	50% Continuous Assessment Mark 50% Final Exams Mark.		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions		

Title	**Field crop production**		
Code	**4AAG432**	**Department**	**Agriculture**
Prerequisites	4AAG212, 4AAG311	Co-requisites	4AAG411
Aim	The module is designed to equip learners with knowledge and understanding of the basic principles and practices involved in field crop production.		
Content	Introduction to Field Crop Production: Definitions, significance and overview of field crops with emphasis on those that could be grown in South Africa. Effect of Environmental Factors on Field Crop Production: The role of soil, water, temperature, wind and sunlight in field crop production and the management of these factors for increased yield and quality of the produce. Cultivation Practices in Field Crop Production: Selection of planting material, Spacing, weeding pest control harvesting and transportation		

	Cereal Crop Production: Production of important cereal crops including wheat, maize and sorghum Legume Crop Production: Production of Peas, Beans and other pulses Oil and Fibre Crop Production: Production of important oil crops		
Outcomes	On completion of this module learners will: ▪ Gain knowledge in the production of field crops, ▪ Understand the soil and climatic requirements of the different field crops ▪ Have knowledge and skills required in field management, transport and storage facilities required by different field crops		
Assessment	50% Continuous Assessment mark 50% Final Exams Mark.		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions		
Title	**Agronomy Research Project I.**		
Code	**4AAG441**	**Department**	**Agricultur e**
Prerequisites	4AAG211, 4AAG212, 4AAG221, 4AAG222	Co-requisites	4AAG311, 4AAG312, 4AAG321, 4AAG352, 4STT111
Aim	The aim of this module is to develop generic skills for developing and planning research projects and to aid students in understanding the research process and how to approach agricultural research efficiently and effectively.		
Content	Students will be introduced to the philosophical and conceptual basis of methodology and learn the procedures, guidelines, and concepts to enable them to plan and conceptualize a research. Guidance will be given on how to identify a science research project/problem, conduct a literature review, formulate hypotheses, plan a research project to test the hypotheses and write a research proposal for basic and applied research.		
Outcomes	By the end of this course, the student will have an understanding of the scientific method and will be able to: Critically evaluate research literature appropriate for their project subject. ▪ Use existing research literature to create hypotheses, and justify experimental design choices for testing those hypotheses. ▪ Develop a structured scientific research proposal. ▪ design ▪ Outline project/research management issues. ▪ Write a research proposal.		
Assessment	50% continuous assessment mark 50% project proposal presentation; written project proposal		
DP Requirement	40% continuous assessment 80% Attendance of meetings with supervisors		

Title	**Fruit Production**		
Code	**4AAG452**	**Department**	**Agriculture**
Prerequisites	4AAG212 4AAG311	Co-requisites	None

Aim	The module is designed to provide students with the theoretical and practical skills required in fruit tree production
Content	Introduction to fruit tree production. Classification of fruit trees and fruits. Definitions, significance and overview of fruit crops with emphasis on those that could be grown in South Africa. Nutritional values of different fruit crops, social and economic factors in fruit tree production. Effect of environmental factors on fruit crop production. The role of soil, water, temperature, wind and sunlight in fruit crop production and the management of these factors for increased yield and quality of the produce. Cultural practices in fruit tree production. Selection of planting material, spacing, pruning, training, windbreaks, weeding etc. Production of selected fruits
Outcomes	Students should be able to: ▪ Design fruit production guidelines for different fruit trees grown in South Africa ▪ Perform practical orchard operations such as marking, calculating plant densities and fertiliser amounts, weeding, pruning etc. ▪ Design orchard plans incorporating the homestead, fields, roads, waterways etc. ▪ Predict the yield of fruit trees given different agro-ecological conditions ▪ Plan the production cycles for fruit trees.
Assessment	50% Continuous Assessment mark 50% Final Exams Mark
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions

Title	**Floriculture and Vegetable Production**		
Code	**4AAG451**	**Department**	**Agriculture**
Prerequisites	4AAG212, 4AAG311	Co-requisites	None
Aim	The module is designed provide learners with basic scientific knowledge of the principles and practices involved in floricultural crop production.		
Content	Production of specific floriculture and vegetable crops with emphasis on environmental manipulation and scheduling of crop growth and development for targeted market and periods. Specific flowering crops are used as models to demonstrate potted flowering plant, cut flower, and bedding plant production systems. Classification of vegetable crops; nursery practices for vegetable crops, land preparation, transplanting, cultural practices, harvesting, processing and storage of produce.		
Outcomes	Students should be able to: ▪ Classify different vegetable and floriculture crops ▪ Classify greenhouses and analyse their environmental control methods for vegetable and ornamental crop production ▪ Formulate suitable production methods for selected vegetable and ornamental crops		
Assessment	50% Continuous Assessment mark 50% Final Exams Mark		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions		

Title	**Seed Science and Technology**		
Code	**4AAG431**	**Department: Agriculture**	
Prerequisites	4AAG311, 4AAG312	Co-requisites	

Aim	The aim of the module is to provide a scientific foundation for the production of quality seed for the sustenance of the crop production sector.
Content	The importance of good quality seed in agriculture; Functions and properties of seeds. Losses from using poor quality seed; Seed biology. The structure of cereal grains and legume seeds. Seed physiology; Seed germination- requirements for germination, seed germination processes; Seed dormancy; Seed vigour, seed longevity and deterioration; Seed production and certification, Cultivar development, Seed multiplication and processing, Seed quality control - seed testing, seed legislation; seed storage behavior, hermetic and cryogenic storage of seeds. Seed gene banking and maintenance of seed gene banks. Seed marketing; Seed in South African agriculture – a case study.
Outcomes	Students should be able to: ▪ Plan the production, processing, storage and handling of seeds of both field and horticultural crops. ▪ Provide a critical analysis of the South African seed industry ▪ Design seed multiplication schemes for various communal areas ▪ Predict the yield of different seed crops given a set of climatic and soil conditions
Assessment	50% Continuous Assessment mark 50% Final Exams Mark
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions

Title	**Applied Plant Breeding**		
Code	**4AAG422**	**Department**	**Agriculture**
Prerequisites	4AAG311, 4AAG312	Co-requisites	None
Aim	The module is designed to equip learners with knowledge and understanding of the application of breeding techniques for crop improvement.		
Content	Introduction to Applied Plant Breeding. Basic concepts in plant breeding. Plant breeding and society, results, benefits and future. Breeding methods and cultivar development. Basic techniques and procedures involved in the breeding of self-pollinated and open pollinated crops and vegetatively multiplied species. Application of molecular biology and biotechnology in plant breeding and multiplication. Genetic engineering, cloning and tissue culture technology. Multiplication and seed quality. Factors to consider in production of high quality seeds, important procedures to be followed in seed multiplication. The role of high quality seed in improvement of yield and the negative effects of contaminants. Registration and variety research. Plant breeders' rights. Field evaluation and breeding efficiency. Yield evaluation and general performance on the field. Practical field breeding techniques.		
Outcomes	On completion of this module learners will: ▪ Understand the basic and applied principles of breeding ▪ Gain knowledge in molecular techniques in plant breeding ▪ Have practical experience of breeding common food and industrial crops ▪ Understand how to produce and handle improved cultivars and maintain their integrity.		
Assessment	50% Continuous Assessment mark 50% Final Exams Mark		
DP Requirement	40% Continuous Assessment Mark		

	80% Attendance of lectures and practical sessions

Title	**Agronomy Research Project II.**	
Code	**4AAG442**	**Department: Agriculture**
Prerequisites	4AAG211, 4AAG212, 4AAG221, 4AAG222	4AAG311, 4AAG312, 4AAG321, 4AAG352, 4AAG441, 4STT111 4AAG441 must be completed
Aim	This course aims to expose participants to qualitative and quantitative data gathering, processing, analysis and presentation methods and skills. Participants will be exposed to such skills through (i) a hands-on experience with qualitative and quantitative methods (ii) through writing research proposals and (iii) through writing an analytical research report on data they have collected.	
Content	Students will be guided in designing, planning and completing a research project, and in analysing the experimental data of the project and writing a scientific report.	
Outcomes	At the end of this course, participants should be able to ▪ Successfully design and complete an independent study project ▪ Conduct a scientific experiment in agronomy, and ▪ Write a scientific report based on data collected from the experiment, and ▪ (d) Orally present a scientific report/paper.	
Assessment	50% Oral Presentation 50% Written Report.	
DP Requirement	40% Completion of fieldwork according to schedule 80% Attendance of meetings with supervisors	

ANIMAL SCIENCE

Title	**Introduction to Animal Science**		
Code	**4AAS211**	**Department**	**Agriculture**
Prerequisites		Co-requisites	4ZOL111
Aim	The course is designed to develop an understanding of the global nature of animal production and how it ties into national and local production. The students will develop the basic understanding of the role of the different livestock and poultry. They will become familiar with the terminology used in animal science as it relates to industry and management practices. The course also develops familiarity with the food and other products derived from animals The students will have a basic understanding of animal nutrition, animal health, animal behaviour and genetics		
Content	The animal science industry, Beef, dairy, swine, small ruminants, poultry and animal products, carcass grading, growth, reproduction and reproduction technologies, nutrients, digestion and absorption, nutrient requirements, genetics and animal breeding, animal health, animal behaviour , lactation and introduction to pastures.		
Outcomes	The student will have: ▪ An understanding of the global animal industry ▪ Knowledge of food produced/processed from the livestock and poultry ▪ A basic knowledge of differences between some farm animal species. ▪ Some understanding of how nutrition, animal health, genetics and animal behaviour are applicable to livestock farming		

Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical's

Title	**Principles of Animal Production**		
Code	**4AAS212**	**Department**	**Agriculture**
Prerequisites		Co-requisites	4ZOL112
Aim	This module is designed to introduce students to monogastric and ruminant management and the effect of genotype on production system types.		
Content	Economic importance of dairy, beef, small ruminants, pigs and poultry. Characteristics of different production systems for each of the farm animal categories, suitable production systems for both large and small scale sectors for each of the livestock types with special references to developing counties. Different management systems for ruminants and monogastrics. History and characteristics of breeds of cattle, sheep, goats, pigs and poultry, suitability of breeds to different production environments. Estimating the age of ruminants.		
Outcomes	The student will have: Gained exposure to ruminant and monogastric production units from the field visits to representative sectors. Knowledge of various exotic and indigenous breeds and characteristics among the breeds for monogastrics and for ruminants with special reference to African countries. Some knowledge of ruminants and monogastric products in South Africa. Ability to estimate age of ruminants using incisors. Ability to differentiate between intensive, semi-extensive, extensive/ subsistence production systems in both ruminants and monogastrics.		
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark		
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical's		

Title	**Farm animal and physiology**		
Code	**4AAS311**	**Department**	**Agriculture**
Prerequisites		Co-requisites	4AAS212, 4ZOL112
Aim	This module is designed to provide learners with an understanding of the anatomy and physiology of farm animals.		
Content	The anatomy and physiology of farm animals (ruminants and nonruminants), histology and embryology functioning of the physiological processes in livestock under specific conditions. The anatomy and physiology of the respiratory, vascular, digestive, nervous, endocrine, urinary, reproductive, muscular and skeletal systems will be discussed. Physiology of appetite, animal growth, integument (mammary gland and hair fibre), lactation, heart and circulation, immunity and the homeostatic control of the major body systems of domestic animals will be examined.		
Outcomes	The student will understand: ▪ the external morphology, organ morphology, ▪ difference of organs between ruminants and nonruminants and physiological function of domestic animals (ruminant or		

	monogastric) in physical and chemical terms for the efficient animal health and economic production.
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical's

Title	**Digestive Physiology**	
Code	**4AAS312**	**Department: Agriculture**
Prerequisites		Co-requisites: 4AAS211, 4AAS212
Aim	The module is designed to introduce students to aspects of physiology as it relates to digestion, absorption and utilization of nutrients and other substances in farm animals (ruminants and non-ruminants including poultry and equines)	
Content	Secretory glands, accessory structures, hormones and peptides of the digestive system of ruminants & non-ruminants, including poultry and equines; digestion, absorption and utilization in ruminants and non-ruminants of carbohydrates, lipids, proteins and non-protein nitrogenous compounds, minerals, vitamins, and phyto-nutrients; inhibitors of digestive enzymes including anti-nutritional factors; digestive disorders and abnormalities; gastrointestinal immunity and gut health; growth factors and gut function; gut microbiology and digestive processes; digestive enzymes and factors affecting their function; nutrient transport systems; stress and other factors in relation to digestive function/processes; toxins and their detoxification in the gastrointestinal tract; control and modification of gut function and digestion.	
Outcomes	An understanding of: ▪ the role of various digestive organs and structures in the secretion of hormones, peptides and enzymes involved in nutrient digestion, absorption and utilization. ▪ A knowledge of nutrient digestion, absorption and utilization under normal and abnormal (stressful/toxic) conditions. ▪ A knowledge of gut microbiology and its contribution to nutrient digestion An understanding of digestive functioning	
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark	
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical's	

Title	**Animal Health**		
Code	**4AAS322**	**Department**	**Agricultur e**
Prerequisites	4AAS211, 4AAS212	Co-requisites	None
Aim	This module is designed to introduce students to veterinary terminology, principles and procedures as well as the causes, diagnosis, prevention and treatments of common livestock and poultry diseases.		
Content	**Theory** ● veterinary terminology ● causes of disease ● general veterinary principles ● common diseases of livestock and poultry **Practical**		

	● clinical examination of farm animals including the chicken ● post mortem examination of farm animals and chickens - administration of medications and vaccines - collection of laboratory samples ● basic laboratory techniques
Outcomes	On completion of the module students will have a basic knowledge and understanding of: ▪ the different causes of disease in farm animals ▪ clinical examination and recognition of symptoms/ lesions in farm animals ▪ general veterinary principles including prevention and treatment of disease ▪ general veterinary procedures ▪ common disorders/diseases of livestock and poultry
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical’s

Title	**Animal Breeding**		
Code	**4AAS321**	**Department**	**Agriculture**
Prerequisites	4AAS211, 4AAS212	Co-requisites	None
Aim	This module is designed to explain: genetic influence on the traits exhibited by farm animals, explain factors that interact with the genes to produce non conformity in animals, selection aids and procedures to select animals for breeding program and how to develop breeding programs.		
Content	Review on mitosis; Meiosis, Mendelian principles, effect and interaction between genes, difference of chromosomal function between that of a fowl and that of a mammalian farm animal. Linkage of gender with the expression of non-sex character traits in specified farm animals, role of mutation in animal breeding. Hardy-Weinberg and forces to change gene frequency. Environmental factors which determine genetic expression in animals, heritability in different classes of livestock, values and measurements of quantitative traits, selection aids, selection methods, response to selection, mating systems, breeding methods, records and some analysis of farm records. Use of performance records, computing of some adjustment factors, performance and progeny testing schemes. General principles of practical breeding, sheep breeding, beef breeding, poultry breeding; Marker assisted selection and QTL, cloning and transgenics, conservation of genetic resources.		
Outcomes	The student will have: ▪ Understanding of the significance of genes in animal production. ▪ Knowledge of the significance of interaction of genes on animal traits ▪ Ability to design and analyse animal farm records for various traits ▪ Some knowledge for implementation of selection and breeding of farm animals ▪ Ability to measure traits of economic importance in livestock ▪ Ability to plan implementation of a breeding program using genetic theory, practical applications to daily husbandry practice and management of animal breeding programs ▪ Ability to use computerized animal breeding programs ▪ Understanding use of biotechnology in animal breeding ▪ Explain where it would be appropriate to use each breeding method in animal breeding programs.		

Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical's

Title	**Animal Nutrition**		
Code	**4AAS331**	**Department**	**Agricultur e**
Prerequisites	4AAS211, 4AAS212	Co-requisites	None
Aim	To provide students with an understanding of the general principles and concepts of animal nutrition to improve animal production efficiency of agricultural animals (ruminants and nonruminants)		
Content	Fundamentals of animal nutrition; nutrients and their metabolism; feed composition; the nutrient requirements of different animals for different production functions, the measurement of body nutritive requirements and nutritive values; nutritive requirement for body processes and productive functions; nutritional properties of various southern African feed stuffs.		
Outcomes	▪ Knowledge of small and large stock metabolic requirements, ▪ feeding standards applied to agricultural animals, ▪ distinction in approach adopted in feeding various types of animals at different productivity levels. ▪ Also students should be able to handle problems related to feeding agricultural animals.		
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark		
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical's		

Title	**Pig and Poultry Production**		
Code	**4AAS332**	**Department**	**Agricultur e**
Prerequisites		Co-requisites	4AAS211, 4AAS212
Aim	This module is designed to introduce students to principles and practical aspects of pig and poultry production/science		
Content	**Pig Production** Modern pig breeding practices. Breeding systems and methods of genetic improvement. Pig breeding programmes. Pig improvement schemes. Nucleus testing. Multiplication testing. Performance testing. Penetrance. Halothane stress gene in pigs. Traits of economic importance in pigs. Stockmanship and animal handling. Factors affecting pig production viability. Economics of pig production. **Poultry Production** Poultry housing and equipment. Poultry feeding/nutrition and management. Poultry breeding/genetics, culling and selection. Poultry breeding systems. Economics of poultry production.		
Outcomes	▪ Understanding of principles of pig and poultry production that affect such aspects as choice of housing and feed management ▪ Understanding of breeding systems and practices and methods of genetic improvement used in pig and poultry production ▪ Knowledge and understanding of the functioning of pig and poultry breeding and pig improvement schemes ▪ Knowledge of desirable (economically important) and undesirable traits in pigs and poultry		

	▪ Understanding of the importance of good stockmanship in pig and poultry production ▪ Understanding of aspects of economics as regards pig and poultry production
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical's

Title	**Pasture ecology and management**		
Code	**4AAS411**	**Department**	**Agricultur e**
Prerequisites	4AAS211, 4AAS212	Co-requisites	None
Aim	This module is designed to introduce students to the concepts of and theories applicable to pasture ecology and management		
Content	Objectives of veld management; Growth and defoliation of veld plants; Growth of trees and shrubs and their reaction to treatment; Effect of defoliation on plant communities; Vegetation of South Africa; Veld condition assessment; Grazing management; Grazing systems; Plant and animal relationship; Value of veld as animal feed; Veld burning and its use in veld management. Characteristics of common cultivated pasture varieties, Dynamics of cultivated pastures, Responses of cultivated pastures to defoliation, Establishment and management of cultivated pastures, Fodder flows; Silage and hay; Drought resistant fodder crops, Analysing pastures		
Outcomes	▪ On completion of the module students will have a basic knowledge and understanding of: ▪ The definition of pastures, fodder, rangelands and veld; ▪ The importance of pasture science in livestock production; ▪ The structural and functional characteristics of fodder in relation to livestock; ▪ The principles and systems of veld and pasture management; ▪ The assessment of veld and pastures for livestock production. ▪ In addition to the specific outcomes, students will develop general writing skills by compiling information from various sources and presenting information in structured reports.		
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark		
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical's		

Title	**Animal Reproduction**		
Code	**4AAS421**	**Department**	**Agricultur e**
Prerequisites	4AAS322	Co-requisites	4AAS311
Aim	This module is designed to introduce students to the anatomy and physiology of the reproductive system of farm animals as well as common disorders/diseases of the reproductive system. Students will then apply their knowledge of reproductive physiology and diseases when they learn management techniques which affect reproductive performance in animals. They will also learn about procedures and techniques which improve or alter reproductive processes in animals.		
Content	Theory ● The physiology of reproduction. ● Endocrinology of reproduction.		

	● Spermatogenesis and oogenesis. ● The oestrus cycle. ● Fertilisation, pregnancy, parturition, the puerperium and lactation. ● Male mating behaviour. ● Disorders and diseases of reproduction. ● Measurements of reproductive efficiency. ● Reproductive management related to the female. ● Reproductive management related to the male. ● Environmental management for improved reproduction. ● Nutritional management for improved reproduction. <u>Practical</u> ● macro and microanatomy of the male and female reproductive organs ● Embryology - anatomical development from gamete to foetus. ● Semen collection, evaluation, processing, storage and handling. ● Artificial insemination. ● Oestrus synchronization, superovulation and embryo transfer. ● altering male reproduction. ● Methods of pregnancy diagnosis.
Outcomes	On completion of the module students will have a basic knowledge and understanding of: ▪ The anatomy and physiology of the male and female reproductive tracts. ▪ The endocrinology of reproduction. This includes the endocrine glands, the hormones they produce and the functions these hormones have on reproduction. ▪ The various components of the reproductive cycle viz. puberty, gametogenesis, oestrus cycle, fertilisation, pregnancy, parturition and lactation. ▪ Reproductive behaviour of male and female animals. ▪ The common disorders and diseases of reproduction in farm animals. ▪ The measurements of reproductive efficiency. ▪ The management of male and female animals to improve reproductive performance. ▪ The effects of environment and nutrition on reproduction. ▪ Semen collection, processing and artificial insemination. ▪ The altering of male reproduction. ▪ Oestrus synchronisation, superovulation, embryo transfer and pregnancy diagnosis in the female.
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
DP Requirement	40% Continuous assessment mark; 80% Attendance of lectures and practical's

Title	**Applied Animal Nutrition**		
Code	**4AAS431**	**Department**	**Agriculture**
Prerequisites	4AAS331, 4AAS312	Co-requisites	None
Aim	The module is designed to introduce students to various feeding standards, feed resources, feed/ration formulation theory, and the analytical techniques used in feed evaluation		
Content	Nutrient requirements for various classes of farm animals and poultry at various physiological states; nutritive value of feeds; ration formulation for different classes of farm animals and poultry at various physiological states;		

	feed composition and nutrient balance; regulation of feed intake; clinical symptoms of nutritional deficiencies and toxicities; identification of various feed ingredients; and determination of the chemical composition of feedstuffs
Outcomes	Students will understand: ▪ the composition and characteristics of the material consumed by the animal, the manner in which this material is metabolized (converted, utilized and excreted) in the digestive tract and body cell, ▪ Analyse the various feeds of the farm animals, ▪ Formulate rations for farm animals and poultry, ▪ The importance of feed analysis and its limitations for efficient animal nutrition, ▪ Understand feed intake regulation, feed formulation and computer application.
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical's

Title	**Animal science research project I**		
Code	**4AAS441**	**Department**	**Agriculture**
Prerequisites	4AAS211, 4AAS212	Co-requisites	4AAS331,4AAS332, 4STT111
Aim	This module is designed to develop students' understanding of concepts involved in animal science research		
Content	Each student will be expected to write and present a proposal (including problem identification, literature review, hypotheses/questions to be addressed and methods to be used) for a research project they will do.		
Outcomes	On completion of the module students will have basic knowledge, understanding and experience of planning a research project aimed at addressing a problem concerning a topic in animal science. This will include: ▪ Reviewing information related to the problem, its significance, reasons for its existence, and possible solutions ▪ Writing a proposal to collect and analyse data about the problem ▪ Presenting the review and proposed project to peers		
Assessment	50% written proposal 50% oral presentation of proposal		
DP Requirement	40% Continuous assessment mark 80% Attendance of meetings with supervisors		

Title	**Applied Pig and Poultry Production**		
Code	**4AAS412**	**Department**	**Agriculture**
Prerequisites	4AAS3232	Co-requisites	None
Aim	This module is designed to introduce students to practical application aspects of pig and poultry production principles and environmental factors affecting the production of both pigs and poultry (broilers and layers)		
Content	**Applied Pig Production** Feed intake enhancement and diet selection. Growth enhancement and feed efficiency improvement. Nutritional control of heat stress. Meat		

	quality and its manipulation. Antibiotics and the environment. Feed and animal waste as pig feed. Anti-nutritional factors and toxins and tropical feed resources. Mycotoxins and nutritional control of mycotoxicosis. Reproduction technology. Nutritional influences on gene expression, reproduction and behaviour. **Applied Poultry Production** Photoperiodic control of poultry performance, reproduction and reproductive physiology. Nutritional control of heat stress. Feed anti-nutritional factors and tropical feed resources. Mycotoxins and nutritional control of mycotoxicosis. Nitrogen excretion and ammonia emissions. Manipulation of egg and meat quality. Antibiotics. Feather pecking and cannibalism. By-products as poultry feed.
Outcomes	▪ Understanding of how principles of pig and poultry science can be used to improve pig production. ▪ Ability to integrate and find relationships among various aspects of pig and poultry production. ▪ Understanding of the influence of various environmental factors on pig and poultry production
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
Assessment Criteria	Learners will be expected to: Explain/discuss/illustrate the influence of various factors affecting pig and poultry production Measure the performance of both pigs and poultry under various environmental conditions
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical’s

Title	**Applied Ruminant Production**		
Code	**4AAS422**	**Department**	**Agricultur e**
Prerequisites	4AAS211, 4AAS212	Co-requisites	None
Aim	To provide learners with an understanding of management principles of ruminants (beef cattle, dairy cattle; sheep and goat). Also, to enable the learners to identify and solve production problems associated with ruminant production systems.		
Content	Ruminant production and management under intensive, semi-intensive and extensive systems including rearing systems and shearing of sheep. Rearing of economically and environmentally feasible livestock to the prevailing marketing standards. Advantages and disadvantages of calving, kidding and lambing different various seasons. Establishment of sustainable ruminant projects in communities. Suitable production systems for various natural regions of southern Africa. Housing parlour systems of different ruminants and meat production. The best and latest managerial techniques used in ruminant farming. Marketing methods of commercial ruminants.		
Outcomes	The learners will know how to establish, to advice and to run a profitable livestock farming unit under prevailing conditions of the southern Africa region. This information is important for mastering both managerial and the technical skills required for running livestock farming business.		
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark		
DP Requirement	40% Continuous assessment mark 80% Attendance of lectures and practical’s		

Title	Applied Animal Science		
Code	**4AAS432**	**Department**	**Agriculture**
Prerequisites	4AAS211, 4AAS212	Co-requisites	None
Aim	This module is designed to introduce students to (i) technological aspects of animal production of such products as milk, meat (beef, lamb, chevon, chicken), eggs and wool, and (ii) the science that underlies the production by ruminants of milk, meat/mutton and hair fibre, as well as a study of the various factors – nutrition, reproduction, genetics/breeding, diseases and parasites – that influence ruminant animal production		
Content	Animal Science Technology Dairy processing. Meat processing (including freezing, dehydration, salting and curing, smoking, comminution and reconstitution). Egg classification. Wool technology Ruminant Production Science Milk synthesis, production and composition, and factors affecting these. Red meat production, composition and quality, and factors affecting these. Wool, mohair & cashmere production and quality, and factors affecting these. Reproduction in ruminants, and factors affecting it & manipulation thereof. Tropical/sub-tropical feedstuffs & manipulation of their nutritive value. Parasites and diseases and the effects thereof on ruminant production. Modifiers of body tissue growth, milk synthesis and composition. Enhancement of the nutritional quality of meat and milk for consumers. Pro- and anti-biotics in ruminant production		
Outcomes	▪ Understanding and ability to apply various processes and technologies involved in the processing of milk, meat, eggs and wool ▪ Understanding of the process of milk synthesis/production, how this can be manipulated and how various factors affect milk production and composition ▪ Understanding of body tissue accretion, how this can be manipulated and how various factors affect meat production, composition and quality ▪ Understanding of the process of hair fibre production, how fibre production can be manipulated and how various factors affect hair fibre production and quality ▪ Understanding of techniques employed to manipulate, and how various factors affect, ruminant reproduction ▪ Understanding of techniques used to improve the nutritive value of low-quality feedstuffs for ruminants in the tropics and sub-tropics ▪ The influence of parasites and diseases on ruminant production especially in the tropics and sub-tropics		
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark		
DP Requirement	40% Continuous assessment mark; 80% Attendance of lectures and practical’s		

Title	Animal science research project II		
Code	**4AAS442**	**Department**	**Agriculture**
Prerequisites	4AAS211, 4AAS212, 4STT111	Co-requisites	4AAS322, 4AAS331,4AAS332 ,

Aim	This module is designed to develop students' understanding of concepts involved in animal science research		
Content	Each student will be expected to collect and analyse data according to a previously approved proposal, report on progress, and write and present a final report on the project.		
Outcomes	On completion of the module students will have basic knowledge, understanding and experience of conducting a research project aimed at addressing a problem concerning a topic in animal science. This will include: ▪ Collecting and analysing the data for the project ▪ Writing a scientific report on the project ▪ Presentation of the project report to peers		
Assessment	50% written report 50% oral presentation of report		
DP Requirement	Completion of fieldwork according to schedule 80% Attendance of meetings with supervisors		

AGRIBUSINESS			
Title	**Intro to Agric Economics & Farm Management**		
Code	**4AAE212**	**Department**	**Agriculture**
Prerequisites	None	Co-requisites	None
Aim	This course is designed to introduce students to the field of Agricultural Economics exposing them to the environment in which an agricultural economist operates with an overview of how the agricultural sector has changed in South Africa		
Content	Introduction to Agricultural Economics Analyzing the career of an economist The importance of agriculture to humanity Agricultural situation of developed and developing countries in terms of: ● The provision of food ● Agricultural efficiency to creating a consumer society ● Providing a livelihood for farm people ● Being custodians of the environment ● Evaluating the performance of agriculture The changing complexion of Agriculture in South Africa An introduction to different economic systems		
Outcomes	On completion of this course students are expected to: ▪ be familiar with key terms and concepts in agricultural economics ▪ understand and describe the role of agricultural economics in agriculture ▪ identify what humanity expects from agriculture ▪ judge the extent to which agriculture has fulfilled its role in developing and developed countries ▪ examine the role of agriculture in a country's economy ▪ understand the dualistic nature of South African agriculture		
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical sessions		

Title	**Principles of Production Economics**		
Code	**4AAE322**	**Department**	**Agriculture**

Prerequisites	4AAE212, 4AAG 212	Co-requisites	None
Aim	To introduce students to the concept of production economics. To explain the application of production economics in agriculture. To explain the use of production economics and the use of a production function. To introduce students to various techniques that could be used in order to reach specific objectives like profit maximization and optimum input applications or optimum combinations of inputs and outputs.		
Content	● Introduction to the concept of production economics ● Introduction to a production function and its application ● The concept of marginality ● Law of diminishing marginal returns ● The use of input/input applications to determine optimal input applications ● The use of input/output application to determine profit maximization. ● The use of output/output applications to determine the most profitable combination when more than one product is being produced ● Resource Allocation for Multi-product holding ● The use of cost principles like marginal cost, average variable cost and average fixed cost to determine optimum production levels. ● Breakeven analysis		
Outcomes	After completing this module student will be able to: ▪ describe the concept of production economics ▪ apply the principles of production economics ▪ use a production function to determine rational and irrational production areas ▪ determine the optimum input application to maximize profit - determine the optimum combinations of more than one input to optimize production ▪ determine the optimum combination of two or more products to produce ▪ apply cost principles like marginal cost, average variable cost and average total cost to determine optimum production levels ▪ determine breakeven point		
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's		

Title	Farm Management and Recording Keeping Systems		
Code	**4AAE311**	**Department**	**Agriculture**
Prerequisites	4AAE212, 4AAG212, 4AAS212	Co-requisites	None
Aim	Expose students to the concept of farm management, the role of a farm manager and the decision making process. To introduce students to sources of information available to farmers when decisions have to be made. To expose students to the records a farm manager should keep and how and why to keep these records. To enable students to draw up basic farm budgets and financial statements such as a cash flow statement, balance sheet and income statement and to interpret the results of the statements.		
Content	● General farm management ● The role of the manager and the decision making process		

	● Sources of external and internal information, and management information systems. The importance of record keeping. ● Record keeping, why keep records? What information to record ● Budgeting and the budgeting process. ● Cash flow statements - Balance sheets - Income statements ● Methods of analysis of farm records adjustments in farming programmes, measures of success in farming. Interpretation of results
Outcomes	After completing this module student will be able to: ▪ understand the concept and the role of a farm manager ▪ understand and apply the decision making process ▪ know the sources of information available to the manager ▪ know which records a manager should keep and why ▪ identify what information should be kept in these records ▪ compile cash flow statement/budget, a balance sheet and compile an income statement ▪ analyse the financial statements and interpret the results
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's

Title	**Entrepreneurship, Co-ops and other forms of Business ownership**		
Code	**4AAE312**	**Department**	**Agriculture**
Prerequisites	None	Co-requisites	None
Aim	This module seeks to equip students with a basic understanding and skills needed to promote entrepreneurship by giving knowledge in the discipline and opportunities to cultivate a problem solving approach and, conceivably, go back to a community and promote entrepreneurship. This module seeks to equip students with an awareness of the different types of business ownership that exists in South Africa. It should also make students aware of the differences, advantages and disadvantages of each business type. More emphasis will be on Co-operatives as they play an important role in South African agriculture. It will therefore seek to equip students with an understanding of the role co-operatives can fulfil in agriculture.		
Content	The concept of entrepreneurship; What is entrepreneurship?; Views on entrepreneurship; Entrepreneurship and economic development; Advantages of entrepreneurship; Myths about entrepreneurship; Success and failures of entrepreneurs; Personality traits of entrepreneurs; The business environment; Macro Environment; Micro Environment; Producer and consumer behaviour in a market economy; Elementary theory of demand; Elementary theory of supply; Elementary theory of price determination; Elasticity of demand and supply; The different types of business ownership in South Africa; A sole proprietor ; A partnership; A close corporation ; A company (private & public); A co-operative; Accountability and liability of members or owners of each business type; The history and development of co-operative principles; Modern co-operative principles; Member's responsibilities in a co-operative; Services and types of co-operatives		
Outcomes	After completing this module student will be able to: ▪ Understand the concept of entrepreneurship; ▪ Understand the environment in which an enterprise functions;		

	▪ Understand how the environment affects the enterprise and *vice versa;* ▪ Understand basic economic concepts; ▪ Understand the theory of price determination; ▪ Understand how consumer and producer markets react in a market economy; ▪ Raise critical questions concerning entrepreneurship; ▪ Be able to find needed information; ▪ Appreciate the importance of developing information networks; After completing this module, students will also be able to have: ▪ An awareness of the different types of business ownership in South Africa. ▪ An understanding of each business type's suitability with special reference to the financial requirements and the liability of owners/shareholders and members. ▪ An understanding of the more common legal aspects of each business type. ▪ An understanding of the role co-operatives have played in the development of the agricultural sector. ▪ An awareness and understanding of co-operative principles and how it functions; ▪ An awareness of the legal aspects and responsibility when establishing a co-operative and the process to follow when establishing a co-operation. ▪ An understanding of the member's responsibilities in a co-operative.
Assessment	50% Continuous Assessment Mark; 50% Final Exam Mark
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's

Title	**AGRIBUSINESS MANAGEMENT AND MARKETING**		
Code	**4AAE411**	**Department**	**Agriculture**
Prerequisites	4AAE212	Co-requisites	None
Aim	This module seeks to equip students with a basic understanding and skills needed to establish an enterprise particularly related to agriculture. To expose students to marketing of agricultural products including the changes in agricultural marketing over the past decade.		
Content	● Identifying business opportunities ● Establishment and ownership of a business ● Business functions ● Management functions and techniques ● Developing a business plan ● Historical background to agricultural marketing ● Recent changes in the marketing of agricultural products including specific products traded on SAFEX		
Outcomes	After completing this, module students will be able to: ▪ be able to go through the process of identifying a business opportunity ▪ have an understanding of the different types of business ownership ▪ have an understanding of the different business functions ▪ have an understanding of the management functions required to manage a business ▪ know the components of a business plan		

	▪ Develop a basic business plan. ▪ have an understanding of how agricultural marketing has changed ▪ have an understanding of the marketing of specific agricultural products
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's

Title	**Risk Management**		
Code	**4AAE421**	**Department**	**Agriculture**
Prerequisites	4AAE312, 4AAE311	Co-requisites	None
Aim	This module seeks to equip students with a basic understanding and skills needed to identify uncertainty and risks related to agricultural production. To expose students to developing various strategies to minimize the effects of risk and uncertainty.		
Content	Imperfect knowledge and the farmer Attitudes to uncertainty, and profit maximization Identifying risks and uncertainty Types of risk Dealing with uncertainty Cost of uncertainty Uncertainty and farm planning Managing risk		
Outcomes	After completing this module student will be able to: be able to identify and illustrate imperfect knowledge in agriculture have an understanding of attitudes to uncertainty and profit maximization be able to identify and describe different risks and uncertainty be able to develop various strategies to cope with various types of risk determine the cost of uncertainty be able to manage risk and uncertainty in farming		
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's		

Title	**Agribusiness research project I**	
Code	**4AAE441**	**Department: Agriculture**
Prerequisites	4STT120 and all AGRIFINANTIAL MANAGEMENT AND MARKETING Core Modules in 2nd	Co-requisites: None
Aim	This module is designed to introduce students to the theoretical concepts involved in research and research preparation. The course aims to expose students to the world of scientific writing by reviewing published material and thereafter producing and presenting a review paper and a research proposal	
Content	● Information Retrieval Skills ● How to write a review paper. ● Presentation Skills ● Introduction to Research	

	● Qualitative and Quantitative Research Methodology ● Research Design ● Writing a Research Proposal ● Analysis of Data ● Writing a Research Report
Outcomes	After completing this module student will be able to: ▪ Consult various forms of scientific communications; ▪ Identify review papers in journals, conference proceedings and web sites; ▪ Review previously published primary papers; ▪ Identify trends emanating from different researchers on a specific topic; ▪ Write a review paper; ▪ Present a review paper; ▪ Produce a research proposal, which outlines clearly a plan on how the researcher will conduct the research.
Assessment	35 % Written Review Paper 35 % Written Research Proposal 30 % Presentation
DP Requirement	80% Attendance of contact sessions with supervisor

Title	**Farm Planning**	
Code	**4AAE412**	**Department: Agriculture**
Prerequisites	4AAE212, 4AAS212, 4AAG212, 4AAS211,	Co-requisites: None
Aim	This module seeks to equip students with the basics of farm planning. It will also give students an opportunity to develop a comprehensive farm plan. The process that the students follow will assist them to develop farm plans in any given area and can also be used as a development project in rural areas.	
Content	● The Planning Environment and the Management Function; ● The purpose of planning ● The dynamic nature of production; ● Uncertainty; ● Basic principles and Concepts of Planning; ● The sequence of decisions in farm planning; ● Planning and budgeting ● Factors which determine types of farming by location; ● Constraints; ● Some commonly used Farm Planning Models; ● Whole-Farm budgeting; ● Partial Budgeting; ● Use of Gross Margin Analysis; ● Cropping Decisions; ● Choice of crops; ● Crop production decisions; ● Live Stock Decisions; ● Planning the kind, amount and system of production ● The place of different enterprises; ● Circumstances that Influence the Financing of farming Enterprises; ● Capital requirements of farming enterprises; ● Putting Theory into Practice; ● Steps to follow when compiling a farm plan	

Outcomes	After completing this module student will be able to: ▪ develop whole or partial farm plans using the following ▪ soil survey/soil maps, climatic data. ▪ crop selection, animal selection or a combination of crops and animals ▪ determine estimated production costs ▪ determine potential income or revenue ▪ area to be utilized ▪ determine the capital required to implement the whole or partial farm plan ▪ determine a 5 year cashflow budget ▪ present this information in the form of a report.
Assessment	50% Continuous Assessment Mark 50% Final Assessment (Farm Plan)
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's

Title	**AGRICULTURAL POLICY AND INTERNATIONAL TRADE**		
Code	**4AAE422**	**Department: Agriculture**	
Prerequisites	CECN201, CECN102	Co-requisites	None
Aim	This module seeks to equip students with an awareness and an understanding of AGRICULTURAL POLICY AND INTERNATIONAL TRADE at provincial and national level It also seeks to equip students with skills needed to participate in developing and evaluating agricultural policies at national and provincial level in SA. It should also equip students with an understanding of AGRICULTURAL POLICY AND INTERNATIONAL TRADE and its impact on international trade.		
Content	Policy Framework at ▪ Provincial level ▪ National level and International level. ▪ Strategic Development Plan for South Africa ▪ NEPAD ▪ BATAT ▪ The National Water Act ▪ International Trade Agreements, GATT etc. ▪ Any other relevant policy		
Outcomes	After completing this module student will be able to: Understand the various policies and their impact on the agricultural sector. Be aware of the various trade agreements and their consequences on the agricultural sector		
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's		

Title	**Agribusiness research project II**	
Code	**4AAE442**	**Department Agriculture**
Prerequisites	4STT120 and all AGRIFINANTIAL MANAGEMENT AND MARKETING Core Modules in 2nd year	Co-requisites: Completion of Agribusiness Research Project 1

Aim	This module is designed to introduce students to the practical concepts involved in research. The course aims to expose students to the world of data collection and analysis and scientific writing by doing fieldwork and producing and presenting a research report.
Content	● Design Research Instruments ● Collect data in the field ● Analyse data ● Write a research report ● Present research findings
Outcomes	On completion of this course students are expected to: ▪ design research tools, ▪ conduct research in the field which entails identifying a research area of interest, ▪ conducting a literature review, ▪ formulating a hypotheses or problem statement and developing a clear plan to conduct the research, ▪ analyse data, ▪ write and present a research report
Assessment	50 % Research Report 50 % Presentation of research findings
DP Requirement	Completion of fieldwork according to schedule 80% Attendance of meetings with supervisors

AGRICULTURAL EXTENSION & RURAL DEVELOPMENT

Title	**Introduction to Extension & Rural Dev**		
Code	**4AAE211**	**Department: Agriculture**	
Prerequisites	None	Co-requisites	None
Aim	This module aims to introduce learners to basic concepts, history, philosophy and patterns of extension worldwide, in the Southern Africa region and nationally outlining the principles, practices, communication process, adoption and diffusion of agricultural production practices and extension methods and to enable students to identify, analyse and apply appropriate extension methodologies in extension and rural development		
Content	● History and philosophy of agricultural extension ● Communication process as a basis for extension ● Adoption and diffusion model ● Participation of Farmers in Extension Programmes ● Self-reliant Participatory Development ● Agents of Change ● Alternative approaches to Organizing Extension ● Using Rapid or Participatory Rural Appraisal ● Participatory Methodologies (PRA, RAAKS, RRA)		
Outcomes	After completing this course, students will be able to: ▪ Define and describe basic concepts in extension and rural development; ▪ Explain how agricultural extension developed globally and nationally with reference to South Africa; ▪ Discuss the philosophy and patterns of extension world-wide and in Southern Africa; ▪ Discuss principles and practice communication process as the basis of extension; ▪ Explain the educational processes achieved through the adoption diffusion model; ▪ Understand and describe how the different participatory extension methods can be applied to real life situations;		

	▪ Assess needs, constraints of farmers and possible solutions to problems using different participatory methodologies
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark
Assessment Criteria	Students will be tested not only on knowledge and insight into extension and rural development concepts but also on their ability to apply this to case studies and real life situations
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's

Title	**Extension methods**	
Code	**4AAE222**	**Department: Agriculture**
Prerequisites	None	Co-requisites : None
Aim	This course is designed to introduce students to farming systems and project management in Extension and Rural Development. The course provides an overview of the fundamentals of project management, planning, implementation and facilitation.	
Content	● The evolution of farming systems ● Planning and management of farming systems ● Applications of Strategic Management in Public Institutions ● Management of Change: Theory and Application ● Project Management: The Process ● Application of Project management for Strategic Change ● Project Management for Community Development Projects ● Community participation ● The Roles and Functions of Public Project Managers	
Outcomes	After completing this module students will be able to: ▪ Understand farming systems in the context of development; ▪ be familiar with key terms in project management; ▪ Understand the strategic management process; ▪ examine management of change in theory and practice ▪ understand the process of project management; ▪ apply project management for strategic change; ▪ examine the role of project management in community development projects; ▪ understand the functions of public project managers	
Assessment	50% Continuous Assessment Mark 50% Final Exam Mark	
Assessment Criteria	Students will be assessed on: Understanding of farming systems and development Application of theoretical aspects of project management	
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's	

Department of Biochemistry and Microbiology

STAFF

Professor	AK Basson, MSc (PU for CHE), DSc (Microbiology) (UNIZULU)
	K Syed, PhD (Biochemistry) (Sri Krishnadevaraya University, India)
Associate Professor	E Madoroba, PhD (Microbiology) (UP)
	MS Mthembu, BScHons, MSc (UNIZULU) PhD (DUT) PGDip (HE) (UKZN), ULDP (USB), RS (RU)
Lecturers	J Shandu, BScHons, MSc (UNIZULU)
	ML Ngwenya, BScHons, Dip (Public Admin), MSc (UNIZULU)
	MS Goqo-Mathenjwa, PhD Biochemistry (UZ)
	Dr N Hlengwa, PhD (Biochemistry), (UNIZULU)
Senior Laboratory Assistants	ZG Ntombela, PhD, MSc (Microbiology) (UNIZULU)
	TG Dube, BSc (Hydrology & Microbiology) (UNIZULU)
	Ms SF Ndulini (MSc) Microbiology, UNIZULU
Laboratory Assistants	RD Mthembu
	MLC Mkhwanazi

BIOCHEMISTRY

Title	**Biomolecules and Enzymology**		
Code	**4BCH211**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4CHM121, 4CHM122	Co-requisites	None
Aim	This module aims to acquaint students with the structural chemistry of the components of living matter and the relationship of biological function to chemical structure.		
Content	● Introduction to water ● Water as solvent in living systems; solubility criteria; acids, bases, pH and buffer action; ionic strength. Quantitative analytical concepts in Biochemistry. ● Biomolecules ● Physical, chemical and biological properties of carbohydrates, lipids, proteins, nucleic acids. Micro-components (vitamins, minerals) in living systems ● Enzymes ● General nature of enzymes; nomenclature and classification; theory of catalysis; nature of active sites; cofactors and coenzymes; kinetics of enzyme reactions; inhibition of enzymes; isoenzymes; immobilized enzymes; non-protein enzymes; enzyme assay.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		
Title	**Metabolism**		
Code	**4BCH212**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4CHM121, 4CHM122	Co-requisites	None
Aim	To gain knowledge on different metabolic pathways involving the catabolism and anabolism of different biomolecules		
Content	● Intermediary Metabolism:		

	o Introduction to metabolism; Catabolism and anabolism ● Energy Metabolism: o Free energy change; High energy biomolecules ● Carbohydrate Metabolism: o Digestion and absorption; Glycolysis; Pentose phosphate pathway; ● Glycogenesis; Control of carbohydrate metabolism o The TCA Cycle: ● TCA cycle reactions; Amphibolic nature of the TCA cycle; o Control of the TCA cycle; Glyoxalate cycle ● Lipid Metabolism: o Introduction of lipid digestion and absorption; β-oxidation; ● Ketone bodies metabolism; Fatty acid synthesis; Control of lipid metabolism o The Electron Transport Chain and Oxidative Phosphorylation: ● Enzymatic shuttles o Protein Metabolism: ● Digestion and absorption of lipids; Amino acid catabolism; Urea cycle
Outcomes	On completion of the module the students will be able to have a thorough understanding of: ▪ The overview of metabolism ▪ Digestion and absorption of different biomolecules ▪ Different metabolic pathways – in relation to the synthesis and breakdown of different biomolecules ▪ Control of metabolism of different biomolecules
Assessment	50% Continuous assessment mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

Title	Biochemistry: Principles and Techniques		
Code	**4BCH222**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4CHM121 4CHM122	Co-requisites	None
Aim	The aim of this module is to make students understand the biochemical principles in association with microbial principles.		
Content	● Introduction and terminology used in practical biochemistry. ● General principles of biochemical investigations ● Molecular biology and basic techniques ● Immunochemical techniques/assays ● Centrifugation techniques ● Protein structure, purification and characterization ● Spectroscopic techniques ● Electrophoretic techniques ● Chromatographic techniques ● Radioisotope techniques ● Fundamentals of Metabolomics		
Assessment	50% Continuous Assessment. 50% Summative Assessment comprising of 3 hour written examination		
DP Requirements	40% Continuous Assessment Mark. 80% practical attendance and field work		

Title	**Gene Expression and Replication**		
Code	**4BCH311**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4BCH212	Co-requisites	None
Aim	This course/module is intended to equip the learner with the basic understanding of DNA and RNA chemistry. Understanding of gene expression and replication		
Content	● Chemical structure of nucleic acids ● DNA and RNA replication ● Enzymes and their role in DNA and RNA replication ● Transcription ● Translation ● Enzymes and their role in transcription and translation. ● Regulation of gene expression ● DNA repair systems		
Assessment	50% Continuous Assessment 50% Summative Assessment comprising of 3 hour written examination		
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's		

Title	**Metabolic Regulation**		
Code	**4BCH321**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4BCH212	Co-requisites	None
Aim	The aim of this module is to provide students with comprehensive knowledge of the current concepts and theories of the regulation of metabolic processes.		
Content	● Metabolic map. Catabolic and anabolic pathways. Regulation of metabolism. Key enzymes and metabolites. Hormones and neurotransmitters as signals. ● Signal transduction by intracellular receptors and by cell-surface receptors. ● Concept of the “second messenger” molecules. Intracellular messenger systems (adenylate cyclase system, calcium/phoshatidylinositol system, calmodulin, nitric oxide) ● Regulation of glycolysis, gluconeogenesis, glycogen degradation/synthesis. ● Regulation of Citric Acid Cycle. Inhibitors and activators of the cycle. ● Regulation of Fatty Acid degradation and synthesis. Synthesis of ketone bodies ● Regulation of Amino Acid degradation. Transamination and oxidative deamination. Ketogenic and glucogenic amino acids. Urea cycle. ● Integration of metabolism. Metabolic effects of insulin and glucagon ● Metabolic regulation in well-fed state and starvation.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical and fieldwork		

Title	**Recombinant DNA Technology**		
Code	**4BCH312**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4BCH211	Co-requisites	None
Aim	The aim of this module is to make students to understand the basics of genetic manipulation.		
Content	● Basic problems in recombinant DNA technology. ● Basic techniques and procedures in recombinant DNA technology. ● Methods used in transformation of microorganisms. ● Enzymes and their usefulness in the transformation of microorganisms. ● Cloning by homopolymer tailing and cloning cDNA. ● Cloning vectors and their properties. ● Plasmid construction and characterization of new cloning vectors. ● Cloning strategies in gram-negative organisms. ● Cloning and gene expression in yeast cells. ● In vitro DNA packaging. ● DNA walking and DNA sequencing		
Assessment	50% Continuous Assessment. 50% Summative Assessment comprising of 3 hour written examination.		
DP Requirements	40% Continuous Assessment Mark. 80% practical attendance and field work		

Title	**Biochemistry of Nutrition**		
Code	**4BCH322**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4BCH211 4BCH212	Co-requisites	None
Aim	The goal of this module is to provide students with comprehensive knowledge of food, nutrition & health.		
Content	● The energy value of food; the biological value of food; RDA, ● Human nutritional requirements— ● Macronutrients—proteins, lipids, carbohydrates ● Micronutrients—vitamins, minerals ● Minerals metabolism ● Water-soluble & fat soluble vitamins ● Dietary fiber, alternative sweeteners ● Anti-nutrients ● Malnutrition (dietary excesses & deficiencies)—obesity, kwashiorkor, marasmus, starvation, diabetes. ● Formulated/crash/optimal diets		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

MICROBIOLOGY			
Title	**Prokaryotes Classification and Microbial techniques**		
Code	**4MCB211**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4CHM121, 4CHM122	Co-requisites	None
Aim	This module is designed to introduce the student to microbial techniques and to apply it in the identification and classification of prokaryotes.		
Content	● Introduction to microscopes. ● Stains and staining techniques. ● Aseptic techniques to transfer bacteria. ● Microscopic examination of wet mounts. ● Basic apparatus and glassware for a Microbiology laboratory. ● Culture media preparation and sterilization. ● Chemical defined- and complex media. ● Selective, differential and enriched media. ● Pure culture techniques. ● Anaerobic culture methods. ● Colony morphology. ● Biochemical activities of bacteria. ● Introduction to Microbial classification. ● Case studies.		
Assessment	Continuous assessment mark 25% Practical assessment mark 25% Formal exam (3Hours) 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

Title:	**Prokaryotes Structure and Environmental Microbiology.**		
Code	**4MCB221**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4CHM112	Co-requisites	None
Aim	The aim of the module is to provide students with comprehensive knowledge of the structure of prokaryotes and their influence on the environment.		
Content	● Overview of the prokaryotic cell structure. ● The plasma membrane. ● The cytoplasmic matrix. ● The nucleoid. ● Plasmids. ● Flagella, pili and fimbriae. ● Bacterial cell wall. ● Archaeal cell walls. ● Protein secretion in prokaryotes. ● Components external to the cell wall. ● Chemotaxis. ● Bacterial endospores. ● Biogeochemical cycling and introductory microbial ecology. ● Microorganisms in marine and fresh water environments. ● Microorganisms in terrestrial environments. ● Microbial interactions.		
Assessment	Continuous assessment mark 25% Practical assessments 25% Formal end of module exam (3Hours) 50%		
DP Requirement	40% Continuous Assessment Mark		

	80% Attendance at practical's and fieldwork

Title	**Microbial Growth and Medical Microbiology**		
Code	**4MCB212**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4CHM121 4CHM122	Co-requisites	None
Aim	This module is designed to give students a better understanding of microorganisms and their role in the field of clinical microbiology.		
Content	● Collection, handling and transportation of specimens. ● Identification of microorganisms. Microscopy, growth, ● biochemical characteristics and rapid methods of identification, immunologic techniques, bacteriophage typing & molecular methods and analysis of metabolic products. Susceptibility testing. ● Computers in clinical microbiology. ● The bacterial growth curve. Measurement of bacterial growth. ● Continuous culture of microorganisms ● The influence of environmental factors on microbial growth. ● Microbial growth in natural environments.		
Assessment	50% Continuous Assessment (comprising 20% practical, 20% assignments and tests) 50% Formal end of module exam (3 hours).		
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's		

Title	**Food Microbiology and Food Analysis**		
Code	**4MCB311**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4MCB211	Co-requisites	None
Aim	This module is designed to provide students with a better understanding of the microorganisms associated with foods, their effects on foods, mode of transmission of pathogens via foods and their usage in food production.		
Content	● Food analysis and food preservation o Analysis of chemical composition of various foods. Preservatives. o Microbial growth in foods o Microbial growth and food spoilage. Methods of controlling food spoilage. ● Food borne diseases o Detection of food borne pathogens ● Microbiology of fermented foods o Microorganisms as foods and food amendments		
Assessment	50% Continuous Assessment (comprising 20% practical, 20% assignments and tests) 50% Formal end of module exam (3 hours).		
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's		

Title	**Environmental Influences on Microorganisms & Principles of Industrial Microbiology**		
Code	**4MCB312**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4MCB212	Co-requisites	None

Aim	This module is intended to equip the learners with the understanding of the role and the influence of nutrition and the environment on microorganisms as well as applying the principles of microbial biotechnology in industries.
Content	• Microbial nutrition and culture media. • Catalysis, enzymes and oxidation reduction reaction. • High energy compounds and energy conservation. • Fermentation • Respiration and electron transport chain and energy conservation. • Carbon flow: Citric acid cycle - Citric acid and other organic compound production • The balance sheet aerobic respiration and energy storage. • Biosynthesis of monomers. • Growth and product formation in biocatalysis. • Characteristics of large scale fermentations and fermentation scale-up. • Vitamins and amino acid production from fermentation. • Alcohol and alcoholic beverages.
Assessment	50% Continuous Assessment (comprising 20% practical assessment plus 20% theory assessments) 50% Formal end of module exam (3 hours).
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's

Title	**Biotechnology**		
Code	**4MCB322**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4MCB212	Co-requisites	None
Aim	This course/module is intended to equip the learner with the basic understanding of biotechnology and allow the student to progress to more advanced experiments.		
Content	• Definition: Overview and Brief History of Biotechnology • Applications of biotechnology in different disciplines • Three-Component Central Core: Material, Process and Products • Tools for Biotechnology: Microbes, Plants and Animals Processes – Fermentation • Bioprocess technology Bioprocess technology • Genetics • Downstream process – Product purification and Marketing • Regulation, Social, ethical and safety Impact of Biotechnology • Patent • Final Review and Future Development of Biotechnology		
Assessment	50% Continuous Assessment 50% Summative Assessment		
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's		

Title	**Epidemiology and Pathogenesis of Infectious Disease.**		
Code	**4MCB311**	**Department**	**Biochemistry & Microbiology**
Prerequisites	4MCB212	Co-requisites	None
Aim	The aim of this module is to make students understand disease origin and progression.		

Content	● Epidemiology and public health and Science of epidemiology ● Epidemiology of HIV/AIDS and transmission of diseases ● Disease reservoirs and nosocomial infections. ● Emerging and re-emerging diseases. ● Epidemiology of airborne diseases. ● Epidemiology of waterborne diseases. ● Epidemiology of sexual transmitted diseases. ● Epidemiology of food borne diseases. ● Food poisoning and food infection.
Outcomes	After studying this module, a learner should be able to: ▪ Define and understand the science of epidemiology. ▪ Describe infectious diseases, their origin and their spread. ▪ Methods and effective ways of curbing epidemics.
Assessment	50% Continuous Assessment (2 tests + 1 assignment). 50% Summative Assessment comprising of 3 hour written examination
Assessment Criteria	Individual skill in writing is critical. The learner should be able to critically analyze and apply the module's outcomes to relevant case studies The ability to orally present a given epidemiology topic is required.
DP Requirements	30% Continuous Assessment Mark. 80% practical attendance and field work.

Department of Botany

STAFF

Associate Professor	NR Ntuli, PhD (UNIZULU)
Senior Lecturers	THC Mostert, PhD (UP)
	CM van Jaarsveld, MSc (UNW); PhD (UFS)
Senior Laboratory Assistants	Z Mbele, MSc (UNIZULU)
Laboratory Assistants	S Ngubane, BScHons (UNIZULU)
	ZBTG Ngcobo, NDip (Chem Eng) (MUT)
	PN Sokhela, BScHons (UNIZULU)

Title	**Introduction to Plant Cytology, Genetics and Physiology**		
Code	**4BOT111**	**Department**	**Botany**
Prerequisites	None	Co-requisites	None
Aim	The learner will study plant metabolism, heredity and cytology. This will include understanding theoretical knowledge and developing the skills to solve genetics problems through microscopic techniques.		
Content	Aspects to be studied will include: ● the chemistry of plants ● essential elements ● carbohydrates, lipids, proteins, nucleic acids ● the plant cell structure and function ● plant cell division ● chemical energy and chemical reactions, enzymes and energy carriers in plants ● the movement of water and solutes in plants ● photosynthesis, transpiration, respiration and the conditions affecting it ● Mendelian genetics		
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours) and practical exams		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

Title	**Plant morphology, taxonomy and an introduction to Mycology**		
Code	**4BOT112**	**Department**	**Botany**
Prerequisites	None	Co-requisites	None
Aim	The learner will study external structure of angiosperms, reproductive system, characteristics and economic importance of fungi. This will include understanding theoretical knowledge and developing the skills to solve mycology problems through microscopic techniques.		
Content	Aspects to be studied will include: ● types of root systems, origin of roots and root modification ● different forms of stems ● external structure of monocotyledon and dicotyledon leaf ● leaf modifications and inflorescences ● floral morphology, floral diagrams and floral formulae ● pollination, seed and fruit formation ● classification, characteristics, reproduction and economic importance of fungi and lichens ● life cycles of fungi and their role in the environment ● effects of fungi on plants and on human health ● microscopic structure of fungi and lichens		

Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours) and practical exams
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

Title	**Plant Growth and Development and Floral Propagation**		
Code	**4BOT211**	**Department**	**Botany**
Prerequisites	4BOT111 and 4BOT112	Co-requisites	
Aim	This course is designed to develop an understanding of the role played by plant hormones on growth and development including plant responses to various stimuli. To understand the principles and factors involved in floral propagation.		
Content	Aspects to be studied will include: ● phytochrome, stomatal movements, ● photophysiology, abscisic acid, auxins, gibberellins, cytokinins, kinetin and ethylene on plant growth and development. ● Phototropic responses and general aspects of seed and vegetative propagation. ● It includes techniques to study the effects of the above mentioned hormones on plant growth and development, and also phototropic responses on plants. ● To develop skills regarding the effect of external factors on the propagation of flowering plants and to identify and break dormancy in seeds.		
Assessment	50% Continuous assessment mark 50% Summative assessment (comprising 3 hour practical and theory exam)		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork		

Title	**Plant Anatomy, Taxonomy and Biodiversity**		
Code	**4BOT212**	**Department**	**Botany**
Prerequisites	4BOT111 and 4BOT112	Co-requisites	
Aim	The purpose of this course is to acquire knowledge of the internal structure of roots, stems and leaves of monocot and dicot plants. To use keys to identify selected plant families and to gain knowledge of the diversity of plant communities.		
Content	● Simple and complex plant tissues: structure and function of xylem, phloem, secretary cells and tissues, epidermis. ● Primary and secondary body of the plant. ● Anomalous secondary growth. Microscopic techniques for identification of monocot and dicot roots, stems and leaves. ● To study the diversity of plant communities: ● Global, national and local factors that affect plant biodiversity. ● Identification of Pteridophyta, Gymnospermae and Angiospermae. ● Herbarium usage, diagnostic characteristics of important plant families.		
Assessment	50% Continuous assessment mark 50% Summative assessment (comprising 3 hour practical and theory exam)		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork		

Title	Cytology, Genetics and Plant Biochemistry		
Code	**4BOT311**	**Department**	**Botany**
Prerequisites	4BOT111, 4BOT112, 4BOT211, 4BOT212	Co-requisites	
Aim	This course is designed to develop an understanding about the mechanism of inheritance, phenolics, isoprenoids, nitrogen metabolism, biochemical plant pathology, biochemical plant ecology and plant cell biotechnology.		
Content	● Cytological and molecular structures of importance to genetics and the genetic code. ● Mendelian genetics. ● Multiple alleles probability. ● Sex determination and sex-linked inheritance. ● Linkage, crossing-over and chromosome mapping. ● Genetic fine structure. ● Pleiotrophy, polyploidy. ● Various cytological staining procedures and solving genetic problems. ● Structures, functions and metabolic pathways of major classes of phenolics in plants, isoprenoid metabolism, special nitrogen metabolism, and biochemical plant pathology and biochemical plant ecology. ● Different techniques involved in chromatography.		
Assessment	50% Continuous assessment mark 50% Summative assessment (comprising 3 hour practical and theory exam)		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork		

Title	Plant Ecophysiology		
Code	**4BOT331**	**Department**	**Botany**
Prerequisites	4BOT111; 4BOT112, 4BOT211, 4BOT212	Co-requisites	
Aim	This course is designed to equip learners to understand the interaction of plants with their environment from a physiological perspective.		
Content	● Stress physiology ● Plant symbiosis with microorganisms ● Plant nutrition ● Basics of weed science ● Plant-animal interactions		
Assessment	50% Continuous assessment mark 50% Summative assessment (comprising 3 hour practical and theory exam)		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork		

Title	People and Plants		
Code	**4BOT312**	**Department**	**Botany**
Prerequisites	4BOT111, 4BOT112, 4BOT211, 4BOT212	Co-requisites	

Aim	To examine the intimate linkage between people and the plant kingdom by studying various aspects of plant-uses, including plants used for medicinal and cultural purposes.		
Content	● Concepts related to ethnobotany and ethnobotany data; methods to record and process this information. ● Ethnobotanical research and community development. ● History, characteristics and economic uses of ethnobotanical important plants. ● Importance of medicinal plants; cultural aspects of healing; plant parts used for healing. ● Methods of collecting and storage for marketing and for phytochemical analysis; dosage forms, methods of preparation and administration; active ingredients. ● The ethics of searching for new plant products; medicinally important plants species in KwaZulu-Natal.		
Assessment	50% Continuous assessment mark 50% Summative assessment (comprising 3 hour practical and theory exam)		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork		

Title	**Plant Conservation and Management and Terrestrial Ecology**		
Code	**4BOT322**	**Department**	**Botany**
Prerequisites	4BOT111; 4BOT112, 4BOT211, 4BOT212	Co-requisites	
Aim	This course is designed to develop an understanding of the principles of environmental management and its role in nature conservation and to study the plants in their environment.		
Content	● A sustainable relationship with plants. ● Environmental management. ● Resource economics, renewable and non-renewable resources. ● Environmental deterioration; ethics of environmental conservation. ● Legislation on nature conservation. ● Biodiversity: mountains, protected areas, coastal and marine. ● Rehabilitating plant communities. ● Plant ecology; the ecological unit; the environmental complex. ● Population structure and plant demography. ● Resource allocation. ● Species interactions. ● Classification and ordination of communities. ● Plant succession. ● Productivity; mineral cycles; environmental factors. ● Plant adaptations. ● Methods of sampling. Methods of documenting succession, measuring productivity and radiation. ● Physical properties of soil monitoring environmental factors.		
Assessment	50% Continuous assessment mark 50% Summative assessment (comprising 3 hour practical and theory exam)		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork		

Department of Chemistry

STAFF

Senior Professor	N Revaprasadu, BScHons (Natal), PhD (London), Dip (Imperial College)
Professor	VSR Pullabhotla, MSc (Eng) (JNT University, India), PhD (UKZN)
	T Govender, PhD (Chemistry) (UKZN) (part time lecturer)
Senior Lecturers	TV Segapelo, BScHons, MSc (UWC), PhD (UJ)
	SM Mohomane, BScHons, MSc (UFS), PhD (UNIZULU)
Lecturer	SE Mavundla, PhD (UWC)
Senior Laboratory Assistants	NM Sibiya, ND (Cape Tech), BScHons (UNISA)
Laboratory Technologist	NL Khumalo, BScHons (WITS)
Lab Assistant	PW Zibane, BScHons (UNIZULU),
	SZ Ncanana, BSc Hons, MSc (Chemistry) (UNIZULU)
Laboratory Helpers	N Ntshangase
	SZ Mkhwanazi, BAdmin (UNIZULU

Title	**General Chemistry 111**		
Code	**4CHM111**	**Department**	**Chemistry**
Prerequisites	None	Co-requisites	4MTH111, 4PHY111 or 4PHY121
Aim	The aim of this module is to give learners the necessary grounding in chemistry for further studies in analytical, inorganic, organic and physical chemistry		
Content	The nature of matter. Atomic structure and periodicity. Electron configurations and bonding. Types of chemical reactions. Chemical equations and the mole concept. The solid, liquid and gaseous states. Solutions. Thermochemistry. Chemical equilibrium. Chemical Kinetics. Redox equations and basic electrochemistry. Acids, bases and salts. Theory of acid-base titrations, including pH. Basic laboratory skills, including weighing and volume measurements and gravimetric, volumetric, and qualitative analyses		
Outcome	Learners must be able to demonstrate: ▪ an understanding of the structure of the atom, the chemical bonding which occurs between atoms and the types of chemical reactions that occur. ▪ an ability to write chemical formulas, balance equations, and apply the mole concepts in chemical calculations to mass reactions and reactions in solution. ▪ an understanding of the classification of matter and the fundamental properties of matter in the solid, liquid and gaseous phases and of solutions. ▪ a thorough grasp of the basic principles of thermochemistry, chemical equilibrium, chemical kinetics, basic electrochemistry and the characteristics of acids, bases and salts as well as the application of this knowledge to acid base titrations. ▪ an ability to perform a range of basic laboratory skills, including weighing and volume measurements and simple gravimetric, volumetric, and qualitative analyses		
Assessment	50% Continuous Assessment Mark 50% Summative assessment(comprising a 3 hour assessment after the course work has been completed)		

DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**General Chemistry 112**		
Code	**4CHM112**	**Department**	**Chemistry**
Prerequisites	Students must have attended and written the assessments for 4CHM111.	Co-requisites	4MTH112, 4PHY112 or 4PHY122
Aim	To provide an introduction to the basic concepts, terminology, laws and principles that determines the properties and behaviour of organic and inorganic compounds.		
Content	Periodicity exemplified by the physical and chemical behaviours of elements in Periods 2 and 3, Groups 1, 2, 4 and first row transition metals. Introduction to coordination chemistry and free energy approach to extraction of metals. Isolation and purification of organic compounds. General properties and structure of organic compounds. The hydrocarbons – nomenclature, properties, preparations, and reactions. Introduction to functional group chemistry. Laboratory work including volumetric, gravimetric and qualitative analyses. Determination of purity of organic compounds. Functional group analyses and some basic reactions of organic compounds.		
Outcomes	Learners must be able to demonstrate: ▪ an understanding of periodicity and the physical and chemical behaviour of elements in Periods 2 and 3 of Groups 1, 2, 4 and first row transition metals. ▪ a grasp of the basic principles of coordination chemistry and the free energy approach to extraction of metals. ▪ a sound knowledge of the nomenclature, properties, preparations, and reactions of the hydrocarbons and of the basics of functional group chemistry. ▪ an ability to perform laboratory work including volumetric, gravimetric and qualitative analyses as well as the determination of purity of organic compounds. ▪ an ability to perform functional group analyses and some of the basic reactions of organic compounds.		
Assessment	50% Continuous Assessment Mark 50% Summative assessment (comprising a 3 hour assessment after the course work has been completed)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's		

Title	**Basic Chemistry 121**		
Code	**4CHM121**	**Department**	**Chemistry**
Prerequisites	None	Co-requisites	None
Aim	The aim of this module is to provide learners with a basic grounding in chemistry in order to provide an insight into chemical aspects of non-chemistry majors.		
Content	The nature of matter. Atoms, elements and compounds. Electronic structure and bonding. Types of chemical reactions. Balancing chemical equations and the mole. The three phases of matter and the gas laws. Properties of solutions. Energy changes in chemical reactions.		

	Chemical equilibria and kinetics. Electrochemical cell and electrolysis. Acids, Bases and Salts.
Outcomes	Learners must be able to demonstrate: ▪ a basic understanding of the structure of the atom, the chemical bonding which occurs between atoms and the types of chemical reactions that occur. ▪ a basic ability to write chemical formulas, balance equations, and apply the mole concepts in chemical calculations to mass reactions and reactions in solution. ▪ a basic understanding of the classification of matter and the fundamental properties of matter in the solid, liquid and gaseous phases and of solutions. ▪ a basic grasp of the basic principles of chemical equilibrium, chemical kinetics, electrochemistry and the characteristics of acids, bases and salts as well as the application of this knowledge to acid base titrations.
Assessment	50% Continuous Assessment Mark 50% Summative Assessment
DP Requirement	40% Continuous Assessment Mark 80% Attendance at tutorials

Title	**Basic Chemistry 122**	
Code	**4CHM122**	**Department: Chemistry**
Prerequisites	Students must have attended and written the assessments for 4CHM121.	Co-requisites: None
Aim	The aim of this module is to provide learners with an insight into basic descriptive chemistry of elements, introductory organic chemistry, and some applications for non-chemistry majors.	
Content	The chemical and physical properties of Periods II and III. The chemical and physical properties of the s and p blocks. Transition metal chemistry. Saturated, unsaturated and aromatic hydrocarbons. The geometry of organic molecules and isomerism. Basic types of organic reactions.	
Outcomes	Learners must be able to demonstrate: ▪ a basic understanding of the physical and chemical behaviour of elements in s and p blocks and transition metals. ▪ a basic knowledge of the nomenclature, properties, preparations, and reactions of the saturated, unsaturated and aromatic hydrocarbons and the basics of functional group chemistry. ▪ an ability to explain the geometry of organic molecules and isomerism and discus the basic types of organic reactions. ▪ Acquire basic manipulative skills in both qualitative and quantitative analyses of materials	
Assessment	50% Continuous Assessment Mark 50% Summative Assessment	
DP Requirement	40% Continuous Assessment Mark 80% Attendance at tutorials	

Title	**Chemistry for Consumer Science**	
Code	**4CHM132**	**Department: Chemistry**
Prerequisites	None	Co-requisites: None
Aim	The aim of this module is to provide learners with a grounding in chemistry that is sufficient to enable them to grasp the various chemical aspects textiles, food preparation and nutrition.	

Content	The Structure of Matter: including elements, compounds, atoms, molecules, atomic structure and electron configuration. and properties. The Periodic Table, periodic properties and trends, metals, non-metals. The nature of chemical bonding and the various types of bonding. Chemical formulas and names of some common household products. Phases of matter, solutions, colloids and emulsions Type of chemical reactions, energy changes in chemical reactions and the factors affecting the rate of chemical reactions and equilibria. Organic Chemistry: Functional groups and their characteristics. Polymerisation reactions and macromolecules. Proteins, carbohydrates, fats, soaps, detergents, hard and soft water and assorted aspects of kitchen chemistry.
Outcomes	Learners must be able to demonstrate: ▪ a basic understanding of the physical and chemical behaviour of matter and its transformations in chemical reactions ▪ a knowledge of the basic principles of organic chemistry with an emphasis on macromolecules and polymers that are relevant to nutrition and other aspects of consumer science.
Assessment	50% Continuous Assessment Mark 50% Summative Assessment
DP Requirement	40% Continuous Assessment Mark 80% Attendance at tutorials

Title	**Analytical & Inorganic Chemistry 2**		
Code	**4CHM211**	**Department**	**Chemistry**
Prerequisites	(1) 4CHM111 (2) 4CHM112 (3) 4MTH111 or 4MTH112 (4) Any **one** of the following: 4PHY111, 4PHY112, 4PHY121 or 4PHY122	Co-requisites	None
Aim	This module is designed to introduce learners to basic concepts and practical skills in Analytical chemistry and to build on the foundation laid on the chemistry of the elements at the first year using the concepts of periodicity in the treatment of chemistry of p-block and first row transition metal chemistry, and to introduce students to co-ordination chemistry.		
Content	Section A: Analytical Chemistry: Basic calculations in analytical chemistry; Errors in chemical analysis; Aqueous solutions and Chemical equilibria; Effect of electrolytes on chemical equilibria; Solving equilibrium calculations for complex systems; Gravimetric methods of analysis; Titrimetric methods of analysis Section B: Inorganic Chemistry: Introduction to molecular orbital theory of simple homo-nuclear and hetero-nuclear diatomic molecules; Periodicity of physical and chemical properties of chemistry of the elements in the p-block and first row transition elements; Introduction to Coordination chemistry.		
Outcomes	Learners must be able to demonstrate: ▪ An understanding of the theoretical background of the chemical principles those are important in analytical chemistry. Ability to perform calculations to obtain quantitative information from analytical data. ▪ Understand of the basic concept of gravimetric methods of analysis and able to perform calculations of results from gravimetric data. ▪ Understand the principles of all aspects of chemical equilibria. ▪ To be able to perform calculations involving neutralization titrations		

	▪ How the concept of periodicity of elements can be used to rationalize the physical and chemical behaviours of p- and d-block elements. ▪ How bonding in simple molecules can be used to predict their physical properties. ▪ An understanding of the basic language and concepts used in coordination chemistry and a prelude to third year work. ▪ The relevance of some of the content of the module to and application of skills to local industries is envisaged.
Assessment	50% Continuous Assessment Mark 50% Summative assessment (3 hour assessment after the course work has been completed)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Organic & Physical Chemistry 2**	
Code	**4CHM212**	**Department: Chemistry**
Prerequisites	4CHM111, 4CHM112, 4MTH111 or 4MTH112 and Any **one** of the following: 4PHY111, 4PHY112, 4PHY121 or 4PHY122	Co-requisites: None
Aim	The build on the basic principles of organic and physical chemistry that were introduced at Year Level 1 and to lay the foundation for more advanced studies in these topics at Year Level 3.	
Content	Chemistry of Monofunctional Group I -Alkyl halides; Stereochemistry, Substitution and elimination reaction; Alcohols, phenols and ether; Chemistry of Aromatic Compounds: Electrophilic substitution reaction. Thermodynamics of ideal gas systems. Phase equilibria of one component systems. The properties and behaviour of ions in solution. Cell emfs, their applications and the factors that affect them. The kinetic of gas phase reactions with simple orders.	
Outcomes	Learners must be able to demonstrate: ▪ An understanding of the chemistry functional groups compounds and factors to identify them. ▪ An understanding of chemical reactions, synthesis and identification when presence as unknown. ▪ An understanding of what aromatic compounds are and why compounds could be in ring form and not be aromatic in nature. ▪ An ability to manipulate thermodynamic equations and apply them in calculations. ▪ A sound insight into the principles governing the phase equilibria of one component systems and the properties and behaviour of ions in solution. ▪ An understanding of the nature and origin of cell emfs, their applications and the factors that affect them as well as demonstrating an insight into the kinetics of gas phase reactions with simple orders and the ability to perform appropriate calculations..	
Assessment	50% Continuous Assessment Mark 50% Summative assessment (comprising a 3 hour assessment after the course work has been completed)	
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's	

Title	Organic Chemistry 3		
Code	**4CHM311**	**Department**	**Chemistry**
Prerequisites	4CHM212, 4MTH111 and 4MTH112, Any **two** of the following: 4PHY111, 4PHY112, 4PHY121 or 4PHY122	Co-requisites	None
Aim	To introduce more advanced facts monofunction compounds and apply them to the synthesis of useful organic compounds and to study basic principles underlying reaction mechanisms. To introduce the principles of spectroscopic methods for organic compound identification.		
Content	Introduction to Carbonyl Compounds: Aldehyde and Ketones, Carboxylic Acids, Carboxylic Acids Derivatives and Dicarbonyl Compounds; Spectroscopy		
Outcomes	Learners must be able to demonstrate: ▪ an understanding of more advanced facts and synthetic application of useful organic compounds ▪ an understanding to study basic principles underlying reaction mechanisms. ▪ an understanding of Spectroscopy In Structure Elucidation		
Assessment	50% Continuous Assessment Mark 50% Summative assessment		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practicals		

Title	Physical Chemistry 3	
Code	**4CHM321**	**Department: Chemistry**
Prerequisites	4CHM212, 4MTH111 and 4MTH112, And Any **two** of the following: 4PHY111, 4PHY112, 4PHY121 or 4PHY122	Co-requisites: None
Aim	The build on the principles that were introduced at Year Level 2 and to lay the foundation for more advanced studies at Year Level 4.	
Content	Gibbs Free Energy, the factors that affect it and its relationship to chemical processes and equilibria. Thermodynamics of phase equilibria and the principles governing two component systems. Transport properties of ions in solution and the Debye Huckel law. Liquid junction potentials other advanced aspects of electrochemical cells.	
Outcomes	Learners must be able to demonstrate: ▪ An understanding of Gibbs Free Energy, the factors that affect it and its relationship to chemical processes and equilibria. ▪ An insight into the thermodynamics of phase equilibria and the principles governing two component systems. ▪ An understanding of the transport properties of ions in solution and the Debye Huckel law as well as liquid junction potentials other advanced aspects of electrochemical cells.	
Assessment	50% Continuous Assessment Mark 50% Summative assessment	

DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical’s

Title	**Inorganic Chemistry 3**		
Code	**4CHM312**	**Department**	**Chemistry**
Prerequisites	(1) 4CHM211 (2) 4MTH111 and 4MTH112 (3) Any **two** of the following: 4PHY111, 4PHY112, 4PHY121 or 4PHY122	Co-requisites	None
Aim	This module is designed to build on the foundation laid on the chemistry of the elements at the lower levels and to introduce students to co-ordination chemistry and organometallic chemistry. At the end of the module students will be adequately equipped to undertake advanced studies, including basic research in chemistry. Adequate exposure to the applications in industries and mining is envisaged.		
Content	Systematic chemistry of the second and third row transition metal series, illustrated by a selection of any three of the sub-groups, and treated comparatively to the chemistry of first row transition series treated in first and second years. Introduction to coordination chemistry: historical development, nomenclature, isomerism, theory of bonding, electronic spectra and stability, and applications in industry. Introduction to organometallic chemistry, illustrated by complexes of carbon monoxide and alkenes. Outline of applications in chemical and pharmaceutical industries.		
Outcomes	Learners must be able to: ▪ Relate the similarities and differences between the first row transition metals and second and third transition metal series to the electronic configurations of the elements ▪ Account for the differences and similarities in the properties of the second and third transition metal series, and how these relate to the trends in the properties of their compounds ▪ Demonstrate adequate understanding of the basic concepts of co-ordination chemistry, which are required in the understanding of advanced topics in co-ordination chemistry as well as are required in the application of co-ordination chemistry in industry and research. ▪ The students should understand the theory of bonding in organometallic compounds and the preparations, properties and reactivities of complexes of carbon monoxide and alkenes, and their applications in chemical and pharmaceutical industries. ▪ Undertake a series of laboratory exercises that help the students to acquire practical skills in synthesis, physico-chemical analyses, and applications of inorganic compounds. They would also be able to use basic research equipment when they characterize their compounds.		
Assessment	50% Continuous Assessment Mark 50% Summative assessment (3 hour assessment after the course work has been completed)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical’s		

Title	**Analytical Chemistry 3**		
Code	**4CHM322**	**Department**	**Chemistry**
Prerequisites	(1) 4CHM211 (2) 4MTH111 and 4MTH112 (3) Any **two** of the following: 4PHY111, 4PHY112, 4PHY121 or 4PHY122	Co-requisites	None
Aim	This module is designed to build on the foundation laid in 2nd year Analytical Chemistry and to provide students with key concepts of instrumentation in analytical chemistry and to perform calculations used in electrochemical methods: potentiometry, coulometry, electrogravimetry, voltammetry, spectrochemical methods, chromatographic techniques. At the end of the module students will be adequately equipped to undertake advanced studies, including basic research in chemistry.		
Content	Principles of neutralization titrations and applications, Titration curves for complex acid/base systems. Electrochemical methods: Potentiometry and Applications of potentiometry, Electrogravimetric and Coulometric methods, Voltammetry. Spectrochemical methods, Instruments for optical spectrometry, Molecular absorption spectroscopy. Chromatography methods.		
Outcomes	Learners must be able to demonstrate: ▪ An understanding of the wide range of analytical techniques that is useful in analytical chemistry. ▪ Have an understanding of the principles, equipment, advantages/disadvantages and basic applications of each technique. ▪ Have practical experience in some of the key techniques, e.g. Potentiometric titrations, conductimetric titrations, Uv/Vis and PL spectroscopy.		
Assessment	50% Continuous Assessment Mark 50% Summative assessment (comprising a 3 hour assessment after the course work has been completed)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical’s		

Department of Computer Science

STAFF

Senior Professor	MO Adigun, PhD, MSc, BSc (Combined Hons), (IFE), MIEEE, PMACM, MSAICSIT
Professor	A Terzoli, PhD (Laurea in Physics) Pavia University, Italy
Senior Lecturer	P Mudali, PhD (Computer Science), MSc (Computer Science) BScHons (Computer Science), BSc (Data Communications Technology) (UNIZULU), MIEEE, MSAICSIT
Lecturers	IN Ezeji, MSc (Computer Science) (UNIZULU), BScHons (Computer Science) (University of Calabar Nigeria), SU Mathaba, MSc, BScHons, BSc (UNIZULU) TC Shozi, MSc, BSc Hons, BSc (Computer Science) (UNIZULU) NC Sibeko, MSc (Computer Science), BScHons (Computer Science) (UNIZULU) P Tarwireyi, MSc (Computer Science) (UFH), BSc Hons (Computer Science) (Rhodes), BSc (UFH), MSAICSIT, MIITP
nGAP Lecturer	SG Zwane, MSc, BSc Hons, BSc Computer Science (UNIZULU)
Computer Literacy instructors	T Ndlovu, BScHons (Computer Science) (UNIZULU) HS Zulu, BScHons (Computer Science) (UNIZULU)
Laboratory Technologist	S Fatyi, BSc Hons (Computer Science), UNIZULU BSc (Computer Science) (UNIZULU)
Secretary	KM Enslin, BA (Health Science & Social Services) (Applied Psychology) NDip (Management Assistant) (Lower Umfolozi)

Title	**Introductory Computing**	
Code	**4CPS111**	**Department: Computer Science**
Prerequisites	None	Co-requisites: Any Mathematics module
Aim	To provide an introduction to hardware and software components of computer systems.	
Content	**Section A – Computer Architecture** Introduction to Digital logic and Digital systems; Machine level representation of data; Assembly level machine organisation **Section B – Software Development Fundamentals** Fundamental Programming concepts and Object-Oriented Programming	
Outcomes	At the end of the module, the learners should be able to: ▪ Explain the organization of the classical von Neumann machine and its major functional units. ▪ Describe the internal representation of data. ▪ Represent Boolean logic problems as: truth tables and logic circuits. ▪ Design, implement, test, and debug programs that use fundamental programming constructs such as: basic computation, simple I/O, standard conditional and iterative structures, methods, and parameter passing.	
Assessment	50% Continuous assessment) 50% final practical and theory examination	
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's	

Title	**Introduction to Programming**		
Code	**4CPS112**	**Department**	**Computer Science**
Prerequisites	None	**Co-requisites**	4CPS111
Aim	To equip students with foundational programming skills including basic data structures.		
Content	Object oriented programming using Java, UML design of Object-oriented architectures, and an introduction to dynamic data structures.		
Outcomes	▪ Demonstrate the ability to use Java constructs to build Objects and object relationships and interactions; ▪ Usage of UML language to represent core Object-oriented concepts such as encapsulation, inheritance and polymorphism; ▪ Acquire skills to use basic data structure algorithms covering array, list, stack and composite data structures based on them.		
Assessment	50% Continuous assessment) 50% final practical and theory examination		
DP Requirement	40% minimum must be scored by a student to qualify to write examination.		

Title	**Computer literacy I**		
Code	**4CPS121**	**Department**	**Computer Science**
Prerequisites	None	Co-requisites	None
Aim	This course is designed to introduce students to the personal computer. It will enable students to use the available features on an Operating System; it is also designed to instruct students in the use of Word Processors from an introductory to an advanced level.		
Content	The theory component of the course will cover the following topics: ● Structure of a computer (Components, Peripherals, Use, Type) ● The practical component of the course will cover the following topics: ● Anatomy of the Window, Control panels ● Internet and the World Wide World ● Introduction to E-mail ● File Management ● Basics of Word Processing ● Editing and Formatting ● Enhancing a document: Web and Other Resources ● Advanced Features: Outlines, Tables, Styles and Selections		
Outcomes	On completion of this course the learner should be able to: ▪ Describe components of the computer system, ▪ distinguish between system software and application Software, ▪ draw parallel between e-commerce and traditional commerce, ▪ Describe the windows desktop and change its appearance, ▪ create file and work with folder. ▪ Explain the benefits of using Word processor, ▪ gain proficiency in editing and formatting a word document, ▪ enhance a document by using the web and other useful resources, ▪ use and create advanced features.		

Assessment	50% Continuous assessment) 50% final practical and theory examination
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's

Title	**Computer literacy II**	
Code	**4CPS122**	**Department: Computer Science**
Prerequisites	None	Co-requisites: None
Aim	*AS in 4CPS011 unless this is a second* Computer Literacy course in which case the Course consists of *XLS* and *PPT.* Note the following Computer Literacy modules can be selected: [*INTRO*] Operating System skills including Basic literacy in Web and Email Services of the Internet; [*WP*]-Word Processing skills as in MS Word; [*XLS*]- Spreadsheet Skills as in Excel; [*PPT*]- Presentation Creation and Usage as in PowerPoint usage. Departments that require additional literacy courses are advised to select from one of the following service courses for non-Computer professionals.	
Content	The theory component of the course will cover the following topics: ▪ Structure of a computer (Components, Peripherals, Use, Type) ▪ The practical component of the course will cover the following topics: ▪ Anatomy of the Window, Control panels ▪ Internet and the World Wide World ▪ Introduction to E-mail ▪ File Management ▪ Introduction to Microsoft Word ▪ Editing and Formatting ▪ Enhancing a document: Web and Other Resources ▪ Advanced Features: Outlines, Tables, Styles and Selections	
Outcomes	On completion of this course the learner should be able to: Describe components of the computer system, distinguish between system software and application Software, draw parallels between e-commerce and traditional commerce, Describe the windows desktop and change its appearance, create files and work with folders. Explain the benefits of using Word processor, gain proficiency in editing and formatting a word document, enhance a document by using the web and other useful resources, use and create advanced features	
Assessment	50% Continuous assessment) 50% final practical and theory examination	
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical sessions	

Title	**Data Structures and Algorithms**		
Code	**4CPS211**	**Department: Computer Science**	
Prerequisites	4CPS111	**Co-requisites**	4CPS112
Aim	The main aim of this course is to provide an introduction to algorithms and data structures. The secondary aim is to improve the students programming skills.		
Content	● Basic Analysis techniques ● Strategies for studying Efficiency and complexity of algorithms ● Data structures covered include but not limited to Lists, Stacks, Queues, Graphs, and Binary trees.		

	● Algorithms covered include search and sorting algorithms such as, Sequential and Binary Search, Insertion Sort and Selection Sort, Heap Sort and Quick Sort, Merge Sort.
Outcomes	On completion of this module the learner should be able to: ▪ demonstrate an understanding of abstract data types ▪ Implement lists, stacks and queues as both arrays and linked lists. And be able to use classes from the Java Collections class ▪ identify the most appropriate algorithms and data structures for a range of situations ▪ understand the concepts of algorithm and data structure efficiency in terms of time/space complexity ▪ be able to implement the various commonly occurring algorithms and data structures ▪ analyse algorithms and estimate their worst-case and average-case behaviour
Assessment	50% Continuous assessment) 50% final practical and theory examination
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Computer Architecture and Assemblers**	
Code	**4CPS221**	**Department** **Computer Science**
Prerequisites	4CPS111	Co-requisites
Aim	The aim of this course is to provide an computer architecture and assemblers.	
Content	● Introduction to Computer structure and Machine Language; ● Addressing techniques: indexing; indirect, absolute and relative addressing; Macros; File input/output; ● Assembly language; Macro and Conditional Assembly, ● Simple and Complex Data Structures; Disk-File Processing, Interrupt Handling.	
Outcomes	On completion of this module the learner should be able to : ▪ Describe the main components of computer systems that define its architecture (CPU, storage, memory, instruction sets, and addressing modes. ▪ Discuss the way the main components of computers are interconnected. ▪ Recognize assembly language syntax while reading and analyzing assembly language programs. ▪ Design, develop and test programs using Assembly Language commands while featuring various basic Assembly Language operations. ▪ Design, develop and test programs using Assembly Language .	
Assessment	50% Continuous assessment) 50% final practical and theory examination	
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical's	

Title	**Computer Communications and Networks**		
Code	**4CPS231**	**Department**	**Computer Science**
Prerequisites	4CPS111	Co-requisites	

Aim	To provide the student with the fundamental principles and techniques of data communication, LANs and WANs, TCP/IP protocol architecture and wireless network architectures.
Content	Data Communication: Signals, Digital and analogue transmission, Multiplexing, Error control; Networks: Switching principles, LAN, MAN, WAN; TCP/IP: Network layer addressing and routing, Network layer protocols, Transport layer protocols, Application layer services; Wireless communication: Principles, Wireless LAN systems, Cellular telephony, Microwave and Satellite networks.
Outcomes	On completion of this module the learner should be able to: ▪ describe the mechanisms and associated data communication protocols. ▪ explain the basic principles underlying the functioning of the Internet ▪ describe the current wireless technologies employed in networking.
Assessment	50% Continuous assessment) 50% final practical and theory examination
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Introductory Software Engineering**		
Code	**4CPS212**	**Department**	**Computer Science**
Prerequisites	4CPS112,	**Co-requisites**	4CPS211
Aim	The aim of this course is to provide an introduction to the basic principles of Software Engineering		
Content	**Section A – Software Engineering** Introduction to the Software Problem; Software Process; Planning a Software Project; Software Architecture; Design; Coding and Unit Testing; Testing **Section B – Platform-based Development** Introduction to Android Apps; Styling a website for Android; Advanced Styling; Native Android App Development		
Outcomes	▪ Express the Software Development Lifecycle ▪ Learn the basics of Android App Development ▪ Application of the Software Development Lifecycle whilst developing an Android App		
Assessment	Students are required to submit two practical projects (an Individual and a Group project). A theory examination is also required		
DP Requirement	An average mark greater than 40% for all submitted Assignments and Projects		

Title	**Database and Information Management I**		
Code	**4CPS232**	**Department**	**Computer Science**
Prerequisites	4CPS111	Co-requisites	
Aim	The aim of this course is to provide an introduction to databases and information management.		
Content	● Introduction to databases and Relational databases, ● Database Design: techniques and models, conceptual design, logical design and normalization. ● relational algebra and calculus, and SQL		
Outcomes	On completion of this module the learner should be able to:		

	▪ demonstrate an understanding of basic concepts of database systems. ▪ demonstrate an understanding of the basics of SQL, construct queries using SQL, and be able to write relational algebra expressions for queries. ▪ use sound design principles to perform logical design of databases, including the E-R method and normalization approach. ▪ demonstrate familiarity with the basic issues of transaction processing and concurrency control.
Assessment	50% Continuous assessment) 50% final practical and theory examination)
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Visual Application Development**		
Code	**4CPS242**	**Department**	**Computer Science**
Prerequisites	4CPS111	Co-requisites	
Aim	To introduce learners to how to program in Visual Basic as well as the fundamentals of visual applications development.		
Content	Introduction to Visual Basic 2005 IDE, Introduction to classes and objects, Control statements (If/Then/Else, While, Do While/Loop, Do Until/Loop, For/Next, Do/Loop While, Do/Loop Until, Exit, Continue, Nest control statements), Methods, Arrays, Object-oriented programming: Inheritance and Polymorphism, Exception handling, Graphical user interface concepts (Event handling, Labels, Textboxes, Buttons, Picture boxes, Menus and List Box, Checked List Box, Combo Box controls), Multithreading, Strings, Characters, Regular expressions, Files and Streams		
Outcomes	▪ Differentiate a console and visual program, ▪ Learn to write console and visual programs in Visual Basic, ▪ Learn control statements, ▪ Know how the concepts of classes and objects work in VB, ▪ Be able to handle exceptions, ▪ Learn using visual controls in VB, ▪ Learn how multithreading is achieved, ▪ Be able to manipulate strings, characters and regular expressions, ▪ Know how to handle files and streams in programs.		
Assessment	2 x 2h00 theory interim assessments, 1X3h00 practical interim assessment, 1 x 1 group practical assignment, and 1 x 4h00 summative assessment which involves theory and practical		
DP Requirement	This module consists of theory and practical components. The practical component contributes 50% to the overall assessment. To pass the module, a sub-minimum of 40% in both the practical and theory components is mandatory.		

Title	**Advanced Programming Techniques**		
Code	**4CPS311**	**Department**	**Computer Science**
Prerequisites	**4CPS211 OR 4CPS212**	**Co-requisites**	**4CPS211**
Aim	To help students inculcate emerging professional practices beyond object orientation with clear emphasis on enterprise development technologies.		
Content	● Articulate and apply principles of engineering reusability: simplicity, safety from bugs, ease of understanding, and readiness for change. ● Solid grasp of, and ability to apply, key software engineering ideas, including interfaces, representation invariance, specifications, invariants, data abstraction, design patterns, and unit testing. ● Design, implement, and test a small- to medium-scale software system (thousands of lines of code, multiple modules). ● Experience developing software collaboratively in a team. ● Use modern programming tools (e.g. Eclipse, Subversion, JUnit) and modern programming technologies (e.g. I/O, regular expressions, network sockets, threads, GUIs).		
Outcomes	▪ Gain mastery in the usage of core patterns in typical frameworks; ▪ Use pattern knowledge to understand typical framework for enterprise software development; ▪ Engage with tools for Enterprise Systems Development.		
Assessment	50% Continuous assessment) 50% final practical and theory examination		
DP Requirement	40% minimum must be scored by a student to qualify to write examination.		

Title	**Systems Programming (OS and Compilers)**		
Code	**4CPS321**	**Department**	**Computer Science**
Prerequisites	4CPS212	**Co-requisites**	
Aim	To introduce the concepts of programming the computer at the system level with particular emphasis on operating systems and formal language recognizer's		
Content	**Section A – Foundational Concepts** Introduction to Assembly Language; Assembling; Linking and Running Assembly Language programs; **Section B – Operating Systems Principles** Process and thread management, Device management, Memory management, File systems, and Input/output and concurrency principles.		
Outcomes	▪ Learn to program in Assembly Language ▪ Learn to program in C ▪ Develop a compiler for a subset of C		
Assessment	Students are required to submit three programming projects. A theory examination is also required.		
DP Requirement	An average mark greater than 40% for all submitted Assignments and Projects		

Title	**Database and Information Management II**		
Code	**4CPS331**	**Department**	**Computer Science**
Prerequisites	4CPS231	Co-requisites	
Aim	The aim of this course is to introduce to learners the current trends in database technologies.		
Content	Introduction to Client/Server systems and Object-Oriented database models.		

	Transaction Management, concurrency control and performance tuning. Distributed Database Management; Data Warehouse : DSS architecture, OLAP and star schemas; Database connectivity and Web development
Outcomes	On completion of this module the learner should be able to: ▪ Understand client/server architecture; ▪ Understand OO principles: objects, OID, messages, protocols, inheritance, object schemas including instance representations. ▪ Describe a transaction according to its properties. ▪ Understand concurrency control with respect to the three anomalies: lost update, uncommitted data and inconsistent retrieval. ▪ Describe locking-, time stamping- and optimistic methods and recovery management. -understand performance-tuning concepts, SQL processing by DBMS, and introduction to DBMS tuning for optimal performance. ▪ Describe the components of a DDBMS, data- and process distribution and data fragmentation. Introduction to the concepts of data warehousing. ▪ To understand the different connectivity types and Web to database middleware.
Assessment	50% Continuous assessment) 50% final practical and theory examination
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practicals

Title	**Distributed Systems Development**		
Code	**4CPS312**	**Department**	**Computer Science**
Prerequisites	4CS321	Co-requisites	
Aim	To provide an introduction to design and implementation of distributed systems, building on some concepts from Operating systems		
Content	**Distributed Systems principles**: System Architectures, Networking and internetworking; Communication, Distributed processes, Naming, **Transactions and Concurrency Control, Security** **Distributed Systems Paradigms**: Distributed Object-based Systems, Distributed web-based systems **Practical**: Elementary database design and implementation, Enterprise Java Beans for development distributed object based systems, **Apache CXF/Axis and Apache Tomcat for development of web services**		
Outcomes	By the end of this unit the learner should be able to: ▪ Characterise and explain, the following concepts in distributed systems o System Architectures. o Networking and internetworking o Communication. o Distributed Process Management o Naming o Transactions and Concurrency Control o Security ▪ Explain how the principles understood in outcome (1) are used in the following paradigms: o Distributed Object-based Systems o Distributed Web-based Systems ▪ Develop some distributed web-based and object-based systems.		
Assessment	50% Continuous assessment) 50% final practical and theory examination		

DP Requirement	To sit for the final examination a student must have an average of at least 40% on interim assessments. To pass the course a student should have scored above a sub-minimum of 40% in the final examination.

Title	**Final Year Project**		
Code	**4CPS322**	**Department**	**Computer Science**
Prerequisites	4CPS212/4CPS242	**Co-requisites**	(4CPS311, 4CPS321) or (4CPS232, 4CPS331)
Aim	To enable students demonstrate what they have learnt in a small-sized but significant real-life type individual software development project.		
Content	The student is allocated a supervisor who guides the student to select a non-trivial project latest by the end of Semester 1. Student must prepare a plan, and follow the plan in design and development of the semester long project.		
Outcomes	▪ Software project development plan; ▪ Software design document; ▪ Software implementation code; and ▪ Project report.		
Assessment	The project development plan must be ready at the end of Semester one. Plan is graded by an assessor different from the supervisor [25%]. Design Document must also be approved prior to implementation [25%]. Software Implementation with Code Demo in addition to Project report must be assessed by two assessors other than the supervisors [50%]. Final Mark is an average of supervisor's plus other assessors' marks for each of the three outcomes.		
DP Requirement	A sub-minimum of 40 is required from Plan plus Design assessments to pass the module.		

Title	**Client / Server Computing**		
Code	**4CPS332**	**Department**	**Computer Science**
Prerequisites	4CPS112 or 4CPS242	Co-requisites	
Aim	To introduce the concepts of client/server programming by learning how to access documents/information on web servers from a web client.		
Content	Basics of web site development, Introduction to basic (X)HTML tags, Web Layout with tables and Frames, Page formatting with CSS, Dynamic web sites with client-side scripting -JavaScript. Images on the Web – GIF, JPEG, PNG. Web Animations – GIF animations, Macromedia Flash, Jave Applets. Multimedia on the web – adding audio and video. Server-side scripting languages – Perl, PHP, JSP, ASP, Servlet. Databases on the web – MySQL server.		
Outcomes	▪ Learn the basics of web site development; ▪ Know the basic protocol for accessing information on a web server; be able to write scripts to control the behaviour of web pages; ▪ learn to develop simple web database application.		
Assessment	50% Continuous assessment) 50% final practical and theory examination		
DP Requirement	This module consists of theory and practical components. The practical component contributes 50% to the overall assessment. To pass the module, a sub-minimum of 40% in both the practical and theory components is mandatory.		

Department of Consumer Science

STAFF

Associate Professors	U Kolanisi, B (Human Ecology) (UWC), M (Consumer Science), PhD (North West PUK)
	CJ du Preez, B (Home Economics) (Stell), HDE (UNISA), MSc, PhD (Wageningen Univ Netherlands)
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	NK Ndwandwe, B (Home Economics) (UNIZULU), Dip (Information Tech) (Working World), M (Consumer Science) (NWU), PhD (UKZN)
	NC Shongwe, BSc (Home Economics) (UNISWA), BSc (Agric Food Science) Hons, MSc (Agriculture) (Food Science) (UFS)
	K Palmer, NDip (Consumer Science: Food & Nutrition) BTech (Consumer Science: Food & Nutrition), MS (Food & Nutrition) (DUT)
	J Benadé, BSc (Home Economics) (UFS), B (Home Economics), Hons (UNIZULU)
	AS Sibisi, NDip (Consumer Science: Food & Nutrition) BTech (Consumer Science: Food & Nutrition), MappSci (Food & Nutrition) (DUT)
Secretary	N Nxele Dip (Office Admin) (Varsity College)
	Vacant (RB campus)
Laboratory Technician	N Ngwane, NDip (Consumer Science: Food & Nutrition) BTech (Consumer Science: Food & Nutrition) (DUT)
	P Kupiso, Food & Nutrition) BTech (Consumer Science: Food & Nutrition), MS (Food & Nutrition) (DUT)
Laboratory Assistant/Chef	S Chiya, NDip (Food & Beverage Management), BTech (Consumer Science: Food & Nutrition) (DUT).

FOOD SERVICES

Title	**Basic food preparation/Culinary studies**			
Code	**4CFD112**		**Department**	**Consumer Sciences**
Prerequisites	None	Co-requisites	4CFH112	
Aim	This course aims at providing learners with a knowledge and understanding of the safe and correct use of kitchen equipment, basic workplace skills and the principals involved in various cooking methods used in the preparation of food for the hospitality industry.			
Content	● Introduction to the catering and hospitality industry. ● Measuring techniques: SI metric system, Measuring equipment. ● Recipe conversions. Vocabulary of cooking. ● Small scale kitchen equipment and use. ● Methods of heat transfer. ● Principles of various cooking methods: boiling, poaching, steaming, stewing, braising, baking, roasting, grilling, deep frying and shallow frying. ● Regeneration of pre-prepared food. ● Cold food preparation.			

Outcomes	▪ An understanding of the terms 'hospitality' and 'catering'. ▪ A sound base of vocabulary used in the hospitality industry. ▪ The ability to convert recipes using the SI system. ▪ Skills in using measuring equipment and the ability to apply these skills in practical cooking. Knowledge of the various sectors and different types of operations in the industry. ▪ A sound foundation of high quality skills and the ability to apply these skills across a range of processes and commodities. ▪ Identify the correct tools and equipment to utilize during the production and presentation of prepared foods. ▪ The ability to identify, interpret and describe various methods of heat transfer used in the preparation of food. ▪ A comprehension of various cooking methods and the ability to relate this knowledge in practical applications. ▪ An understanding of the different types of foods and the use of regenerated and pre-prepared foods in the preparation of meals ▪ Be competent at preparing and cooking a range of dishes using various cooking methods. The ability to work effectively in a team. ▪ Demonstrate a sound understanding of food safety in storing, preparing and cooking food.
Assessment	Formative: 50% Summative: Final examination 50%
DP Requirement	40% Continuous Assessment Mark 80 % attendance of lectures/practical.

Title	**Meal Planning and Management**		
Code	**4CFD211**	**Department**	**Consumer Sciences**
Prerequisite	4CFS112 or 4CFD112 AND 4CFH112	Co-requisites	None
Aim	To provide the student with the ability & skills to plan, manage, prepare and evaluate nutritious meals for different groups of people who have differing needs & requirements. This is an applied module that uses acquired knowledge on basic principles of food cookery & handling as well as applying the systems approach to foodservice.		
Content	Goals and principles of meal planning and management for food production for the household and institutional food service delivery. History of the foodservice industry. The systems approach to foodservice; sanitation and safety in the foodservice; Practical's: Food production management in teams. Menu planning; recipe standardization; planning of purchasing; food preparation and service.		
Outcomes	**Theory**: On completion of this module the student will be able to: ▪ Compile and plan diets and meals by applying the goals of meal management for families or institutions. ▪ Identify the food needs of different groups and plan menus accordingly ▪ Classify the different types of menus that can be found ▪ Describe and plan the various styles of service depending on the situation ▪ Plan special meals for different functions with a diverse group of people ▪ Apply the systems concept to the functioning of the foodservice unit		

	Practical: On completion the students will be able to: ▪ Compile menus & meals according to the needs of the different people. ▪ Write the menus according to a set format ▪ Demonstrate the skills of management of available resources and their working environment during meal preparation. ▪ Food production management in teams. ▪ Menu planning; recipe standardization; planning of purchasing; food preparation and service.
Assessment	Formative: Assignments, tutorials, presentations and class tests (50%), Summative: Final examination (3 hours) (50%) 40% subminimum in all assessments
DP Requirement	40% continuous assessment mark 80% attendance at lectures and practical's/tutorials

Title	**Quantity food production**		
Code	**4CFD212**	**Department**	**Consumer Sciences**
Prerequisite	4CFD112/4CFS112	Co-requisite	4CFD211
Aim	To enable the student to plan a foodservice layout and placement of equipment and to produce large quantities of food. It also entails the application of management principles in the foodservice unit.		
Content	● Facilities planning and design; a study of equipment and furnishings Layout: detailed arrangement of equipment, floor space, and counter space; environmental management. Food product flow. ● Production of large quantities of food: Recipe formulation and standardization, Production forecasting, scheduling, production control. ● Review DOH manual for the planning of an institutional or health facility foodservice unit ● Assembly and distribution of meals, meal costing. Baking for profit ● Service styles ● Ration scales and their translation into meal plans		
Outcomes	▪ A demonstrable ability to plan a foodservice layout and design which takes into account the appropriate flow of food and products in a foodservice unit ▪ A demonstrable ability to plan nutritious appealing food combinations and menus that are customer based within a defined budget. ▪ A demonstrable ability to scale recipes for a pre-determined number of clients without compromising on quality and safety. ▪ A demonstrable ability to work within a team of foodservice workers. ▪ A demonstrable ability to manage a team of fellow students who are foodservice workers. ▪ A demonstrable ability to write a report as a foodservice manager. ▪ A demonstrable ability to translate ration scales into meal plans		
Assessment	Formative: Assignments, tutorials, presentations and class tests (50%), Summative: Final examination (3 hours) (50%)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and practical's/tutorials		

Title	**Organization and management of food services**		
Code	**4CFD222**	**Department**	**Consumer Sciences**
Prerequisite	**4CFD112**	**Co-requisite**	**None**
Aim	To give the student an understanding of the importance of the correct flow of food through the various components of a food service operation, the activities and functions of the different components and their relatedness.		
Content	● Food service models. ● Purchasing, storage, inventory records and controls. ● The movement of products (food & non-food items) through the distribution channel/ marketing channel. ● The critical points for safe receiving and storage of food products. ● The management process; Types of managers; Roles of managers. Management skills, Management functions ● Tools of management, managing quality in the foodservice ● Human resource management: Staffing, Recruitment, selection ● Labor management relations		
Outcomes	▪ Differentiate between the various food service models. ▪ Define activities conducted in purchasing, storage, inventory records and controls. ▪ Discuss the movement of products (food & non-food items) through the distribution channel/ marketing channel. ▪ Compare the different methods of purchasing, storage, inventory records and controls employed by differently sized foodservice organizations. ▪ Explain the critical points for safe receiving and storage of food products. ▪ Demonstrate an ability to manage human capital ▪ Demonstrate communication skills through oral & written presentations of reports ▪ A demonstrable ability to differentiate between the different types of managers, their role, skills and functions ▪ An understanding of the staffing process and labor relations.		
Assessment	Formative: Assignments, tutorials, presentations and class tests (50%), Summative: Final examination (3 hours) (50%) 40% subminimum in all assessments		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and practical's/tutorials		

Title	**Food and Beverage Management**		
Code	**4CFD311**	**Department**	**Consumer Sciences**
Prerequisites	4CFD212	Co-requisites	4CFD222
Aim	This course will enable the students to appraise the components of food and beverage service management in various types of food service systems. The students will learn cost and sales concepts and their relationship with profits. The student will learn how to calculate costs and profits and apply control concepts factors for food, beverage and labor control.		
Content	● Introduction to food and beverage management ● The meal experience ● Managing quality in food and beverage operations. ● Food menus and beverages lists		

	● Food and beverage control ● Financial aspects of food and beverage ● Purchasing of beverages ● Receiving, storing and issuing of beverages. ● Food and beverage service methods ● Food and beverage production control ● Food and beverage management in function, hotel and industrial catering.
Outcomes	The learner will be able to: ▪ Manage the service of food and beverage production to satisfy customer expectations. ▪ Evaluate the importance of the complete 'meal experience' ▪ Manage quality in food and beverage operations. ▪ Have knowledge of the control, purchasing, receiving, storing and issuing of beverages. ▪ Plan, cost and develop menus for a theme event. ▪ Develop contingency and organizational planning skills in the execution of both events. ▪ Demonstrate the importance of training and motivation for employees. ▪ Manage time and resources to achieve operational objectives.
Assessment	Formative: 50% Continuous Assessment Mark (practical assessments; Interim test; Assignment) Summative: 50% 3-hour exam and practical exam
DP Requirement	40% Continuous Assessment Mark 80 % attendance of lectures. 90% attendance of practical's.

Title	**Food Marketing**		
Code	**4CFD312**	**Department**	**Consumer Sciences**
Prerequisites	4CFS112, 4CNU 112, 4CNS212	Co-requisites	4CFS 211
Aim	Enable students to apply marketing principles to food in the context of consumer behaviour patterns.		
Content	● The food marketing system ● Approaches to the study of food marketing - ● Stakeholders in the food marketing chain (Functional view) ● Marketing as a value added process, agricultural production and marketing ● Consumers and food marketing, the business environment ● Marketing strategy (segmentation, targeting, positioning, the 4P's ● Food and Nutrition marketing – labelling and claims, food promotion ● Food marketing trends – wholesaling, retailing ● Behavioural view to food marketing -Food consumption and marketing, consumer choice, guidelines to marketing food to children ● Environmental and social issues in food marketing- Functional foods, genetically modified foods in the context of consumer perspective		
Outcomes	▪ Understand basic terminology related to marketing and food marketing. ▪ Demonstrate understanding of the structure of the food industry, major players and the nature of the food marketing system.		

	▪ Understand a company's marketing strategy to selected commodities/products ▪ Analyse case studies and identify environmental factors affecting the performance of a company's marketing strategy ▪ Discuss how marketing add value to farm products. ▪ Debate environmental/social issues in food marketing that affect the consumer ▪ Demonstrate the use of oral and written communication skills.
Assessment	Formative: Continuous assessment mark 50% (Class interim tests 20%; Tutorials 20%) Summative: 3-hour final exam 50% 40% subminimum in all assessments
DP Requirement	40% Continuous Assessment Mark 80% Attendance lectures, tutorials and fieldwork

FOOD SAFETY

Title	**Food Safety and Hygiene**			
Module Code	**4CFH112**	**Department**		**Consumer Sciences**
Prerequisites	None		Co-requisites	None
Aim/purpose	This course seeks to provide students with a knowledge and understanding of the basic principles and procedures for achieving and maintaining high sanitation and safety standards in the hospitality industry.			
Content	● Food Safety for catering ● Food, personal and equipment hygiene. ● Food hygiene legislation. ● Safe food preparation and storage. ● Health and safety practices. ● Bacteria and food poisoning. ● Food borne illness. ● Cleaning and disinfection. ● Kitchen pests, Sanitation and waste disposal. ● HACCP.			
Outcomes	▪ An understanding of his/her responsibility for personal cleanliness during food preparation and cooking in the workplace. ▪ The ability to identify and describe correct food storage, storage control, stock rotation system and record keeping. ▪ The knowledge to differentiate between food spoilage and food poisoning. ▪ The ability to differentiate between various organisms causing food spoilage and food poisoning. ▪ An understanding of factors that encourages the growth of microorganisms. ▪ Comprehension of factors causing the death of microorganisms. ▪ The ability to classify cleaning and disinfecting agents as used in the hospitality industry. ▪ Knowledge of kitchen pests. ▪ Knowledge of sanitation and waste disposal in the hospitality industry. ▪ Comprehension of HACCP in the workplace. ▪ Knowledge of food hygiene legislation. ▪ Knowledge of illness caused by bacteria, toxins, protozoa, viruses and parasitic worms.			

	▪ An understanding of the importance of following health and safety procedures in the workplace. ▪ The ability to describe the types and use of safety signs and the types of hazards and incidents that require reporting.
Assessment	Formative: 50% Continuous Assessment Mark Summative: 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment. Mark 80% Attendance at theory and practical's.

FOOD SCIENCE

Title	**Introduction to Food Science**		
Module Code	**4CFS112**	**Department**	**Consumer Science**
Prerequisites	None	Co-requisites	4CFH112
Aim/Purpose	To expose students to scientific principles directly applied to changes in foods during preparation using basic concepts from chemistry, physics, biology and microbiology. To examine the behaviour of basic constituents common to food products and relate the behaviour to the structure and properties of different foods.		
Content	● Measuring techniques in food preparation and experimentation. ● Heat transfer methods and cooking methods. ● Colloid chemistry and application to food systems. Classification, physical, chemical properties/ reactions of food constituents water, cereals and carbohydrates, proteins- eggs, milk meat, poultry seafood, lipids, fruits and vegetables as subject to various treatments – heat, cold, chemicals. ● Vegetable protein – soy, soy processing products, nutritive value. ● Gelatin experiments and preparation. ● Food evaluation – objective and sensory methods.		
Outcomes	▪ Explain basic concepts relating to the chemical and physical properties of water, carbohydrates, proteins, fats, fruit and vegetables. ▪ Explain the basis of heat transfer methods. ▪ Analyse and compare the effects of various preparation methods on the chemical properties of cereals, starches, proteins, fruits and vegetables through experimental methods. ▪ Identify and appropriately interpret information in evaluating prepared food products through sensory methods. ▪ Engage in recipe analysis ▪ Demonstrate communication skills in written experimental form.		
Assessment	Formative: 50% Continuous Assessment Mark Summative: Final examination, 3 hrs. final exam (50%)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures, practical's and fieldwork		

Title	**Food Processing Technologies**			
Code	**4CFS211**	**Department**		**Consumer Sciences**
Prerequisites	4CFH112, 4CFS112		Co-requisites	None
Aim	The aim of this course is to introduce students to the principles of conventional food preservation methods and industrial technologies applied by the food industry.			
Content	● Review of causes of food spoilage, the plant cell. Unit operations in food processing. Equipment studies. ● Review microbial growth, Principles of food preservation			

	● Thermodynamics and thermal properties of food (D,Z F values). Use of high temperatures pasteurization, UHT treatment, sterilization. High temperature processing methods- canning ● Low temperature methods – Refrigeration, Chilling, Freezing ● Food Dehydration - control of water activity – drying fruit and vegetables, concentration. Preservatives: sugar, acid, curing agents (jam making, pickling, curing, processed meat products - sausages) ● Introduction to fermented foods– LAB and mycotoxins of Fusarium. Fermented traditional foods in South Africa. ● Food packaging technologies – principles, aseptic packaging, vacuum packaging, modified atmosphere packaging, recent innovative packaging ● Irradiation, high pressure processing, ● Additives, Food labeling, HACCP, ISO 9001/current quality systems
Outcomes	▪ Explain the principles behind each of the preservation methods. ▪ Evaluate effectiveness of each of the various methods in achieving microbial safety, nutritional quality and economic advantages ▪ Assess the appropriate methods and equipment of preserving selected food types. ▪ Engage in experimental preservation of selected food types. ▪ Apply the principles of HACCP in the processing and production of selected foods e.g. yoghurt, cottage cheese, processed meat, fruit leathers, fruit and/vegetable juices, chutneys through laboratory practical's.
Assessment	Formative: 50% Continuous Assessment Mark Summative: 50% Formal end of module exam (3 hours) 40% subminimum in all assessments
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures, practical's and fieldtrips.

Title	**Food Product Development**		
Code	**4CFS311**	**Department**	**Consumer Sciences**
Prerequisite	4CFS112, 4CFS211	Co-requisite	4CFD312 (EXPOSURE)
Aim	The aim of this course is to give students a problem-based interdisciplinary capstone learning experience designed to enhance career skills (critical thinking, decision making, team work, communication etc.) in the context of food industry's approach to developing new and improved food products.		
Content	● Overview, processes and stages of food product development ● Standardization and Formulation of recipes: ● Recipe development, ingredients formulation and concept idealization. ● Review of chemical, physical properties and functions of ingredients in product development, recipe development and food preparation. ● Sensory Evaluation: Definitions, test types and Application ● Techniques used to measure food sensory aspects ● Product development in laboratory ● Sensory Analysis, Shelf life and food stability of developed products		

	● Product Performance testing: Consumer taste panels, acceptance of product ● Product Marketing ● Role of HACCP in Food Product Development
Outcomes	▪ The knowledge on application of food product development techniques ▪ The ability to develop a novel food product from initial stages through trials and shelf life evaluation. ▪ Understand the processes and unit operations in food processing as demonstrated both conceptually and in practical laboratory settings. ▪ Understand the recipe standardization unit operations required to produce a given food product. ▪ Understand the principles and current practices of processing techniques and the effects of processing parameters on product quality. ▪ Understand the properties and uses of various packaging materials. ▪ Be able to apply and incorporate the principles of food science in practical, real-world situations and problems. ▪ Understand the basic principles of sensory analysis. ▪ Be aware of current topics of importance to the food industry ▪ Demonstrate time management, handling multiple tasks and teamwork skills. ▪ Demonstrate oral and written communication skills. This includes writing technical reports, letters and memos; communicating technical information to a non-technical audience and technical; and formal & informal presentations.
Assessment	Formative: Assignments, tutorials, presentations and class tests (50%), Summative: Final examination (3 hours) (50%)
DP Requirement	40 % Continuous Assessment Mark 80 % attendance at lectures, tutorials/practical's

INTERIOR & HOUSING

Title	**Principles of design and interiors**		
Code	**4CHC212**	**Department**	**Consumer Sciences**
Prerequisites	None	Co-requisites	None
Aim	To provide students with knowledge and understanding of art elements and principles as applied in interior planning; selection, use and maintenance of materials used in interior planning; and planning of interior spaces.		
Content	● Steps in the design process and different types of design. ● Design elements (e.g. line, space, shape and form, colour, texture) and design principles (e.g. balance, rhythm, emphasis, proportion, harmony, unity) and its application in interior design. ● Environmental issues, including energy conservation and efficiency in the home; Technical requirements, including plumbing, heating, ventilation, electrical, acoustical, safety and security. ● Interior components e.g. walls and ceilings, floors and stairways, windows and doors, and lighting. ● Characteristics, selection and maintenance of floor, wall and window treatments, and lighting; Introduction to ergonomics ● Planning of social, work and private spaces; Floor plan		

	selection and evaluation.
Outcomes	▪ Describe and apply the steps in the design process and distinguish between different types of design. ▪ Display knowledge of art elements and principles and be able to apply both in interior planning. ▪ Understand the importance and demonstrate knowledge of environmental issues and technical requirements when designing or purchasing a home. ▪ Demonstrate knowledge of the materials used in construction of a home. ▪ Describe and select appropriate materials for use in the home. ▪ Explain the criteria for placement of walls, windows, doors and lighting. ▪ Describe various aspects and select floor, wall and window treatments, and lighting. ▪ Demonstrate skills in problem solving as applied in the design process. ▪ Demonstrate awareness considering ergonomics the design process. ▪ Apply knowledge in planning of social, private and work spaces. ▪ Evaluate a various aspects of different floor plans.
Assessment	Formative: Continuous assessment, 50% (class tests, assignments and reports, and oral and visual/poster presentations) Summative: 3-hour final examination, 50% 40% subminimum in all assessments
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's/tutorials

Title	**Housing Education and Environment**		
Code	**4CHC312**	**Department**	**Consumer Sciences**
Prerequisite	4CNS211	Co-requisite	None
Aim	To provide students with an in-depth knowledge of human needs in housing focusing on the ecological, socio-psychological and the cultural aspects. Students will gain insight into housing policy and practice, housing delivery strategies in South Africa, housing legislation and finance for housing and review topical issues surrounding delivery such as densification and community participation in housing provision		
Content	Definition of concepts, housing in human perspective, evaluation of housing choices; housing policy pre- and post-1994 and policy formulation at local government level; housing legislation and finance; community participation in housing; evaluation of housing choices and decision making processes; various forms of housing and types of home ownership; costs and procedures involved in buying a home.		
Outcomes	▪ Develop an understanding of concepts related to housing. ▪ Understand housing as a basic human need. ▪ Examine the theoretical frameworks central to housing. ▪ Policy formulation at local government level. ▪ Understand the various Housing Acts/Legislations ▪ Critically evaluate the different subsidy instruments used to address housing challenges in South Africa. ▪ Understand the impact of HIV/AIDS on a household's ability to obtain and maintain accommodation. ▪ Understand housing as an environmental issue. ▪ Gain insight into various tenure options and housing forms. ▪ Develop research and report writing skills		

	▪ Communicate effectively, orally and in written form.
Assessment	Formative: 50% Class tests; assignments; portfolio, oral/poster presentations, case studies Summative: 50% 3-hour final examination 40% subminimum in all assessments
DP Requirement	40% continuous assessment mark 80% Attendance of lectures, tutorials/practical's

HOSPITALITY			
Title	**Introduction To Hospitality Management**		
Code	**4CHT111**	**Department**	**Consumer Sciences**
Prerequisite	None	Co-requisite	None
Aim	To provide students with an overview of hospitality services and expectations of the industry in provision of quality service.		
Content	● Hospitality services and link with tourism. ● Hotel business development and classification. ● General introduction to food and beverage services and current trends. Restaurant business and classification, restaurant operation. ● Accommodation management: Hotel and rooms division operation, identification, description and rating of accommodation establishments. ● Regulations and guidelines on housekeeping equipment, materials and their selection and maintenance. ● Housekeeping staffing and responsibilities.		
Outcomes	▪ Explain the different facets of the hospitality industry and link with Tourism ▪ Explain concepts associated with hospitality services, with emphasis on accommodation and housekeeping. ▪ Understand the importance/relevance of other subject matter areas such as interior design, cultural knowledge and understanding, and human resource management skills, to hospitality services ▪ Identify the important role of service in the hospitality industry ▪ Incorporate tourism aspects into hospitality services ▪ Identify and describe the various departments associated with rooms division ▪ Describe the maintenance and cleaning of furniture, surfaces and supplies. ▪ Describe various positions within the establishment and explain procedures to be followed in the recruitment, interviewing and training of staff. ▪ Explain how to market an establishment and deliver continuous guest satisfaction. ▪ Have knowledge on the planning and managing of a guesthouse.		
Assessment	Formative assessment: 50% (Class tests, portfolio, practical assignments, field visits reports, oral presentation & group work.). Summative assessment: 3 hour final examination=50%, subminimum of 40%		
DP Requirement	40% Continuous assessment mark 80% Attendance at lectures, practical's, tutorials		

Title	Experiential Learning in Hospitality		
Code	**4CHT319**	**Department**	**Consumer Science**
Prerequisites	4CFD212	Co-requisites	4CFD311, 4CHT322, 4CHT332
Aim	Enable students to apply and relate various content areas of hospitality and tourism to relevant occupational experiences.		
Content	● Critique a food service unit layout, menu planning. ● Engage/ observe the planning and management of accommodation establishments. ● Analysis and evaluation of various lodging operations ● Evaluate purchasing, receiving and storage inventory, work in food production and service unit. ● Participate/observe various elements of effective front office management with emphasis on administrative skills, systems and documentation. ● Observe/practice the use of software package for front office operations.		
Outcomes	▪ Demonstrate understanding of the agency's organizational structure, means of operation, rules and procedures. ▪ Demonstrate the ability to work in a team. ▪ Acquire organizational and coordinating skills. ▪ Demonstrate the use of oral and written communication skills.		
Assessment	Fieldwork preparation workshops 25% Field experience: Work integrated learning report 50% Oral assessment 25% 40% subminimum in all assessments		
DP Requirement	80% Attendance of fieldwork preparation workshops.		

Title	Hospitality Service Operations		
Code	**4CHT322**	**Department**	**Consumer Sciences**
Prerequisite	4CHT111	Co-requisite	4CHT319, 4CFD222, ARTO221, ARTO222
Aim	An study of the development, marketing and management of accommodation and food service operations, with emphasis on identifying opportunities and developing ideas for establishing a guesthouse/B&B and a food and beverage service operation.		
Content	● The following as applied to accommodation and food service operations: ● Planning, establishing, marketing and operating, ● Developing a service culture and dealing with guests, ● Front-of-the-house and back-of-the-house operations, ● Staffing – job descriptions, selection and training, ● Cultural uniqueness; Services rendered by establishments, e.g. events ● Meeting hospitality industry requirements; Ensuring health, hygiene and safety, ● General, financial and human resource management, ● Exterior and interior planning and selection and maintenance of finishes, furniture, equipment and accessories,		

	● Entrepreneurship: Planning, establishing, marketing and operating a guesthouse/B&B and a restaurant/other food service operation.
Outcomes	▪ Understand the importance/relevance of other subject matter, such as interior design, cultural knowledge and understanding, financial management, etc. to hospitality services; ▪ Explain how to plan, establish, market and operate an establishment; Identify the important role of service in the hospitality industry and explain how to deal with guests and provide outstanding service. ▪ Identify and describe front-of-the-house and back-of-the-house operations. ▪ Explain how to achieve cultural uniqueness while meeting requirements. ▪ Describe various positions within the establishment and explain procedures to be followed in the recruitment, interviewing and training of staff. ▪ Describe the maintenance and cleaning of furniture and surfaces. ▪ Demonstrate knowledge of general, financial and human resource management. ▪ Display the ability to apply knowledge on principles of exterior and interior planning and selection and maintenance of finishes, furniture, equipment and accessories ▪ Apply knowledge in the development of a plan for the establishing, marketing and operating of an accommodation and food service establishment
Assessment	Formative: Continuous assessment, 50% (tests, assignments and presentations) Summative: 3-hour final examination, 50% 40% subminimum in all assessments
DP Requirement	40% Continuous assessment mark 80% Attendance at lectures, practical's/tutorials

INTERNSHIPS			
Title	**Internship for Extension and Rural Development**		
Code	**SCIN419**	**Department**	**Consumer Science**
Prerequisites	ADEV211, ADEV222, 4AAE211	Co-requisites	4CNS312,4CRM311
Aim	Enable students to apply and relate various content areas of rural development to relevant occupational experiences.		
Content	● Community needs assessment, planning for appropriate interventions, meeting basic needs of the vulnerable. ● Identify and assess resources of families, communities and those of the agency and make effective use of these to promote the welfare of the community. ● Apply consumer science principles from the various content areas in providing education to families and communities ● Understand and work with community leadership and other community structures. Management of community projects from planning, implementation, monitoring and evaluation, community work roles and skills. ● Participate in community based income generation projects. ● Participate in a team with the community to develop appropriate techniques and tools in relation to food, clothing, housing.		

	● Provide consumer education to various audiences in the community. ● Plan and participate in awareness campaigns e.g. Identify a specific community group or project and propose a skills development related intervention.
Outcomes	▪ Demonstrate understanding of the agency's organizational structure, means of operation, rules and procedures. ▪ Demonstrate the ability to work in a team. ▪ Acquire organizational and coordinating skills. ▪ Profile a community. ▪ Demonstrate the use of oral and written communication skills.
Assessment	Fieldwork preparation workshops 20% Field experience Work integrated learning report 60% Oral assessment 20% 40% subminimum in all assessments
DP Requirement	80% Attendance of fieldwork preparation workshops.

CONSUMER SCIENCE				
Title	**Household And Consumer Studies**			
Module Code	**4CNS111**	**Department**	**CONSUMER SCIENCES**	
Prerequisites	None	Co-requisites		None
Aim/Purpose	To provide basic understanding of the profession and the mission statement of Consumer Sciences; and relevant theoretical perspectives and to develop critical thinking; analytical and problem-solving skills			
Content	● Definition of concepts; the mission of consumer studies; careers and areas of study in Consumer Sciences. ● The concept consumer and consumer rights; an ecosystems framework and other theoretical approaches to studying the family. ● Households; family forms and structures. ● Roles and functions of the family. ● Relationships across the family life cycle. ● Social and developmental changes within the family and the profession.			
Outcomes	▪ Develop an understanding of the mission and concerns of Consumer Science ▪ Examine and explain the historical development of the profession and developmental changes through the years ▪ Identify career opportunities and recognize the interdisciplinary nature of Consumer Science ▪ Examine the theoretical frameworks central to the study of the family. ▪ Identify linkages between the family and other institutions or systems. ▪ Analyse the different family forms and structures. ▪ Illustrate the boundaries of marital, family and kinship organization. ▪ Analyse social and developmental changes within the family. ▪ Examine marital instability, family crisis, violence and coping strategies. ▪ Participate in group tasks and work cooperatively in teams ▪ Communicate effectively, orally and in written form.			
Assessment	Formative: 50% Continuous Assessment Mark Summative: 50% 3 hour final examination			
DP Requirement	Subminimum: 40% Continuous Assessment Mark			

	80% Attendance of lectures and tutorials/practical's

Title	**Household Resource Management**		
Code	**4CNS211**	**Department**	**Consumer Sciences**
Prerequisite	4CNS111	Co-requisite	None
Aim	The module seeks to provide students with a comprehensive education in household resource management which includes household/family financial management and management of community resources.		
Content	Concepts underlying household, decision making and management of resources; an analytical approach to family financial planning; the family as a producing and consuming unit including the decision-making processes and links between economic and social issues; Management of family financial resources; review of practical money skills including budgeting, credit management, savings and investments; development of a comprehensive family financial plan		
Outcomes	▪ Develop an understanding of the concepts underlying household management of resources. ▪ Review the theories of consumer and household decision making ▪ Analyse and describe the systems and management approaches through practical application ▪ Describe the relationship between needs, values, goals and standards and their influence on management. ▪ Identify household and individual needs, values, goals and standards ▪ Classify and describe characteristic of resources and identify individual and household access to resources. ▪ Demonstrate an understanding of planning and implementation of plans practically. ▪ Develop an understanding of financial planning, and importance of investments and savings. ▪ Develop research and report writing skills ▪ Communicate effectively, orally and in written form.		
Assessment	Formative: 50% continuous assessment (Class tests; assignments; oral presentations; portfolio) Summative: 50% 3-hour final examination 40% subminimum in all assessments		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's/tutorials		

Title	**Consumer and the market**		
Code	**4CNS212**	**Department**	**Consumer Sciences**
Prerequisites	None	Co-requisites	None
Aim	To introduce students to the basic concepts of marketing, consumer behavior, consumer decision making, consumer rights and responsibilities, money management and consumer education as applied in the buying of goods and services.		
Content	● Introduction to marketing – approaches and principles ● The role of the marketer – planning and research ● The market – segmentation, targeting and positioning ● Marketing mix – product, price, place and promotion ● Consumer behavior – the effect of individual and environmental factors. ● Consumer decision making – the process and its application		

	● Consumer education – an introduction to the economic system ● Consumer rights and responsibilities; Consumer problems, addressing protection ● Money management – budgeting, tax, saving, investment and credit ● Buying goods and services – buying food, shelter, clothing, transport, furniture and equipment; and acquiring professional services.
Outcomes	▪ Define concepts related to marketing, consumer behavior and education. ▪ Describe the marketing process, compare various marketing approaches and discuss the principles of marketing; Define marketing planning and explain the steps in the planning process; Define marketing research and explain how it should be done. ▪ Explain the necessity for and importance of market segmentation, describe methods of segmenting and criteria for successful segmentation. ▪ Identify and describe individual and environmental factors affecting cons. behavior. ▪ Describe steps in decision making and apply to purchasing of goods and services ▪ Demonstrate knowledge of responsible consumer practices and effective management of the consumer role. ▪ Evaluate consumer problems, needs and issues and make contributions to solve problems, meet needs and resolve issues to improve quality of life. ▪ Develop relevant material to be used in consumer education. ▪ Demonstrate the ability to make knowledgeable consumer choices relating to food, clothing, furnishings, shelter etc.
Assessment	Formative: Continuous assessment, 50% (tests, assignments and presentations) Summative: 3-hour final examination, 50% 40% subminimum in all assessments
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and practical's/tutorials

Title	**Gender, development and technology**			
Code	**4CNS312**	**Department**		**Consumer Sciences**
Prerequisite	4CNS211		Co-requisite	None
Aim	The module will introduce students to contemporary issues and theory surrounding gender planning and explore the relationship between gender development and technology. The module will examine the impact of development and technological interventions and the subsequent patterned change in the areas of division of labour and rights over resources. Focus will also be given to resource use and allocation and sustainable development			
Content	Definition of concepts such as gender, gender equality, appropriate technology, livelihood, poverty, development; gender roles, the family and household; practical and strategic gender needs, approaches to women in development; gender issues in the work environment; the gender planning process and training strategies; Women's organizations; characteristics and choice of appropriate technology; appropriate technology, Indigenous Knowledge Systems and sustainable development; rural livelihoods & diversity; poverty, development & gender; rural households & HIV/AIDS.			
Outcomes	▪ Develop an understanding of basic concepts such as gender, equality, equity etc.			

	▪ Identify gender, development and poverty topics, review literature and compile written reports; Interpret and evaluate research on gender, development and poverty ▪ Exposure to debate on gender in relation to development and technology ▪ Describe household livelihood generation, and analyse the dimensions of livelihood ▪ Understand, analyse & describe events/actions around gender, poverty& development ▪ Introduce and explore the concept appropriate technology and its impact on development and capacitation of women. ▪ Review gender dynamics and appropriate technology for empowering rural women ▪ Develop knowledge and skills in many technological areas such as designing and making equipment for food processing, storage, measuring and other form of equipment using inexpensive and locally available materials. ▪ Demonstrate knowledge and skills in the use of appropriate technology. ▪ Produce and present a completed final and practically tested product. ▪ Understand the impact of HIV/AIDS on rural household with special reference to women: demographics, socio-economic and socio-cultural. ▪ Develop research and report writing skills; Communicate effectively, orally and in writing
Assessment	Formative: 50% Class tests; assignments; portfolio, presentations Summative: 50% 3-hour final examination 40% subminimum in all assessments
DP Requirement	40% continuous assessment mark 80% Attendance of lectures and tutorials/practical's

Title	**Management of Community Programmes**				
Code	**4CNS412**	**Department**		**Consumer Science**	
Pre-requisite	4CNS211		Co-requisite		None
Aim	Develop skills in providing programmes and extension services (to include knowledge and skills transfer) for the purposes of community development. The focus is on planning and design, implementation and evaluation of such programmes. Understand and use community development principles to effectively communicate with individuals and communities.				
Content	Concepts: community, community development, rural development, extension. Understanding the community; adult education, Non- formal education and adult learning characteristics and how these are linked to community development. Principles of community development, Social, political, cultural, technological and environmental context within which community programmes are planned Design and implementation of nutrition programmes Community participation in development planning Importance of Needs assessment and strategies to determine needs. Participatory Rural Appraisal Use of groups (Vs individuals) in community development. Multisectoral approaches in programme management Principles and practices of successful nutrition programmes Planning, implementation, monitoring and evaluation of nutrition projects.				
Outcomes	It is expected that by the end of the module, the student will be able to; ▪ Discuss community development and the role of extension service ▪ Understand the social, political, cultural, technological and environmental context within which community programmes are planned ▪ Discuss and apply the principles of community development				

	▪ Understand the purpose and methods of needs assessment in programme planning ▪ Determine the project planning cycle and steps involved ▪ Use knowledge and skills learnt to plan a community programme or project of their choice ▪ Familiarise with participatory methods of reaching or interacting with communities for their own development
Assessment	Formative: Assignments, tutorials, presentations and class tests (50%); Summative: 3-hour examination (50%). 40% subminimum in all assessments
DP Requirement	40% Continuous assessment mark. 80% Attendance at lectures and practical's/tutorials

NUTRITION

Title	**Introduction to Nutrition**			
Code	**4CNU112**	**Department**		**Consumer Science**
Prerequisites	None		Co-requisites	None
Aim/Purpose	To give students an in depth understanding of: Energy, macronutrients and micronutrients and dietary standards			
Content	● A review of; Macronutrients, Energy, Micronutrients – vitamins and minerals, - description, functions, food sources and deficiencies. ● Digestion and Absorption of macronutrients and micronutrients ● Food choices, food habits, food composition, standards of nutrient intake (Dietary reference intakes (DRI's) - Estimated Average Requirements (EAR's), RDA's, Adequate intakes (AI's) and Tolerable Upper Intake Levels (UL's) and a comparison of dietary guidelines. ● Nutrient analysis tools: Use of Food composition tables, Food Quantities manual, Food exchanges.			
Outcomes	▪ Explain functions, sources and deficiency diseases related to macro-nutrients ▪ Classify micronutrients, sources, functions and deficiency diseases. Describe the sources and role of fibre in the human body. ▪ Describe influencing factors on food choices of major groups and specific cultures in South Africa. ▪ Apply standards of nutrient intake in dietary planning. Compare standards with analyzed diets. ▪ Discuss food guides in Nutrition education – food groups, food pyramid, mixed meal guide and their shortcomings, ▪ Analyse and evaluate dietary guidelines in developed and developing communities. ▪ Plan and analyze given meals using the exchanges.			
Assessment	Formative: 50% Continuous Assessment Mark Summative: 50% Final examination =3 hours			
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical and lectures			

Title	**Nutrition in the Lifecycle**		
Code	**4CNU211**	**Department**	**Consumer Sciences**
Prerequisites	4CNU112	Co-requisites	None

Aim	To introduce students to physiological changes and accompanying nutrient requirements throughout the lifecycle, prevalent nutritional problems and their management.
Content	● Review of nutrient food sources and functions ● Nutrition requirements in the lifecycle and physiological changes ● Prevalent nutrition disorders and solutions throughout the lifecycle ● Protein-energy malnutrition (PEM) ● Micro-nutrient deficiencies, nutrition and HIV/AIDS ● Over-nutrition and lifestyle diseases ● Nutrition and alcoholism ● Dietary guidelines; nutrition misinformation and food labeling and conveying of nutritional messages.
Outcomes	▪ Develop an understanding of the physiological changes that occur in infancy, childhood, adolescence, pregnancy, adulthood and old age and the nutrient requirements that accompany such changes. ▪ A demonstrable ability to plan meals to meet the nutrient requirements of all lifecycle stages. ▪ A demonstrable ability to educate about and advocate for breastfeeding; assess the nutritional status of infants and children; ability to plan meals for the alleviation of prevalent nutrition disorders such as micro-nutrient deficiencies; PEM; and other forms of under-nutrition and over-nutrition; ability to advise and plan meals for individuals with HIV/AIDS ▪ An understanding of the relationship between alcoholism and nutrition and alcohol intake and pregnancy, and how to prevent anomalies arising from each relationship. ▪ An understanding of the relationship between nutrition and dental health. ▪ Evaluate diet histories according to the prudent diet guidelines and through the use of exchanges. ▪ Distinguish between reliable sources of nutritional information and unreliable sources; Develop an ability to read and interpret food labels
Assessment	Formative: Continuous assessment, 50% (class tests, assignments and reports, and oral and visual/poster presentations) Summative: 3-hour final examination, 50% (subminimum 40%) 40% subminimum in all assessments
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and practical's/tutorials

Title	**Community Nutrition and Food Security**		
Code	**4CNU311**	**Department**	**Consumer Sciences**
Prerequisite	4CNU112	Co-requisite	None
Aim	To enable students to gain an in-depth understanding of nutrition and food security policies and programs and to identify gaps that exist between policy and implementation. The module also aims to introduce students to various methods of assessing the nutritional status of individuals and communities and nutrition intervention strategies. Students will learn to integrate food security policies into nutrition intervention programs		
Content	Community nutrition concepts and theoretical frameworks on working with communities; nutrition and food security policy evaluation; Nutrition assessment methods and intervention strategies: nutrition		

	including food supplementation and enrichment programs. Integrated Nutrition Programmes with special reference to: Food Supplementation and Fortification; Food security indicator; food availability, supply and access at household, national and international levels. Food security programs and environmental issues
Outcomes	▪ Develop an understanding of concepts related to community nutrition and food security. ▪ Review the Universal Declaration of Human rights and the South African Constitution on the right to food and nutrition. ▪ Examine the theoretical frameworks central to working with communities ▪ Identify possible causes of malnutrition with reference to the UNICEF Model. ▪ Critically evaluate nutrition and food security policies and programs. ▪ Identify and examine the various methods used in assessing the nutritional status of individuals and communities ▪ Review and develop nutrition intervention strategies ▪ Identify and analyse the indicators of assessing food security at household and national/international levels. ▪ Provide an in-depth understanding of the relationship between food security, nutrition and traditional knowledge ▪ Develop research and report writing skills ▪ Communicate effectively, orally and in written form.
Assessment	Formative: 50% Class tests; assignments; oral/poster presentations, case studies; reports Summative: 50% 3-hour final examination 40% subminimum in all assessments
DP Requirement	40% continuous assessment mark 80% Attendance of lectures, tutorials/practical's

Title	**Nutrition Education & Training**		
Code	**4CNU331**	**Department**	**Consumer Sciences**
Prerequisites	4CNU211	Co-requisites	None
Aim	To provide students with research skills on how to explore, develop and evaluate nutrition education materials for different groups and also aims to equip students with information on the various strategies that could be used to change nutritional knowledge and habits/behavior of people.		
Content	Approaches and techniques for changing food and lifestyle habits. Research, development and evaluation of health/nutrition education materials for different groups.		
Outcomes	▪ Gain knowledge and skills on the various approaches and strategies of behavioral change. ▪ Be able to select the most appropriate mode of nutrition education for the target group. ▪ Understand cultural and ethical considerations and obtain skills that will assist them in determining how and what food habits to be improved. ▪ Gain knowledge on the evaluation of nutrition education programs. ▪ Understand the importance of team approach in nutrition education. ▪ Identify individuals at risk for malnutrition through need assessment.		

	▪ Be able to develop messages and materials for specific target group. ▪ Develop demonstration skills. ▪ Develop research and report writing skills. ▪ Communicate effectively, orally and in written form.
Assessment	Formative: Continuous assessment, 50% (class tests, assignments and projects, portfolio and oral and visual/poster presentations) Summative: 3-hour final examination, 50% 40% subminimum in all assessments
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and practical's/tutorials

RESEARCH

Title	**Research Methods**			
Code	**4CRM311**	**Department**	**Consumer Sciences**	
Pre-requisite	None	Co-requisite		None
Aim	To introduce students to the basic principles of research methods and its use in various job situations. Students are expected to demonstrate an understanding of the research concepts by describing them and applying research knowledge in problem solving exercises on the various research steps, and to equip students with necessary skills to: a) develop a research proposal and b) Collect, analyze and interpret data required for research.			
Content	Fundamentals of research, tools of research, review of literature. Types of research; quantitative and qualitative research designs. Data collection methods, to include questionnaire development. Sampling: role of sampling, type of sampling procedures or techniques. Fundamentals of statistics -Types of data or measurement scales - Discrete versus continuous variables - Independent versus dependent variables Distinguishing between descriptive and inferential statistics Descriptive statistics- Percentages and proportions, Frequency distributions, measures of central tendency- (mean, mode, median), standard deviation, Correlations .			
Outcomes	▪ Discuss importance of research and the need for a scientific approach in acquiring knowledge; ▪ Demonstrate ability to recognize/identify research problems ▪ Review and write a literature review related to an identified research topic ▪ Determine appropriate sampling methods for various types of research; ▪ Understand, design and apply appropriate data collection methods to identified research problem ▪ Demonstrate understanding of research steps and apply these in development of a research proposal ▪ Explain the role/importance of statistics in research ▪ Explain and make sense of basic statistical concepts ▪ Define what is meant by measures of central tendency and measures of variability ▪ Understand the analysis and interpretation of data for research ▪ studies based on sample data collected.			
Assessment	Formative: Assignments, tutorials, presentations and class tests (50%); Summative: 3-hour examination (50%). 40% subminimum in all assessments			

DP Requirement	40% Continuous assessment mark 80% Attendance in lectures and tutorial/practical's		

Title	**Research Project**			
Code	**4CRM422**	**Department**	**Consumer Sciences**	
Pre-requisite	None	Co-requisite		4CRM311
Aim	To apply research skills gained to design and implement a research project on a selected topic in the major field of study. The module is intended to also test the students' ability to organize and interpret data collected and present the results in a research report.			
Content	Review of research methodology Planning a research project and implement according to research protocol: Review and refine problem statement, design, and sampling and data collection methods. Update review of literature. Design research instrument(s). Preparing for data collection and seeking for approval and related ethical considerations pertaining to the research Data collection, data cleaning, coding and analysis. Writing of research report.			
Outcomes	▪ -Identify a research problem within major field of study, based on identified need and feasibility of the project. ▪ -Write a research proposal ▪ -Design and execute independently a research project following the main research steps, as outlined in the proposal ▪ -Communicate effectively, orally and in written form, to various people as part of executing the research project. ▪ -Use the library effectively for background literature review ▪ Demonstrate ability to process, analyse and present data collected ▪ -Produce a concise but well written professional report that presents the research work undertaken. The usual components of a research report are expected.			
Assessment	Formative: Each step of the research process (Proposal, design of data collection instrument, chapter 1, 2, 3 and 4) constitutes work to be assessed as assignments (50%); Summative: Marking of full research report and oral presentation. (50%). Subminimum of 50% in assessments			
DP Requirement	80% Attendance of fieldwork preparation workshops.			

CLOTHING AND TEXTILES

Title	**Clothing and textiles 1**			
Code	**4CTC212**	**Department**	**Consumer Sciences**	
Prerequisites	None	Co-requisites		None
Aim	To provide students with an introduction to textile products, its components, selection, use and maintenance and to introduce students to sewing equipment and basic sewing techniques and its use and application in the construction of interior components.			
Content	● The origin and properties of natural and man-made textile fibres. ● Yarn and fabric construction methods and properties. ● Finishing processes, color and design application. ● Appearance, performance, maintenance and use of textile products. ● Care equipment, products and procedures.			

	● Introduction to equipment used in the construction of clothing and interior components; Introduction to hand and machine sewing techniques. ● Application of sewing techniques in the construction of interior components e.g. bed linen, cushions, curtains, etc. ● Requirements and costing of interior components ● Planning and equipping a sewing area; The benefits of sewing for the home and industry; Evaluation of workmanship in the construction of interior components.
Outcomes	▪ Differentiate between natural and man-made textile fibres. ▪ Describe the properties of fibres and explain how these influence appearance, performance, durability and maintenance of textile products. ▪ Describe yarn and fabric construction processes and explain how these influence appearance, performance, durability and maintenance of textile products. ▪ Describe selected finishes and application of colour and design and explain how these influence appearance, performance, durability and maintenance of textiles. ▪ Apply the above knowledge in the selection, use and care of textile products ▪ Demonstrate correct use and control of sewing machine and other sewing and pressing equipment and identify and solve basic stitching errors. ▪ Describe and correctly use sewing terms and symbols, knowing how and where these are used and follow basic sewing instructions. ▪ Determine requirements and estimate production cost. ▪ Apply basic hand and machine sewing techniques and demonstrate creativity in the production of selected soft furnishings and window treatments. ▪ Critically evaluate the quality of workmanship in interior components.
Assessment	Formative: Continuous assessment, 50% Summative: 3-hour final examination, 50% 40% subminimum in all assessments
DP Requirement	40% Continuous Assessment Mark 80% Attendance of lectures and practical's/tutorials

Title	**Clothing and textiles 2**		
Code	**4CTC312**	**Department**	**Consumer Sciences**
Prerequisites	4CTC212	Co-requisites	None
Aim	To introduce students to the social and cultural aspects of dress as non-verbal communicator, the development, production and marketing of fashion, and to equip students with skills used in clothing construction.		
Content	● Dress as communicator. ● The fashion cycle, demand, change and research. ● The raw materials of fashion. ● Design and production of clothing and accessories. ● Wholesale fashion marketing and distribution. ● Fashion retailing and promotion. ● Body measurements, and basic size and fitting alterations. ● Maintenance of sewing equipment. ● Selection and use of commercial patterns.		

	● Characteristics, selection and garment construction using a variety of fabrics. ● Requirements and production cost of garments. ● Sewing as an income generation activity. ● Evaluation of workmanship in the construction of garments
Outcomes	▪ Explain how dress communicates characteristics of individuals and groups. ▪ Demonstrate an understanding of fashion as a reflection of change. ▪ Knowledge of clothing categories, styles and price and size ranges. ▪ Understand the fashion cycle and knowledge of fashion adoption. ▪ Understand the marketing of fashion and explain the importance of fashion research. ▪ Describe the design and production of fashion ▪ Describe the wholesale marketing and retail merchandising and promotion of fashion. ▪ Take accurate body measurements and adapt patterns and garments for perfect fit. ▪ Demonstrate the ability to operate and maintain sewing and pressing equipment. ▪ Select appropriate fabric for the construction of different garments. ▪ Determine the requirements and calculate the cost to construct garments. ▪ Correctly use a commercial pattern and follow garment construction instructions. ▪ Apply sewing techniques in the construction of garments. ▪ Explain how sewing can be used as an income generating activity.
Assessment	Formative: Continuous assessment, 50% Summative: 3-hour final examination, 50% 40% subminimum in all assessments
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and practical's/tutorials.

DIPLOMA IN HOSPITALITY MANAGEMENT

CODE	MODULE NAME	MODULE DESCRIPTION
4HHC111	Hospitality Communication	Hospitality Communication is an interactive course designed to help students learn the fundamentals of working in the hospitality industry by improving their communication, self-esteem and presentation skills. The module focuses on intercultural communication, applicable to South Africa, conflict management strategies and forms of business correspondence. Application of workplace scenarios are dealt with throughout the module.
4HMI 111	Hospitality Information Systems 1	The aim of this module is to skill students in computer literacy within Windows operating system, browser and word processor applications.
4HMP111	Hospitality Operations I	The aim of this module is to introduce students to the scope of the hospitality industry as well as the organisation and structures of hospitality establishments. The module will also provide an

		overview of aspects of rooms division management, food service, lodging and hospitality careers.
4HMG111	Hotel Health and Safety	Hotel Health and Safety gives students a broad look at the different aspects of health and hygiene in the hospitality industry. The module aims to equip students with theoretical and practical knowledge of hazards, micro-organisms, fire safety and basic first aid as required in the hospitality industry.
4HMB111	Food and Beverage Studies 1	The important link between food and beverage service in the hospitality industry cannot be denied. This module provides students with technical skills of set-up and serving as well as theoretical knowledge of the necessary attributes of staff, tea and coffee service and sectors of the hospitality industry.
4HMC111	Culinary Studies 1	This course covers culinary theory, practices and principles. Learners are introduced to tools and equipment and mise-en-place in the kitchen. It focusses on theory, practices and principles of knife skills, dry heat cooking methods, microwave cooking and the use of flavours and flavourings in food fabrication. Hands-on kitchen laboratory experiences introduce the students to basic baking, stocks & soups, eggs, dairy and poultry preparation. Introduction to breakfast cookery is also included.
4HMI112	Hospitality Information systems 2	The aim of the module is to equip students with basic computer literacy skills in presentation and spreadsheet applications.
4HMG112	Nutrition	The module provides the students with a foundation of nutritional principles applied in the food and beverage service operations. The content of the module focuses on the menu choices for various ethnic groups and religions. It also places an emphasis on diet and diseases as well as implementation of good nutritional principles during food preparation.
4HMM112	Hospitality Management 1	This module introduces the student to the core concepts, principles, theories and practices of effective management essential to the successful operation of an enterprise in the hospitality industry.
4HMC112	Culinary Studies 2	This course builds on the theory and practices learned in Culinary Studies 1. Hands-on kitchen laboratory experiences introduce the student to moist heat cooking methods, knife skills, classical cookery methods in sauces, salads, sandwiches, quick breads, vegetables and starch preparation. Emphasis is placed on plate presentation.
4HMG122	Service Excellence	The aim of this module is to enlighten students on the importance of service excellence as well as a practical application of how to provide excellent service in all hospitality related environments as service excellence leads to customer satisfaction and loyalty, ultimately promoting the success of the business.
4HMF112	Hospitality Financial Management 1	After completing this module, students should be able to articulate the nature of financial management and its importance in the hospitality industry context. They will use the trial balance and prepare a basic income statement and balance sheet in the prescribed format

		evidencing correct classification of transactions and balances and incorporating accurate calculations. Basic vertical, horizontal and ratio financial analysis of the income statement and balance sheet and the interpretation of the outcome of each analysis will also be performed. A three-month cash budget and the articulation of the importance of working capital management in the hospitality industry will be performed and emphasised.
4HMP212	Hospitality Operations II: Front Office	Front office is often the initial point of physical contact between the customer and the hospitality unit. As a Hospitality professional, students will be required to display knowledge and skills essential to the efficient functioning of this department.
4HMG211	Hospitality Behavioural Studies	This module will introduce students to the field of consumer behaviour with specific reference to the hospitality industry. This module aims to enlighten students on decision-making processes of consumers and factors that may influence these decisions.
4HMM211	Hospitality Management II	This module presents a systematic approach to human resource management in the hospitality industry, focusing on the staffing and function of management. This module is designed to provide students with an understanding of the importance of human resource management in the hospitality industry.
4HML211	Hospitality Law 1	The purpose of the module is to present the history of South African Law and laws which are commonly used in hotel, restaurant, transport and travel services as well as the regulatory instruments that support effective management of the hospitality industry. The module focusses mainly on the law of contract, law of delict and commercial contract. It also develops the students' understanding of key aspects of these laws including how sales contracts are formulated, rights of the parties and liabilities.
4HMC221	Culinary Studies 3	The module builds on the theoretical and practical knowledge gained in the first year. Plate presentation, service styles, menu planning and evaluation is emphasised. Additional culinary skills and techniques such as yeast and gelatine work, meat, poultry, fish and shellfish are incorporated whilst building on the importance of team work, organisation and time management. The module aims to expose students to new cooking methods and ingredients to broaden their culinary horizons.
4HGH111	German for Hospitality 1	The aim of this module is to learn basic communicational skills (listening, speaking, reading and writing) in everyday German. On completion of this module learners should be able to use every day conversational and communicative phrases, such as: general conversations about learners themselves and other people (e.g. greeting people, introducing yourself, saying where you come from and where you live), conversations in a restaurant/café/hotel, booking a room, using numbers etc.

4HMC222	Culinary Studies 4	This Culinary Studies module focus on kitchen management and utilises the knowledge and practical experience gained in the previous culinary studies modules to challenge students to make use of what they have learned to put together their own balanced and theme-oriented menus for events. The students are then required to manage every aspect of the kitchen for an event including; ordering, preparation and service.
4HMB212	Food and Beverage Studies 2	The module is delivered in both theory and practical whereby students interact with the customers on a regular basis. Students are equipped with skills on serving meals and beverages (alcoholic and non-alcoholic). Learners will learn to apply different serving and clearing techniques. It also gives student a basic knowledge of international wines, law and wine tasting.
4HGH112	German for Hospitality 2	The aim of this module is for learners to build on the knowledge and language skills that they have acquired during the first semester. This will include conversations in a restaurant/ café/ hotel, asking for and giving directions, buying things in shops, etc. Learners will need to know simple grammatical structures and vocabulary that will enable them to construct their own dialogues and interact in a simple way provided the person talks slowly and clearly.
4HHM212	Events Management	This module is designed to introduce students to the planning and management of special events. This highly interdisciplinary course addresses the systems, tools and checklists necessary for successful event planning. Students learn the principles of marketing as applied in the events management industry.
4HML311	Hospitality Law 2	The module introduces the basic framework of consumer, liquor, food as well as labour legislations and how such laws are enforced. Laws which are applied when opening a hospitality business is emphasised. The module also provides focus on how the law protects the consumer/employee in everyday transactions.
4HMF311	Hospitality Financial Management 2	Hospitality Financial Management 2 revises the performance of basic financial statement analysis with a view to understanding business performance and position. Strategies for business growth and the associated costs thereof, as well as working capital management techniques are covered. Net Present Value and payback period investment analysis methods are used to evaluate investment opportunities and students are taught to compile a business plan which includes a financial budget.
4HMM311	Hospitality Management 3	The module entrepreneurship focuses on the practical and personal development aspects of starting a new venture. The module presents the concept of entrepreneurship opportunities; discoveries; value creation; customer and market orientation and development; basic feasibility analysis; preparing the marketing and sales; business modelling as well as business planning and analysis. As part of this

		module, students are expected to organise a seminar on entrepreneurship with the aim of attracting local entrepreneurs and business owners who assist in assessing the quality of the business idea and plan.
4HMP311	Hospitality Operations 3	This module studies the impact of facility design on facility management. Facility systems include safety & security systems; water and wastewater systems; HVAC systems; lighting systems; laundry system as well as food service equipment.
4HMI311	Hospitality Information Systems 3	This module introduces the computer systems in the hospitality industry and the practical application of these systems.
4HMG312	Work Integrated Learning	This module builds on the knowledge and skills gained during the programme. It integrates theory and practice in learning. Students work in a fully operational hospitality organisation for a period of six (6) months.

Degree-specific Rules – According to rules as specified by Faculty of Science, Agriculture and Engineering

Department of Engineering

STAFF

Professor	Vacant
Associate Professor	Vacant
Senior Lecturers	B Kibirige, BSc Engineering (Electrical) (MUK), MSc Engineering (Electrical), PhD (Electrical Engineering) (WITS), MISES, MSAIP CT Thiart BEng Engineering (Mechanical) (UP), MEng (Nuclear Engineering) (UP), PhD (Mechanical)(UP)
Temporary Lecturers	B Khoza, BSc Engineering (Electrical), MPhil Electrical Engineering (Nuclearl) UCT
Part-time Lecturers	A Martin, NTDip (ITSA), HDE (University of Natal) AT Akinola, BTech (Computer Science & Engineering), MSc (Computer Science) (UNIZULU), PhD (UNIZULU), MCSSA, MIEEE, FM Nkalanga, BScHons (Physics), MSc (Physics) (UNIZULU) F Silwiba, BScHons (Statistics), MSc (Applied Mathematics) (UNIZULU) W Zvarevashe, BScHons (Applied Mathematics), MSc (Mathematics), PhD (UNIZULU), MSASAS, MSAMSA SC Masikane, BScHons, MSc (Chemistry), PhD (UNIZULU)
Administrator	Vacant

Degree Module Content for BEng (Electrical Engineering)

Title	**Calculus I for Engineers**		
Code	**4MTH171**	**Department**	**Mathematical Sciences**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	To introduce differential calculus with necessary prerequisites from logic and general algebra.		
Content	• Elementary Logic and Theory of Sets: sets and subsets, Venn-Euler diagrams, basic set operations, sets of numbers, elementary logic. • Inequalities: Definition, order axioms, interval notation, set builder notation, solving inequality equations. Absolute value • Functions: elementary functions, graph of a function, combination of functions, inverse functions, exponential and logarithmic functions, relations. • Limits, Continuity and Differentiation: definition of limit, continuity and the derivative • Algebra: induction, vectors and vector algebra, dot products and cross products, introduction to matrices and matrix algebra, transpose and determinants, the adjoint matrix, invertible matrix and Cramer’s rule, complex numbers and De Moivre’s theorem.		

Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials.

Title	**General Physics A for Engineers**		
Code	**4PHY171**	**Department**	**Physics**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The module is meant for entry level BEng and contains fundamental concepts in Physics and Engineering that prepares the student for later study in more advanced fields in the Physical Sciences. It contains basic concepts in mechanics, waves, optics and thermodynamics.		
Content	• Statistical concepts: Probability, distributions, histograms, standard deviation, propagation of errors. Units and measurement: Dimensions, SI-system of units, basic measurements in physics. • Mechanics: Forces, moments, couples, Newton's laws, circular motion, momentum, oscillations, momentum and impulse. • Heat and thermodynamics: Mechanisms of heat transfer, heat capacity, phase changes, gases. • Waves: Sound waves, light and light sources, laws of refraction, diffraction and reflection. • Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.		
Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic mechanics concepts, laws of Newton and their practical application. ▪ The understanding of circular motion, its mathematical representation and solving of problems associated with repetitive circular motion. ▪ An understanding of wave concepts, modes of propagation and associated phenomena inside a material medium. ▪ Problems. ▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results. ▪ Learners must be able to write simple scientific reports commensurate with level 1 B.Sc.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		

DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and Project work

Title	**Introductory Computing for Engineers**		
Code	**4CPS171**	**Department**	**Computer Science**
Prerequisites	**None**	**Co-requisites**	**Any Mathematics module**
Aim	**To provide an introduction to hardware and software components of**		
Content	**Section A – Computer Architecture** Introduction to Digital logic and Digital systems; Machine level representation of data; Assembly level machine organization **Section B – Software Development Fundamentals** Fundamental Programming concepts and Object-Oriented Programming		
Outcomes	At the end of the module, the learners should be able to: ▪ Explain the organization of the classical von Neumann machine and its major functional units. ▪ Describe the internal representation of data. ▪ Represent Boolean logic problems as: truth tables and logic circuits. ▪ Design, implement, test, and debug programs that use fundamental programming constructs such as: basic computation, simple I/O, standard conditional and iterative structures, methods, and parameter passing		
Assessment	50% Continuous assessment 50% final practical and theory examination		
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's		

	Engineering Drawing		
Code	**5MEC111**	**Department**	
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The aim of this module is to use conventional drawing techniques to develop the skill of reading, interpreting and creating engineering drawings using drawing instruments and free hand sketches		
Content	1. Understand the concepts of scales and proportions, lines in space and true length and shape. 2. Understand and apply the drawing standards for international graphic communication. 3. Competently use drawing instruments to generate: • orthographic detailed drawings • pictorial views with an emphasis on isometric views • sectioned and auxiliary views of engineering components 4. Generate free hand sketches of orthographic and pictorial projections of engineering components. 5. Communicate with a workshop / manufacturing environment by means of notes and dimensions on drawings. 6. Interpret the information on an orthographic detailed working drawing.		

Assessment	Test 1: Descriptive Geometry Test 25% Test 2: Descriptive Geometry Test 25% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork

Title	**Engineering Mechanics**		
Code	**4MTH181**	**Department**	**Mathematical**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**one**
Aim	Engineering Mechanics is the first module that prepares students to analyze forces and stresses that exist in structures and machines. It is therefore an extremely important foundational module. The central core of the module has to do with equilibrium of rigid bodies and fixed structures such as trusses and beams. This module continues the modelling approach begun in Physics (for particles) and extends it to rigid bodies in static equilibrium. Although not a mathematics module, aspects of mathematics are brought to bear on the formulation and solution of equilibrium problems. The engineer requires skills of both analysis and of modelling. This module, being an introduction, will emphasize the analysis but will begin to develop the modelling ability in students. The module is concerned with developing ways of "seeing" or visualizing equilibrium problems. It is crucial to develop a variety of skills and strategies that will be used in solving problems, but it is also essential that students realize that these are necessary but not sufficient conditions for problem solving. The visual aspect of recognizing equilibrium, simplifying the system, drawing free body diagrams and applying appropriate boundary conditions is what is really important to develop in students. The importance of geometric ability cannot be over-emphasized. The module aims to develop in students an appreciation of forces in their various forms or guises, internal and external, and the way in which they contribute to the equilibrium of an object. The module requires a professional approach that recognizes the need for precision in engineering problem solving, mathematical language, a logical approach to calculations, diagrams that are accurate representations of the physical situation and a layout that is neat.		

Content	1. Review of vectors a. Position, displacement and force vectors b. Line of action and transmissibility, addition of forces at a point c. Adding forces: resultants, components, unit vectors 2. Forces a. Normal reaction and friction b. Equilibrium for a particle c. Connected particles d. Limiting equilibrium: friction, toppling, sliding e. Free body diagrams 3. Parallel and non-parallel coplanar forces, a. Moment of a force, couples, principle of moments b. Addition of a force and a couple c. Resultant and equilibrium for a rigid body, internal forces, toppling and sliding d. Two-force and three-force systems e. Compound systems f. Trusses: methods of nodes and sections g. Beams: bending moments and shear forces
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials

Title	**General Chemistry for Engineers**		
Code	**4CHM172**	**Department**	**Chemistr**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The aim of this module is to give learners the necessary grounding in chemistry for further studies in analytical, inorganic, organic and physical chemistry		
Content	The nature of matter. Atomic structure and periodicity. Electron configurations and bonding. Types of chemical reactions. Chemical equations and the mole concept. The solid, liquid and gaseous states. Solutions. Thermochemistry. Chemical equilibrium. Chemical Kinetics. Redox equations and basic electrochemistry. Acids, bases and salts. Theory of acid-base titrations, including ph. Basic laboratory skills, including weighing and volume measurements and gravimetric, volumetric, and qualitative analyses		

Outcome	Learners must be able to demonstrate: ▪ an understanding of the structure of the atom, the chemical bonding which occurs between atoms and the types of chemical reactions that occur. ▪ an ability to write chemical formulas, balance equations, and apply the mole concepts in chemical calculations to mass reactions and reactions in solution. ▪ an understanding of the classification of matter and the fundamental properties of matter in the solid, liquid and gaseous phases and of solutions. ▪ a thorough grasp of the basic principles of thermochemistry, chemical equilibrium, chemical kinetics, basic electrochemistry and the characteristics of acids, bases and salts as well as the application of this knowledge to acid base titrations. ▪ an ability to perform a range of basic laboratory skills, including weighing and volume measurements and simple gravimetric, volumetric, and qualitative analyses
Assessment	50% Continuous Assessment Mark (comprising 25% practical assessments plus 25% Interim assessments.) 50% Summative assessment(comprising a 3 hour assessment after the course work has been completed)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Calculus II for Engineers**		
Code	**4MTH172**	**Department**	**Mathematic**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**
Aim	The aim of the module is to further develop concepts in calculus (integration, elementary introduction to differential equations) and to apply their techniques in problem solving.		
Content	• Differentiation: some differentiation formulas, the chain rule, implicit differentiation, the mean-value theorem and applications, some curve sketching, applications of derivatives. • Integration and Techniques of integration: the fundamental theorem of integral calculus, indefinite integrals, some area problems, • Transcendental functions: logarithmic, exponential, inverse trigonometric functions, hyperbolic functions. • Elementary Introduction to Differential Equations: First order linear equations. • Sequences: properties, limits.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Physics B for Engineers**		
Code	**4PHY172**	**Department**	**Physics**
Prerequisites	**4PHY171(DP)**	**Co-requisites**	**None**
Aim	The module is meant for entry level B.Sc. and contains fundamental concepts in Physics and Engineering that prepares the student for later study in more advanced fields in the Physical Sciences. It contains basic concepts in electricity, nuclear physics and modern physics.		
Content	• Electricity and Magnetism: Coulomb's law, conductors and insulators. The electric field. Gauss' law. Potential, electrical potential energy, line integral of electric field, Capacitance, dielectrics and properties of dielectrics, Electric circuits. Magnetic field and magnetism, motion of charges particles through magnetic fields, the cyclotron. Ampere's law. Induced electromotive force, The R-L circuit and the L-C circuit. • Magnetic properties of matter, materials, permeability, molecular theory. Magnetization and susceptibility. Hysteresis. Magnetic field of the earth. Magnetic circuits. • Atomic Physics and radioactivity: Quantum theory of radiation. Wien and Stefan's laws. Planck's radiation formula. Radioactivity, natural decay series. Detectors of radiation, Nuclear reactions, conservation laws, reaction process, proton-induced, neutron-induced and other reactions. Q-values, alpha-. beta- and gamma-decay. Nuclear binding energy. Fission and fusion. Reactors, nuclear fuel, breeders. • Cosmic radiation and fundamental principles. • Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.		
Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic in static electricity, natural phenomena such as lightening, and the principles of machines based on static electricity concepts such as Van De Graaf Generators. ▪ An understanding of electric current and its effects (such as heating) ▪ The generation of electricity (Faraday's law, Lenz's law, etc.) ▪ A learner should understand the basic concepts of radioactivity, constituents of the nucleus and the effect of radiation. ▪ Learners should be able to solve problems related to theory taught. ▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results ▪ Learners must be able to write simple scientific reports commensurate with level 1 B.Sc.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

<table>
<tr><td>Title</td><td colspan="3">Introduction to Engineering Design</td></tr>
<tr><td>Code</td><td>5MEC112</td><td>Department</td><td>Engineering</td></tr>
<tr><td>Prerequisites</td><td>5MEC111(DP)</td><td>Co-requisites</td><td>None</td></tr>
<tr><td>Aim</td><td colspan="3">Engineering graphics is the medium for communicating concepts and component manufacturing information. This module aims at developing the skills needed for documenting designs using drawings. Manual and computer aided methods of graphical communication will be used to introduce the fundamentals of descriptive geometry and apply the concepts of basic design for manufacturing.</td></tr>
<tr><td>Content</td><td colspan="3">1. Understand the concepts of scales and proportions, lines in space and true length and shape.
2. Understand and apply the drawing standards for international graphic communication.
3. Competently use drawing instruments to generate:
● orthographic detailed drawings
● pictorial views with an emphasis on isometric views
● sectioned and auxiliary views of engineering components
4. Generate free hand sketches of orthographic and pictorial projections of engineering components.
5. Communicate with a workshop / manufacturing environment by means of notes and dimensions on drawings.
6. Interpret the information on an orthographic detailed working drawing.
7. Use 3D computer aided drawing software as a tool to
● Generate working drawings for manufacturing with design intent.
● Apply dimension standards to drawings.
● Generate assembly drawings applicable to manufacturing.
8. Understand the fundamentals of Fits and Tolerances
• Calculations and IT tables
9. Understand constraints and degrees of freedom in assembled mechanical components.</td></tr>
<tr><td>Assessment</td><td colspan="3">Tests 30%
CAD assignments 20%
Examination 50%</td></tr>
<tr><td>DP Requirement</td><td colspan="3">40% Continuous assessment mark
80% Attendance at practical’s and fieldwork</td></tr>
</table>

Title	**Introduction to Engineering**		
Code	**5EEE112**	**Department**	**Engineering**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**
Aim	• To motivate students and help them understand the nature and scope of engineering and specifically electrical engineering • To familiarize students to electrical circuits • Introduce electrical network theorems • To introduce the concept of DC response, steady state AC response and transient response of circuits • To analyze steady state single phase AC circuits using phasor diagrams		
Content	Explanation of the engineering disciplines and some job descriptions for each discipline. Circuit terminology, basic laws of resistive networks, nodal and mesh analysis, further network theorems, energy storage elements, RC and RL circuits, second order circuit analysis, RLC circuits and resonance, introduction to sinusoids and phasors, phasors in steady state AC circuit analysis, AC steady state power in single phase circuits. Introduction to transient analysis of circuits with energy storage elements.		
Assessment	Continuous assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	Advanced calculus for Engineers		
Code	4MTH271	Department	Mathematical
Prerequisites	4MTH171, 4MTH172	Co-requisites	None
Aim	This module is designed to introduce students to the concepts of series, vector functions, differentiation and integration of vector functions and functions of several variables.		
Content	• Intro to infinite series: The integral test The comparison test, The root test & the ratio test • Absolute and conditional convergence • Taylors polynomial in x; taylors theorem in x • Taylors series in (x-a) • Vector equation for a line & Vector equation for a plane • Limits, continuity, differentiation of Vector functions • The evaluation of double integrals by repeated integrals • The double integral as the limit of a Reimann sum • Triple integrals & Reduction to repeated integrals • Cylindrical co-ordinates & Spherical co-ordinates • Jacobian		
Assessment	50% continuous assessment 50% formal end of semester 3hr exam on all material covered during the semester.		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	Signals and Systems I		
Code	5EEE211	Department	Engineering
Prerequisites	5EEE112	Co-requisites	None
Aim	The module provides students with the basic tools required for understanding linear systems, and the effect that such systems have on deterministic signals.		
Content	• This module provides students with the tools required for understanding linear • systems, and the effect that such systems have on deterministic signals. • Upon completion, students will be able to characterize and manipulate linear time- • Invariant systems in terms of input-output relationships, using both time and frequency • domain methods. • The module includes concepts related to signal representation, linear convolution, • Fourier analysis, and sampling of continuous-time signals.		
Assessment	Continuous Assessment 50% Examination 50%		

DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Analogue Electronic Design**		
Code	**5EEE221**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	Students are introduced to device structures of some of the important Analog Electronic devices, their properties and models, analysis of simple circuits consisting of passive and active devices, operational amplifiers, and analysis of some practical analog electronic circuits.		
Content	• The module is delivered in the forms of lectures. There is a fixed text book for the • module, which standardizes the module. • After every 2- 3 weeks' lecture, the students are given a set of SPICE based simulation • exercises which helps them to grasp the material. The SPICE exercises are so • modelled that the students can see the importance of different device parameters and • their effect on some basic designs. • There are also four tutorials given in the module, and tutors are available on the tutorial • classes to help the struggling students. There is an end-of-semester mini project done • in groups. With this, the students try to design and analyze a bigger circuit and make a • report. This helps them to grasp some of the challenges of designing an electronic circuits.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Project Management**		
Code	**5MEC231**	**Department**	**Engineering**
Prerequisites	**All first year modules**	**Co-requisites**	**None**
Aim	This module deals with the theory, tools, techniques and practices in project management. Opportunities are provided to develop an understanding of the triangle of Project Management (PM) – time, cost and performance and to use PM techniques to achieve objectives within triangle constrains. The application of the theory, tools, techniques and practices is an objective. This takes the form of a multidisciplinary project i.e. development of a small scale engineering system.		
Content	• Introduction to Project Management Introduction to Project Planning and Life Cycle Project Scope Management • Project Time Planning and Network Costing Project and Financial Statement Managing Project Resources • Managing Risk in Projects • Project Quality Management Project Human Resource Contracts • Trade-off Analysis in a Project Environment Project Closeout • Tools include, but are not limited to, WBS, CPM, Gantt Chart, Resource Levelling, Cash Flow Statement, Trade- off analysis and communication techniques		
Assessment	Continuous Assessment 50% Examination 50%		

Title	**Linear Algebra and Differential Equations for Engineers**		
Code	**4MTH272**	**Department**	**Mathematical**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This module is designed to introduce students to the concepts of linear algebra, and to methods of finding exact solutions to ordinary differential equations		
Content	• Linear algebra: finite and infinite dimensional vector spaces, subspaces, linear transformations and matrices, systems of linear equations, determinants, change of bases, similar matrices, eigenvalues and eigenvectors. • Differential equations: study ordinary differential equations such as separable variables, exact equations, linear equations. Solutions of homogeneous differential equations with constant coefficients, Cauchy-Euler equation, systems of linear equations, nonlinear equations, Laplace transforms, homogeneous linear systems with constant coefficients.		
Assessment	50% continuous assessment (two assessments during the semester) 50% formal end of semester 3hr exam on all material covered during the semester.		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Introduction to Power Engineering**		
Code	**5EEE212**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	To provide a foundation in power engineering		
Content	Phasor diagrams for resistive, inductive and capacitive loads; transient analysis of circuits, complex power; power factor correction; 3-phase systems; magnetic circuits; the single phase transformer; dc. machines		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Embedded Systems I**		
Code	**5EEE222**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	This module aims to give students a strong foundation in embedded systems by introducing them to digital system fundamentals, including information representation, Boolean algebra, logic gate behavior, combinational and sequential digital circuits, digital building blocks and algorithmic state machines. The module also provides a basic understanding of what a microcontroller is, how it works inside and what it can be used for. These objectives will be carried out by writing code for a micro in ASM and C		
Content	• The goal in convening this module is to impart elementary knowledge and a basic • understanding of logic and computer design and the advances in the underlying • technology that have had an impact on the application of these fundamentals. • We also aim to enable the student to design a prescribed digital system and finite state • machine. At the end of the study, the student must be able to appreciate the role of • digital electronics in computer and automation systems. The topic sequence to bring • this about consists mainly of the following: • Digital systems and information representation, Binary logic, Boolean Algebra, • combinational circuits, combinational design concepts and procedures, arithmetic • functions, sequential circuits, combinational design concepts and procedures. Digital • storage and representation of data in a memory architecture.		

Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**Professional Communications**		
Code	**5EEE232**	**Department**	**Engineering**
Prerequisites	**All first year modules**	**Co-requisites**	**None**
Aim	The aim of the module is to equip students with theory of oral and written communication, and to give them practical skills that will enable them to communicate more effectively at the University and in their professional careers.		
Content	Referential Style and Academic writing and presentation; Planning & Discourse of technical written and oral messages; Reports – investigative/ evaluative; Executive Summaries/ Synopses; Individual presentations; graphics and visual literacy. Module content covers the following areas: Communication theory: • aim of communication • barriers to communication • audience and readership analysis • modes of communication Planning and Discourse: • definitions and schools • reasons for codes and rules • professional practice as defined by ECSA • corporate governance and King III report		
	Reports: • types: investigative and feasibility • research: citation and referencing • different formats for types of reports • sections within reports (introduction, methods, results, conclusions, recommendations) and their functions • preliminary sections such as Table of Contents • final sections such as Appendices •		

	Summaries: • purpose of an executive summary to a technical or professional report • structure and components of a good executive summary • style and language for a persuasive and comprehensive summary Graphic and PowerPoint Design: • fundamental principles of visual literacy for text documents and presentations • types of graphics • types of visual aids that support and enhance a good presentation • visual literacy and creating PowerPoint slides. Individual presentations: criteria for giving an effective oral presentation • vocal delivery • techniques for planning and balance in a presentation • audience reach • managing questions
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Electromagnetism for Engineers**		
Code	**4PHY272**	**Department**	**Physics**
Prerequisites	**4PHY171, 4PHY172**	**Co-requisites**	**None**
Aim	This module is designed to introduce students to the concepts of and theories applicable to electromagnetism and its applications		
Content	• electromagnetism • Electrostatics, Gauss's law. Dipoles. Dielectric media. Phenomena related to electron levels: Introduction to metals, semi-conductors and insulators. Contact potential. Thermoelectric effects. • Electromagnetism: Forces on moving charges in electric and magnetic fields. Magnetic scalar potential and vector potential. Ampere's law. Faraday's law. Self-induction and mutual induction. • Alternating current: M L C R circuits and A-C bridges • Magnetism: dia, para-and ferromagnetic materials. The magnetic circuit. • Applications of concepts and theories of electromagnetism • Transmission lines, microwaves, waveguides, electromagnetic		
Outcomes	▪ An understanding of concepts and theories of electromagnetism. ▪ Understanding and applications of Gauss law. ▪ An understanding of laws governing electrical conduction and circuits. ▪ Understanding principles of magnetism and magnetic circuits ▪ Understanding applications of electromagnetism.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		

DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

Title	**Electromagnetic Engineering**		
Code	**5EEE311**	**Department**	**Engineering**
Prerequisites	**4PHY272,4MTH271**	**Co-requisites**	**None**
Aim	To provide an understanding of electromagnetic field and wave theory in the context of applications in electrical engineering. To convey the relationship between electromagnetic field theory described by Maxwell's equations and circuit theory described by Kirchhoff's laws. To cover the concepts of EM wave radiation, propagation, reflection and refraction in linear media. To introduce radiation from simple structures, and basic calculations of EM field parameters at a distance from a radiating antenna, and calculations relating to line-of-sight communications link. To provide the theory required for more specialized EM topics like microwave engineering and antenna design. Visualization of electromagnetic fields.		
Content	The module introduces the electrical engineering student to the mechanism of electromagnetic radiation by antennas and the nature of fields produced by antennas. The propagation of plane waves in space and in lossy media is studied and applications are presented. One-dimensional models for TEM transmission lines are constructed. These models are often used as basic elements in design of antennas and other components. Simplification to very short lines such as power lines are discussed. A selection of conventional and modern waveguide structures re considered. Finally, an overview of computational methods for the solution of realistic electromagnetic problems are presented.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	Electronic Devices and Circuits		
Code	5EEE321	Department	Engineering
Prerequisites	5EEE231	Co-requisites	None
Aim	To provide the student with an understanding of basic electronics concepts and also to equip the student with the necessary skills to perform detailed electronics design and analysis		
Content	Operational amplifiers, specifications and limitations and varieties and common configurations. Frequency response of amplifiers; Bodes plot Basic building blocks of analog ICs and circuits; current mirrors. Feedback and its effects in analog circuit design; stability Analog filters: filter design principles; different common ways to implement filters. Signal generators: oscillators and types of oscillators. Power Amplifiers Noise, sources and types. Switched mode power supplies and introduction to power electronics, buck, boost, buck-boost and isolated fly back topologies Safe Operating Area, mixed signal design, circuit layout, decoupling and grounding SPICE based simulations		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	Energy Conversion		
Code	5EEE331	Department	Engineering
Prerequisites	5EEE212	Co-requisites	None
Aim	To introduce students to the fundamentals of AC Electrical Machines and Power Electronics. Two machine types are studied, i.e. induction and synchronous machines. The constructional features, operational differences, capability and characteristics of each machine type are studied. Uncontrolled rectifier circuits and DC-DC converters are also being introduced. Industrial applications of power electronics and electrical machines are analyzed.		
Content	AC machine windings, rotating magnetic field in AC machines, induction and synchronous machine equivalent circuits, determination of equivalent circuit parameters, induction and synchronous machine performance characteristics, uncontrolled rectification, controlled rectification, dc-dc		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Signals and Systems II**		
Code	**5EEE341**	**Department**	**Engineering**
Prerequisites	**5EEE221**	**Co-requisites**	**None**
Aim	• To develop skills for the analysis of signals and noise in linear systems, and also some • non-linear systems • To convey how systems arising in electrical and electronic engineering may be analyzed in the time domain and the frequency domain. • To develop concepts such as bandwidth, response time, power spectral density, and signal to noise ratio for quantifying signals and noise in linear systems • To gain familiarity with basic modulation schemes used in communication systems and		
Content	**Part A:** Random signals and processes in continuous /discrete time, probability distribution/density functions, random signals calculus (mean, variance, moment generation function), transforms of random signals, Bayesian Theorem, covariance and correlation, Central Limit theorem, Gaussian processes, random signals spectrum and bandwidth, power spectral density (PSD), Wiener-Khinchine Theorem, entropy function, estimation/filtering of random signals. **Part B:** Time and frequency domain signal processing for electronic systems (carrier-wave radio and instrumentation), continuous-time Fourier theory, sampled signals and use of the discrete Fourier transform, propagation of signals and noise through linear systems, complex analytic signal representation, power calculations using PSD functions, pulse detection using correlation and the matched filter, analog carrier-wave modulation/demodulation, amplitude modulation (double sideband and single sideband; suppressed carrier and large carrier), heterodyning, angle modulation (frequency and phase modulation), s/n ratio calculations.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Statistics for Engineers**		
Code	**4STT171**	**Department**	**Mathematical**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This Module aims to introduce engineering students to the basic concepts and tools of Statistics which are of particular relevance in an engineering context, and to enable students to apply these to data collected from engineering experiments.		
Content	Topics include: Random variables, sampling and basic statistical measures; Normal, t, F and Chi-square distributions; Confidence intervals; Statistical models, such as the means and the effects models; t, F and Chi-square tests; Regression and correlation; One-way analysis of variance; Introduction to the design of experiments; Application of statistical tools to experimental data in an engineering setting.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Control Engineering**		
Code	**5EEE312**	**Department**	**Engineering**
Prerequisites	**4MTH271, 4MTH272, 5EEE231**	**Co-requisites**	**None**
Aim	To train and educate students in control engineering methods for SISO control problems, including formulation of elementary problems as block diagrams, analysis of system interconnected systems, design and synthesis of feedback control systems in terms of input-output and state-space models. To introduce students to open-ended control engineering projects by means of a team project centered around a control problem.		
Content	Terminology: Open and closed loop configurations, block diagrams, dynamic system modelling, transient response, stead state error criterion. System stability: Routh Hurwitz criterion, Root Locus. Frequency responses. Nyquist lots, Bode diagrams, Nichols Charts. Compensation: Lead-lag circuits, minor loops, feedforward and three-term controllers. Sensitivity functions, minimum prototype response controllers, bilinear transformation, frequency response methods. State variables, state space models and design methods. Robustness, observability		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Power Systems**		
Code	**5EEE322**	**Department**	**Engineering**
Prerequisites	**5EEE212**	**Co-requisites**	**None**
Aim	To create an interest in power systems engineering, to provide a sound basis of study for those who will continue studies in this subject and, for those who do not continue with power modules, to provide useful information relevant to future needs		
Content	Structure of power system, ac power theory, electrical loads, customer tariffs and power factor correction, introduction to power systems analysis, including: 3-ph transformer representation, Per unit calculations, Load flow and fault calculations; AC and DC power distributors, Transmission efficiency and conductor efficacy; Protection principles and Matlab programming.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Communications and Networks**		
Code	**5EEE332**	**Department**	**Engineering**
Prerequisites	**5EEE231**	**Co-requisites**	**None**
Aim	To provide a basic understanding of communication systems and the architecture, technology, and protocols of computer networks		

Content	**Module A:** Introduction to Networks: Internet, protocol, network edge, core network and access networks, circuit switching and packet switching, LAN topology, physical media, layered architecture, performance, protocol model. Application layer: service, client-server paradigm, network applications: web and http, ftp, email, ssh, DNS, p2p file sharing, socket programming. Transport layer: transport layer services, multiplexing/demultiplexing, network layer: Introduction, virtual circuit and datagram networks, router, Internet Protocol datagram, fragmentation, IPv4, Physical layer: Digital information, Digital communication system, Sampling, Pulse modulation, Quantization, Pulse code modulation, Bandpass modulation schemes ASK, FSK, PSK, Phase-shift keying and amplitude phase keying in vector representation, Orthogon **Module B:** Communication system and network design II : Transport layer: UDP, reliable data transfer, TCP, connection management, congestion and congestion control. Network layer: ICPM, IPv6, link-state algorithm, distance vector routing algorithm, routing in Internet, broadcast and multicast routing. data link layer: link layer services, error detection and correction. Multiple access: TDMA, Aloha, CSMA. LAN technologies: IEEE 802 family, MAC, LAN addressing, ARP, Ethernet, Token Rings, hubs and switches, PPP, ATM, MPLS, all IP networks. Physical layer: Information theory and entropy, Channel capacity, Source coding, Probability of error, Eb/n performance, Matched filter detection, ISI and pulse shaping, Equalization, Bandpass demodulation/detection schemes with ASK, FSK, PSK, Probability of Error with bandpass detection, MSK
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	Culture and Society in Africa		
Code	1ANT172	Department	Social
Prerequisites	None	Co-requisites	None
Aim	This is a Complementary Studies Module for Electrical Engineering students aimed at broadening student's perspective.		
Content	Culture and Society in Africa provides students from all faculties with background knowledge about the continent on which they live. The module includes an examination of the concepts of culture, race, society, ethnicity and nation-state, a perspective on African worldviews and ways of thought, and a consideration of the role of Africa in a changing world.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	Electrical Engineering Design		
Code	5EEE342	Department	Engineering
Prerequisites	All second year modules	Co-requisites	None
Aim	To tackle a design and research project in Electrical Engineering		
Content	In this module students will be assigned a design problem relevant to the Electrical Engineering discipline within which they will need to design a prototype and test a sub- system. This will provide insight to understand the intricacies of real-life complex sub system design. Students will be expected to solve an Electrical Engineering problem methodically using the skills they have gathered over the previous semesters of the curriculum, especially from the Design 1 module. Financial constraints required to complete the project and financial decision making will be reported.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Process Control and Instrumentation**		
Code	**5EEE411**	**Department**	**Engineering**
Prerequisites	**5EEE312**	**Co-requisites**	**None**
Aim	Aims to provide an integrated view of the principles and practice of modern industrial control and its applications		
Content	Various topics will be covered including: Measurement of physical variables, industrial transducers, integration of programmable logic controllers (PLCS), supervisory control and data acquisition (SCADA) systems and management information systems (MIS), signal transmission and conditioning, microcontrollers, computer interfacing, realtime multitasking in computer control, nonlinear and advanced control methods.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Engineering Systems Design**		
Code	**5EEE421**	**Departmen t**	**Engineering**
Prerequisites	**5EEE342**	**Co-**	**None**
Aim	To understand and apply the principles of engineering design		
Content	**Design environment** - Project, production and manufacturing processes. The pessimistic mind view - worst-case design, tolerances, reliability and statistical yield. Standards and codes. STEEP analysis - social, technical, environmental, economic and political context. EDA and CAD *Design methods* - Synthesis of candidate concepts and selection of an optimum concept; development of specifications and user requirements; modelling, simulation, reality checks; design work; qualification and acceptance tests; documentation. Case histories **Formal Design Methodology** - Common features of formal design methodologies. IBM's Rational Unified Process. Phases and iterations -inception, elaboration, construction, transition. **Disciplines** - business modelling, requirements gathering, analysis and design, implementation, testing, deployment, project management, configuration and change management, environment. **Project** – Two assignments will be tackled, and a poster will be prepared and presented		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Engineering Professionalism**		
Code	**5EEE461**	**Department**	**Engineering**
Prerequisites	**All 3rd year modules**	**Co-requisites**	**None**
Aim	This module deals practically with the student's transition to the workplace. The aim is to complement the student's theoretical training by introducing (in some cases) and reinforcing (in others) the topics and issues most likely to be encountered in the engineering profession. This is part of the endeavour to produce a well-rounded mechanical engineer for industry, consulting and the design environment		
Content	Professional registration – ECSA, the Washington Accord, code of conduct, due diligence, government certificate of competence, mentorship in industry. Types of engineering employment – details of the options available for graduates, the realities of the workplace and industry training, career path management. Engineering economics – working capital, cash flow, salaries and wages, depreciation, tax considerations, rate of return, payback period. Health and Safety – managing disease and health in the workplace, occupational safety and related legislation, practical HAZOP analysis, safe work permits and lockouts. Industrial law – Overview of employment law, labour relations and employment equity contracts, basis of offer and acceptance. Quality, reliability and maintenance management and their importance in the engineering profession. Environment – legislation, ISO140001, aspects of engineering operations and likely impacts, considerations of the created environment as well as the impacts on socio- economic and cultural systems.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Power Electronics and Machines**		
Code	**5EEE431**	**Department**	**Engineering**
Prerequisites	**5EEE331**	**Co-requisites**	**None**
Aim	To develop an understanding of electric motor speed control principles and to develop an understanding of power electronics and its practical applications		
Content	Electrical Machines: Introduction to Motor Drives, DC Motor Characteristics and Speed Control Principles, Class-A Chopper Drive, Induction Motor Drives, Unbalanced Operation of Induction Motors, Switch Reluctance Motors Power Electronics: Switching and Conduction Losses of Power Semiconductor Devices, Uncontrolled and Controlled rectifiers, Dc to Dc Converters: Buck, Boost, Chuck, Flyback and Full Bridge, Unipolar and Bipolar Pulse with Modulation Schemes, Space-Vector Pulse Width Modulation		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Power Systems Engineering**		
Code	**5EEE441**	**Department**	**Engineering**
Prerequisites	**5EEE322**	**Co-requisites**	**None**
Aim	To develop an understanding of power systems and protection		
Content	Distribution and transmission systems, protection systems, steady state operation of transmission lines, high voltage engineering, electricity pricing, microgrids and smart grids. Topics include: Loads - Electrical load characteristics (PIR, transient, statistical distribution and probabilistic load model), Non Linear Loads, non- active power, unbalance, Load data collection, Data analysis, Time series, parametric, sectoral and spatial load forecasting High Voltage Engineering - Introduction and fields, Gas discharges, solids, liquids; Over voltages, insulation coordination Branches – Cables, LV feeders voltage drop calculations, Herman Beta spread sheet, Overhead lines: design, safety, electric machinery regulations,3-ph overhead lines: types of structures and conductors, conductor selection, load capacity, line parameters; 3- ph overhead lines: cost, MV voltage drop and losses – radial feeder with point loads, minimum route length; Mechanical design of overhead lines, 2-ph and SWER lines: capacity, design, safety/reliability, unbalance; Comparison of alternative overhead lines, HVDC transmission.; Nodes - Small substations; Large substations; Unconventional: CCS, Captap, SWS; DG: Energy resources, environment and cost,: Voltage rise constraints Protection - Protection philosophy, switchgear and surge arresters, instrument transformers, , OC and DOC relays, Relay settings grading, Protection testing and commissioning, protection lab, , Unit feeder protection(circulating current ,pilot wire), Distance protection, Transformer protection delivery processes and policy - Delivery processes: planning design, construction, O&M (incl condition monitoring), EIA, QA,standards; Logframe for planning and evaluation of electrification; Electrification in SA, NEP, future electrification, EDI restructuring, Power Quality/Quality of Supply; Reliability; Financial evaluation of projects (IRR, NPV, inflation, losses, economics of pf correction); Pricing policy, rationalization, residential tariffs, BEST/		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Telecommunications**		
Code	**5EEE451**	**Department**	**Engineering**
Prerequisites	**5EEE332**	**Co-requisites**	**None**
Aim	To enhance an understanding of and competence in analyzing and designing wireless communication systems to specified performance criteria. To extend your study of principles of communication engineering towards current design topics.		
Content	Selected topics in (1) digital communication systems (24 lectures) and (2) radio frequency & wireless systems (24 lectures). Digital Communication Systems Content: Any topics from: *Digital Modulation*: highlights; *Formatting and Source Coding*; *Synchronization*; *Reducing Signal Degradation*: signals, spectra and noise, communications link analysis, coding and interleaving to mitigate fading effects, main parameters of *Fading Channel Models*, applications. *Modulation and Coding* trade-offs; *Error Performance* of communication systems corrupted by noise. RF & Wireless Systems Content: Any topics from: Microwave and RF components and transmission lines; Mobile communication systems; Radar systems; Noise and distortion in microwave systems; Frequency planning; Regulatory aspects of Spectrum usage; Antenna technology; Satellite communication systems; Global Positioning Systems (GPS); Use of microwave test equipment.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

<table>
<tr><td>Title</td><td colspan="3">Professional Communication Studies</td></tr>
<tr><td>Code</td><td>5EEE412</td><td>Department</td><td>Engineering</td></tr>
<tr><td>Prerequisites</td><td>5EEE241</td><td>Co-requisites</td><td>None</td></tr>
<tr><td>Aim</td><td colspan="3">Professional Writing including: Business Proposals; Graphic Communication and Readability; Posters; Group presentations with Power-point</td></tr>
<tr><td>Content</td><td colspan="3">Referential and Academic writing and presentation; Persuasive argument; Formats for business plans and proposals; group presentations; graphics and visual literacy. Module content covers the following areas:
Group theory and Team work:
• aim of communication
• barriers to communication
• why groups are formed
• types of groups
• group dynamics and how teams are formed
• advantages of groups.
• different types of leaders
• process and benefits of Brainstorming
• different approaches to Problem-solving and decision-making.
• negotiation skills
Ethics:
• definitions and schools
• reasons for codes and rules
• professional practice as defined by ECSA
• corporate governance and King III report
Business Plans and Proposals:
• solicited and unsolicited proposals
• requests for proposals
• functions of SWOT and PESTEL
• Table of Contents of a Business Proposal
Summaries:
• purpose of an executive summary
• structure and components of a good executive summary
• style and language for a persuasive and comprehensive summary
CVs and Covering letters
• formats for and choice and ordering of content
• traditional and non-traditional CVs
• covering letters for responding to an advertisement or tender and for direct approach.
Poster Design:
• difference between stand-alone posters and accompanied posters
• fundamental principles of well-designed posters.
Group presentations:
• criteria for giving an effective group oral presentation
• vocal delivery
• techniques for good cohesion, transitioning and handover to the next person in the group
• types of visual aids that support and enhance a good presentation
• visual literacy and creating PowerPoint slides.</td></tr>
<tr><td>Assessment</td><td colspan="3">Continuous Assessment 50%
Examination 50%</td></tr>
<tr><td>DP Requirement</td><td colspan="3">40% Continuous assessment mark
80% Attendance at practical’s</td></tr>
</table>

Title	**New Venture Planning and Management**		
Code	**5EEE422**	**Department**	**Engineering**
Prerequisites	**All third year modules**	**Co-requisites**	**None**
Aim	Learning Business skills involved in starting entrepreneurial businesses from products designed: feasibility analysis, business plan, presentations		
Content	The entrepreneurial perspective; developing a new venture; what is a feasibility plan? Product concept and description; market assessment; industrial analysis; marketing plan; operations, development plans and management; financial projections		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Industrial Ecology**		
Code	**5EEE442**	**Department**	**Engineering**
Prerequisites	**All third year Modules**	**Co-requisites**	**None**
Aim	The module is an introduction and overview of the relatively new 'field' of Industrial Ecology and its more recent trends. In the context of the module "industrial ecology" is interpreted as encompassing all of the interactions of an industrial society with the natural environment as well as the associated drivers of industrialization. A more appropriate way of thinking about the module is to rename it "the Ecology of Industrial Society". The objectives are to encourage a systems perspective of industrial activity as it is integrated with and forms part of the natural systems (lithosphere, pedosphere, biosphere, hydrosphere, atmosphere) This module is intended to be an enjoyable and enlightening experience, given the very different kind of learning that is expected. The students in the class have the responsibility to make the learning their own – to engage in debate and ask questions that will lead to the class finding out new information and reading different literature than that originally proposed – because it concerns what interests you and what you want to learn. What you learn and the effects of industry on the environment both affect your future. We are all in this together – the learning and the living. Let's do it with enthusiasm and meaning. There are however, two primary educational goals for the module. The first has to do with the content and the second with the process. Students are expected to become aware of the problem issues facing the global community that relate to the industrial impact on the environment – the ecology of industrial society. You are expected to demonstrate this awareness and the acquisition of knowledge and understanding through discussion in class, through oral arguments, quizzes, projects, an exam and a term paper. These forms of communication hint at the second set of outcomes that relate to the ability to accomplish a limited kind of research as well as communicating ideas in a professional manner. Students are expected to put into practice the skills they have acquired in their professional communication module as well as using the opportunity to improve those skills. These do not only relate to the presentation side of the skills but also to the exploratory and critical aspects – being able to ask critical questions, seek information from the internet and other sources, argue a case in discussion as well as in a formal written presentation, show logical development of a debate and a willingness to be persuaded by a counter argument.		
Content	Ecosystem deterioration, pollution Resource depletion: Fossil fuels, water, uranium, rare earth metals Climate change Systems thinking, thermodynamics Sustainability; the limits to growth Industrial Ecology concepts and tools Material Flow Analysis Life Cycle Assessment; the circular economy Design for Environment Eco-Industrial Parks: industrial symbiosis Ethics: economic paradigms, consumption Energy, Mobility,		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Final Year Research Project**		
Code	**5EEE432**	**Department**	**Engineering**
Prerequisites	**Depends on the topic**	**Co-requisites**	**None**
Aim	To give individual students the opportunity to tackle a real engineering project within a limited period under the guidance of a supervisor and submit a project report on the results.		
Content	The final year research project is an important opportunity for the student, at the end of the degree programme, to tackle a real engineering project. The student is expected to work on the project both individually and under the guidance of a supervisor. An engineering project involves the creative application of scientific principles to the solution of a technical problem. It involves a problem description or research hypothesis developed in consultation with a supervisor, reviewing the topic in detail and defining the boundaries (scope) carefully, confirming an understanding of the requirements of the supervisor, searching for, selecting and justifying the most appropriate approaches to solving the problem or testing the hypothesis. It also requires a student to be able to analyze, design, build, integrate and test as is appropriate for the specific project. This could include the use of hardware, software and simulation. Students are also required to evaluate the project against the success criteria and design objectives, and to write a report about the project, the findings, and any recommendations. In addition, students need to make an oral presentation and prepare an exhibit.		
Assessment	Thesis 100%		
DP Requirement	Meeting the ELO requirements		

Degree Module Content for BEng (Mechanical Engineering)

Title	**Calculus I for Engineers**		
Code	**4MTH171**	**Department**	**Mathematical Sciences**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	To introduce differential calculus with necessary prerequisites from logic and general algebra.		
Content	• Elementary Logic and Theory of Sets: sets and subsets, Venn-Euler diagrams, basic set operations, sets of numbers, elementary logic. • Inequalities: Definition, order axioms, interval notation, set builder notation, solving inequality equations. Absolute value • Functions: elementary functions, graph of a function, combination of functions, inverse functions, exponential and logarithmic functions, relations. • Limits, Continuity and Differentiation: definition of limit, continuity and the derivative • Algebra: induction, vectors and vector algebra, dot products and cross products, introduction to matrices and matrix algebra, transpose and determinants, the adjoint matrix, invertible matrix and Cramer's rule, complex numbers and De Moivre's theorem.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials.		

Title	**General Physics A for Engineers**		
Code	**4PHY171**	**Department**	**Physics**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The module is meant for entry level BEng and contains fundamental concepts in Physics and Engineering that prepares the student for later study in more advanced fields in the Physical Sciences. It contains basic concepts in mechanics, waves, optics and thermodynamics.		

Content	• Statistical concepts: Probability, distributions, histograms, standard deviation, propagation of errors. Units and measurement: Dimensions, SI-system of units, basic measurements in physics. • Mechanics: Forces, moments, couples, Newton's laws, circular motion, momentum, oscillations, momentum and impulse. • Heat and thermodynamics: Mechanisms of heat transfer, heat capacity, phase changes, gases. • Waves: Sound waves, light and light sources, laws of refraction, diffraction and reflection. • Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.
Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic mechanics concepts, laws of Newton and their practical application. ▪ The understanding of circular motion, its mathematical representation and solving of problems associated with repetitive circular motion. ▪ An understanding of wave concepts, modes of propagation and associated phenomena inside a material medium. ▪ Problems. ▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results. ▪ Learners must be able to write simple scientific reports commensurate with level 1 B.Sc.
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and Project work

Title	**Introductory Computing for Engineers**		
Code	**4CPS171**	**Department**	**Computer Science**
Prerequisites	**None**	**Co-requisites**	**Any Mathematics module**
Aim	**To provide an introduction to hardware and software components of computer systems.**		
Content	**Section A – Computer Architecture** Introduction to Digital logic and Digital systems; Machine level representation of data; Assembly level machine organization **Section B – Software Development Fundamentals** Fundamental Programming concepts and Object-Oriented Programming		

Outcomes	At the end of the module, the learners should be able to: ▪ Explain the organization of the classical von Neumann machine and its major functional units. ▪ Describe the internal representation of data. ▪ Represent Boolean logic problems as: truth tables and logic circuits. ▪ Design, implement, test, and debug programs that use fundamental programming constructs such as: basic computation, simple I/O, standard conditional and iterative structures, methods, and parameter passing.
Assessment	50% Continuous assessment 50% final practical and theory examination
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's

Title	**Engineering Drawing**		
Code	**5MEC111**	**Department**	**Engineering**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The aim of this module is to use conventional drawing techniques to develop the skill of reading, interpreting and creating engineering drawings using drawing instruments and free hand sketches		
Content	1. Understand the concepts of scales and proportions, lines in space and true length and shape. 2. Understand and apply the drawing standards for international graphic communication. 3. Competently use drawing instruments to generate: • orthographic detailed drawings • pictorial views with an emphasis on isometric views • sectioned and auxiliary views of engineering components 4. Generate free hand sketches of orthographic and pictorial projections of engineering components. 5. Communicate with a workshop / manufacturing environment by means of notes and dimensions on drawings. 6. Interpret the information on an orthographic detailed working drawing.		
Assessment	Test 1: Descriptive Geometry Test 25% Test 2: Descriptive Geometry Test 25% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork		

Title	**Engineering Mechanics**		
Code	**4MTH181**	**Department**	**Mathematical Sciences**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**
Aim	Engineering Mechanics is the first module that prepares students to analyze forces and stresses that exist in structures and machines. It is therefore an extremely important foundational module. The central core of the module has to do with equilibrium of rigid bodies and fixed structures such as trusses and beams. This module continues the modelling approach begun in Physics (for particles) and extends it to rigid bodies in static equilibrium. Although not a mathematics module, aspects of mathematics are brought to bear on the formulation and solution of equilibrium problems. The engineer requires skills of both analysis and of modelling. This module, being an introduction, will emphasize the analysis but will begin to develop the modelling ability in students. The module is concerned with developing ways of “seeing” or visualizing equilibrium problems. It is crucial to develop a variety of skills and strategies that will be used in solving problems, but it is also essential that students realize that these are necessary but not sufficient conditions for problem solving. The visual aspect of recognizing equilibrium, simplifying the system, drawing free body diagrams and applying appropriate boundary conditions is what is really important to develop in students. The importance of geometric ability cannot be over-emphasized. The module aims to develop in students an appreciation of forces in their various forms or guises, internal and external, and the way in which they contribute to the equilibrium of an object. The module requires a professional approach that recognizes the need for precision in engineering problem solving, mathematical language, a logical approach to calculations, diagrams that are accurate representations of the physical situation and a layout that is neat.		

Content	4. Review of vectors a. Position, displacement and force vectors b. Line of action and transmissibility, addition of forces at a point c. Adding forces: resultants, components, unit vectors 5. Forces a. Normal reaction and friction b. Equilibrium for a particle c. Connected particles d. Limiting equilibrium: friction, toppling, sliding e. Free body diagrams 6. Parallel and non-parallel coplanar forces, a. Moment of a force, couples, principle of moments b. Addition of a force and a couple c. Resultant and equilibrium for a rigid body, internal forces, toppling and sliding d. Two-force and three-force systems e. Compound systems f. Trusses: methods of nodes and sections g. Beams: bending moments and shear forces
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials

Title	**General Chemistry for Engineers**		
Code	**4CHM172**	**Department**	**Chemistry**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The aim of this module is to give learners the necessary grounding in chemistry for further studies in analytical, inorganic, organic and physical chemistry		
Content	The nature of matter. Atomic structure and periodicity. Electron configurations and bonding. Types of chemical reactions. Chemical equations and the mole concept. The solid, liquid and gaseous states. Solutions. Thermochemistry. Chemical equilibrium. Chemical Kinetics. Redox equations and basic electrochemistry. Acids, bases and salts. Theory of acid-base titrations, including ph. Basic laboratory skills, including weighing and volume measurements and gravimetric, volumetric, and qualitative analyses		

Outcome	Learners must be able to demonstrate: ▪ an understanding of the structure of the atom, the chemical bonding which occurs between atoms and the types of chemical reactions that occur. ▪ an ability to write chemical formulas, balance equations, and apply the mole concepts in chemical calculations to mass reactions and reactions in solution. ▪ an understanding of the classification of matter and the fundamental properties of matter in the solid, liquid and gaseous phases and of solutions. ▪ a thorough grasp of the basic principles of thermochemistry, chemical equilibrium, chemical kinetics, basic electrochemistry and the characteristics of acids, bases and salts as well as the application of this knowledge to acid base titrations. ▪ an ability to perform a range of basic laboratory skills, including weighing and volume measurements and simple gravimetric, volumetric, and qualitative analyses
Assessment	50% Continuous Assessment Mark (comprising 25% practical assessments plus 25% Interim assessments.) 50% Summative assessment(comprising a 3 hour assessment after the course work has been completed)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Calculus II for Engineers**		
Code	**4MTH172**	**Department**	**Mathematical Sciences**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**
Aim	The aim of the module is to further develop concepts in calculus (integration, elementary introduction to differential equations) and to apply their techniques in problem solving.		
Content	• Differentiation: some differentiation formulas, the chain rule, implicit differentiation, the mean-value theorem and applications, some curve sketching, applications of derivatives. • Integration and Techniques of integration: the fundamental theorem of integral calculus, indefinite integrals, some area problems, • Transcendental functions: logarithmic, exponential, inverse trigonometric functions, hyperbolic functions. • Elementary Introduction to Differential Equations: First order linear equations. • Sequences: properties, limits.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Physics B for Engineers**		
Code	**4PHY172**	**Department**	**Physics**
Prerequisites	**4PHY171(DP)**	**Co-requisites**	**None**
Aim	The module is meant for entry level B.Sc. and contains fundamental concepts in Physics and Engineering that prepares the student for later study in more advanced fields in the Physical Sciences. It contains basic concepts in electricity, nuclear physics and modern physics.		
Content	• Electricity and Magnetism: Coulomb's law, conductors and insulators. The electric field. Gauss' law. Potential, electrical potential energy, line integral of electric field, Capacitance, dielectrics and properties of dielectrics, Electric circuits. Magnetic field and magnetism, motion of charges particles through magnetic fields, the cyclotron. Ampere's law. Induced electromotive force, The R-L circuit and the L-C circuit. • Magnetic properties of matter, materials, permeability, molecular theory. Magnetization and susceptibility. Hysteresis. Magnetic field of the earth. Magnetic circuits. • Atomic Physics and radioactivity: Quantum theory of radiation. Wien and Stefan's laws. Planck's radiation formula. Radioactivity, natural decay series. Detectors of radiation, Nuclear reactions, conservation laws, reaction process, proton-induced, neutron-induced and other reactions. Q-values, alpha-. beta- and gamma-decay. Nuclear binding energy. Fission and fusion. Reactors, nuclear fuel, breeders. • Cosmic radiation and fundamental principles. • Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.		
Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic in static electricity, natural phenomena such as lightening, and the principles of machines based on static electricity concepts such as Van De Graaf Generators. ▪ An understanding of electric current and its effects (such as heating) ▪ The generation of electricity (Faraday's law, Lenz's law, etc.) ▪ A learner should understand the basic concepts of radioactivity, constituents of the nucleus and the effect of radiation. ▪ Learners should be able to solve problems related to theory taught. ▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results ▪ Learners must be able to write simple scientific reports commensurate with level 1 B.Sc.		

Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

Title	**Introduction to Engineering Design**		
Code	**5MEC112**	**Department**	**Engineering**
Prerequisites	**5MEC111(DP)**	**Co-requisites**	**None**
Aim	Engineering graphics is the medium for communicating concepts and component manufacturing information. This module aims at developing the skills needed for documenting designs using drawings. Manual and computer aided methods of graphical communication will be used to introduce the fundamentals of descriptive geometry and apply the concepts of basic design for manufacturing.		
Content	1. Understand the concepts of scales and proportions, lines in space and true length and shape. 2. Understand and apply the drawing standards for international graphic communication. 3. Competently use drawing instruments to generate: • orthographic detailed drawings • pictorial views with an emphasis on isometric views • sectioned and auxiliary views of engineering components 4. Generate free hand sketches of orthographic and pictorial projections of engineering components. 5. Communicate with a workshop / manufacturing environment by means of notes and dimensions on drawings. 6. Interpret the information on an orthographic detailed working drawing. 7. Use 3D computer aided drawing software as a tool to • Generate working drawings for manufacturing with design intent. • Apply dimension standards to drawings. • Generate assembly drawings applicable to manufacturing. 8. Understand the fundamentals of Fits and Tolerances • Calculations and IT tables 9. Understand constraints and degrees of freedom in assembled mechanical components.		

Assessment	Tests 30% CAD assignments 20% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork

Title	**Introduction to Engineering**		
Code	**5EEE112**	**Department**	**Engineering**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**
Aim	• To motivate students and help them understand the nature and scope of engineering and specifically electrical engineering • To familiarize students to electrical circuits • Introduce electrical network theorems • To introduce the concept of DC response, steady state AC response and transient response of circuits • To analyze steady state single phase AC circuits using phasor diagrams		
Content	Explanation of the engineering disciplines and some job descriptions for each discipline. Circuit terminology, basic laws of resistive networks, nodal and mesh analysis, further network theorems, energy storage elements, RC and RL circuits, second order circuit analysis, RLC circuits and resonance, introduction to sinusoids and phasors, phasors in steady state AC circuit analysis, AC steady state power in single phase circuits. Introduction to transient analysis of circuits with energy storage elements.		
Assessment	Continuous assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Advanced calculus for Engineers**		
Code	**4MTH271**	**Department**	**Mathematical**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This module is designed to introduce students to the concepts of series, vector functions, differentiation and integration of vector functions and functions of several variables.		

Content	• Intro to infinite series: The integral test The comparison test, The root test & the ratio test • Absolute and conditional convergence • Taylors polynomial in x; taylors theorem in x • Taylors series in (x-a) • Vector equation for a line & Vector equation for a plane • Limits, continuity, differentiation of Vector functions • The evaluation of double integrals by repeated integrals • The double integral as the limit of a Reimann sum • Triple integrals & Reduction to repeated integrals • Cylindrical co-ordinates & Spherical co-ordinates • Jacobian
Assessment	50% continuous assessment 50% formal end of semester 3hr exam on all material covered during the semester.
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials

Title	**Signals and Systems I**		
Code	**5EEE211**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	The module provides students with the basic tools required for understanding linear systems, and the effect that such systems have on deterministic signals.		
Content	• This module provides students with the tools required for understanding linear • systems, and the effect that such systems have on deterministic signals. • Upon completion, students will be able to characterize and manipulate linear time- • Invariant systems in terms of input-output relationships, using both time and frequency • domain methods. • The module includes concepts related to signal representation, linear convolution, • Fourier analysis, and sampling of continuous-time signals.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Analogue Electronic Design**		
Code	**5EEE221**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	Students are introduced to device structures of some of the important Analog Electronic devices, their properties and models, analysis of simple circuits consisting of passive and active devices, operational amplifiers, and analysis of some practical analog		

Content	• The module is delivered in the forms of lectures. There is a fixed text book for the • module, which standardizes the module. • After every 2- 3 weeks' lecture, the students are given a set of SPICE based simulation • exercises which helps them to grasp the material. The SPICE exercises are so • modelled that the students can see the importance of different device parameters and • their effect on some basic designs. • There are also four tutorials given in the module, and tutors are available on the tutorial • classes to help the struggling students. There is an end-of-semester mini project done • in groups. With this, the students try to design and analyze a bigger circuit and make a • report. This helps them to grasp some of the challenges of designing an electronic circuits.
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Mechanics of Solids I**		
Code	**5MEC211**	**Department**	**Engineering**
Prerequisites	**4MTH172, 4MTH181**	**Co-requisites**	**None**
Aim	A student who successfully completes this Module will have a thorough grounding in the essential principles of Mechanics of Solids. He or she will also have the understanding and capability to formulate and undertake problem solving in the areas of (i) simple direct stress and strain, (ii) shearing force and bending moment, (iii) bending stress, (iv) deflection, (v) torsion, and (vi) analysis of complex stress and strain (in 2 dimensions). In addition, they would be aware of the limitations of the mathematical modelling, (e.g. St Venant's principle, "point" loads, stress concentrations, symmetric sections, isotropic materials) as well as the value of free body diagrams, and the range of applicability of the formulations (e.g. Only 2 dimensions, statically determinant structures, axi-symmetric sections for torsion).		

Content	Simple Stress and strain: • Understanding of material tensile stress behaviour, Young's modulus and Poisson's ration. • Formulation of solving of direct stress problems, including pre-stress and temperature induced loads. Shearing of force and bending moment: • Determination of reactions and subsequently drawing up free body diagrams for loaded structures. • Accurate drawing up of shear force and bending moment diagrams on the exploded structure. Bending Stress. • Clear understanding of the relationship between moment M, second moment of area I, stress , distance to outer fibre y, Young's modulus E and radius of curvature R. • Calculation of second moment of areas for symmetrical and non-symmetrical sections as well as compound beams. Determination of stress under various loads. Defection of beams: • Calculation of beam deflection using direct integration, Macaulay's method and moment area techniques. Torsion: • Strong understanding of the relationship between Torque T, polar moments of J, shear stress , radius R, shear modulus G, and angular twist , for round sections. Calculation of polar moments of area, and determination of torsional stresses and general torsional behaviour, including power transmission. Analysis of complex stress and strain: • Understanding of shear stress and strain in two dimensions. Calculation of stresses on an inclined plane. Determination of principal stresses and planes and use of Mohr's circle.
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Materials Science in Engineering**		
Code	**5MEC221**	**Department**	**Engineering**
Prerequisites	**4MTH172, 4MTH181**	**Co-requisites**	**None**
Aim	Any design engineer should know how to select materials which best fit the demands of a particular design – economic and aesthetic demands, as well as demands of strength and durability. This Module is intended to give a broad introduction to these properties and limitations. It cannot make you a materials expert, but it can teach you how to make a sensible choice of material, how to avoid mistakes that have led to embarrassment or tragedy in the past, and where to turn to for further, more detailed assistance.		

Content	Overview of the classification, price and availability of engineering materials. • Structure-property relationships of metallic materials, with particular emphasis on the transition from elastic to plastic behaviour. • Description and measurement of mechanical properties of metals. Modification of the properties of metals by deformation and heat treatment (consider plain carbon steels and low alloy steels as examples). • Structure-property relationships of ceramic and amorphous (glass) materials, with particular emphasis on brittle behaviour and crack growth. • Measurement of fracture toughness in relation to the energy required to propagate a crack. • Modification of the properties of ceramics and glasses by controlled processing (eg thermal treatment to induce residual stress) and composite design (eg influence of fibres on crack propagation). • Structure-property relationships of polymeric materials, with particular emphasis on the classification of thermoplastics, thermosets and elastomers. • Description of the manufacture of polymer components using processes such as extrusion, spinning, and injection and blow moulding. • The principles of reinforcement and design on the properties of composite materials. • Relationship between structure and the electrical behaviour of engineering materials. • Influence of environmental effects (particularly corrosion) on the deterioration and degradation of materials. The Cambridge Engineering Selector (CES): • The first steps in optimising the selection of materials in design (translation, screening, documentation). • Ranking materials suitability using material indices. • Several case studies in materials selection.
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	Linear Algebra and Differential Equations for Engineers		
Code	**4MTH272**	**Department**	**Mathematical sciences**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This module is designed to introduce students to the concepts of linear algebra, and to methods of finding exact solutions to ordinary differential equations		
Content	• Linear algebra: finite and infinite dimensional vector spaces, subspaces, linear transformations and matrices, systems of linear equations, determinants, change of bases, similar matrices, eigenvalues and eigenvectors. • Differential equations: study ordinary differential equations such as separable variables, exact equations, linear equations. Solutions of homogeneous differential equations with constant coefficients, Cauchy-Euler equation, systems of linear equations, nonlinear equations, Laplace transforms, homogeneous linear systems with constant coefficients.		
Assessment	50% continuous assessment (two assessments during the semester) 50% formal end of semester 3hr exam on all material covered during the semester.		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	Thermofluids I		
Code	**4MEC212**	**Department**	**Engineering**
Prerequisites	**4MTH172, 4MTH181**	**Co-requisites**	**None**
Aim	The aim of this Module is to introduce students to the thermodynamics and fluid mechanics sciences. In particular, students will gain an understanding of the 1st law of thermodynamics, mechanisms of heat transfer, as well as hydrostatic forces, pressure and momentum associated with fluid flow.		
Content	The subject will be covered by presenting both the theory as well as solving examples related to the individual topics. The Module will cover principles and examples of: ▪ The fundamentals of pressure, temperature and forms of energy. ▪ The origin and calculation of hydrostatic forces and pressure and their application. ▪ The First Law of Thermodynamics and its application to closed systems and control volumes. ▪ Property Tables and Equations of State. ▪ Equations of continuity and momentum and their applications.		
Assessment	Continuous Assessment 50% Examination 50%		

DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Dynamics I**		
Code	**5MEC222**	**Department**	**Engineering**
Prerequisites	**4MTH172, 4MTH181**	**Co-requisites**	**None**
Aim	The objective of this Module is to review and extend the fundamental principles and formulations of the kinematics and kinetics of Newtonian mechanics in the context of problems involving the dynamics of particles and rigid bodies.		
Content	Particle Kinematics: Rectilinear, plane and curvilinear motion Relative and constrained motion Particle Kinetics: Newton's 2nd law Work, kinetic energy and potential energy (power and efficiency) Linear and angular impulse-momentum and impact D'Alembert's principle Rigid Body Kinematics: Rotation and absolute motion Instantaneous centres of zero velocity Relative velocity and acceleration Motion relative to rotating axes (Coriolis acceleration)		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Mechanical Engineering Machine Element Design I**		
Code	**5MEC232**	**Department**	**Engineering**
Prerequisites	**5MEC112**	**Co-requisites**	**None**
Aim	The aim of this module is to introduce students to the design process for Mechanical Engineering Machine elements.		

Content	This Module introduces the basic engineering design process, applied to selection of simple machine components and development of basic machine assemblies. It draws on basic engineering science (Solid Mechanics, Materials Science, Dynamics) and applied engineering topics (Manufacturing Processes) to understand how machine components are selected and sized, depending on the required application and function. Computer Aided Modelling and Design (CAD) principles, which are introduced in first year, are developed further in the modelling and analysis of more realistic and complex machine assemblies. Topics to be covered during the Module will include: Elementary Design Process; manufacturing processes; tolerances of size and geometry; bearing type selection and sizing; gear type selection and kinematics; flexible drive selection and kinetics; fasteners and sealing; and design for static strength and stiffness.
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**Introduction to Power Engineering**		
Code	**5EEE212**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	To provide a foundation in power engineering		
Content	Phasor diagrams for resistive, inductive and capacitive loads; transient analysis of circuits, complex power; power factor correction; 3-phase systems; magnetic circuits; the single phase transformer; dc. machines		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Mechanics of Solids II**		
Code	**5MEC311**	**Department**	**Engineering**
Prerequisites	**5MEC211**	**Co-requisites**	**None**
Aim	Solid Mechanics is the study of load carrying structures in terms of forces, deformations, and stability. The main objective is to develop the skills that will allow students to understand materials. under different loading conditions.		

Content	**Strain Energy and Theories of Failure** Understanding combined loading conditions and formulating point of failure. Failure theories including maximum principal stress theory, maximum shear stress theory, maximum principal strain theory, maximum shear strain energy theory, Coulomb-Mohr shear stress theory. Determination of component failure using elastic failure theories. **Deflection using Castigliano's Energy Method.** Calculation of beam deflection using Energy Methods, for different loading conditions. **Thin and thick cylinders** Understanding and calculation of the stresses developed in vessels under pressure, shrink fits and compound cylinders. **Strains beyond the elastic limit** Understanding of material behaviour beyond its yield stress where deformation is permanent and non-reversible. Calculation of additional load capacity when considering plasticity. **Rotating discs** Understanding the stresses developed in discs under rotary motion. **Two laboratory sessions on tensile testing and loading of structures**
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Thermofluids II**		
Code	**5MEC321**	**Department**	**Engineering**
Prerequisites	**5MEC212**	**Co-requisites**	**None**
Aim	The Module consists of two topics, Thermodynamics and Fluid Dynamics. The main objectives are to develop the skills that will allow students to solve engineering problems and also to communicate the outcomes of a laboratory session in a report		

<table>
<tr><td>Content</td><td>Different types of flow.
▪ Application of the conservation of mass in fluid flow.
▪ Application of the conservation of momentum in fluid flow.
▪ Application of the conservation of energy in fluid flow.

Revision of bascic concepts:
○ Eenergy
○ properties of pure substances
○ energy analysis of closed systems
○ mass and energy analysis of control volumes.
○ Constant volume and constant pressure processes
○ enthalpy
Second Law of Thermodynamics, heat source and sink, thermal efficiency,
perpetual motion machines, reversible and irreversible processes,
Carnot efficiency, Carnot heat engine, Carnot refrigeration cycle,
entropy, isentropic processes.

Efficiency of compressors, steady flow devices, isothermal, polytropic and isentropic processes, isentropic efficiencies for turbines, compressors,
pumps and nozzles.Gas cycles:
○ Otto,
○ Diesel,
○ Stirling,
○ Ericsson,
○ Brayton and jet-
propulsion cycles. Vapour and combined cycles:
○ Rankine cycle:
▪ reheat,
▪ regeneration,
▪ co-generation,
○ Refrigeration cycles:
▪ vapour-compression cycles,
heat pumps, absorption refrigeration (basic concept)
Gas and vapour mixtures, psychrometric charts. (basic concept)</td></tr>
<tr><td>Assessment</td><td>Continuous Assessment 50%
Examination 50%</td></tr>
<tr><td>DP Requirement</td><td>40% Continuous assessment mark
80% Attendance at practical’s</td></tr>
</table>

Title	**Mechanical Engineering Machine Element Design II**		
Code	**5MEC331**	**Department**	**Engineering**
Prerequisites	**5MEC232**	**Co-requisites**	**None**
Aim	To introduce students to machine design methods.		
Content	This Module aims to facilitate the development of knowledge and skills that will allow students to address design problems with both creativity and rigor, by generating concept designs, designing machine components and assemblies that will perform and can be produced in accordance with appropriately specified development requirements, and the creation of suitable engineering drawings for parts and assemblies. Topics include: Concept generation, machine component design and basic machine system design, CAD modelling and creation of part and assembly drawings including tolerances. Specific knowledge areas are static and fatigue failure theories; standard machine design for joints (welding, threaded and non-threaded fasteners), and power screws and includes basic design projects on the machine level.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Statistics for Engineers**		
Code	**4STT171**	**Department**	**Mathematical**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This Module aims to introduce engineering students to the basic concepts and tools of Statistics which are of particular relevance in an engineering context, and to enable		
Content	Topics include: Random variables, sampling and basic statistical measures; Normal, t, F and Chi-square distributions; Confidence intervals; Statistical models, such as the means and the effects models; t, F and Chi-square tests; Regression and correlation; One-way analysis of variance; Introduction to the design of experiments; Application of		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Experimental Methods**		
Code	**5MEC341**	**Department**	**Engineering**
Prerequisites	**All second year modules**	**Co-requisites**	**None**
Aim	This Module aims to develop skills, based on a real-world scenarios and case studies, which will allow a student to perform successful engineering experiments, as well as data analysis and interpretation.		

Content	The Module covers topics such as: basic concepts in experimental methods and taking measurements; safety and risk assessment; uncertainty analysis; basic electrical measurements; sensing and data management; temperature, pressure, force, strain		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Project Management**		
Code	**5MEC231**	**Department**	**Engineering**
Prerequisites		**Co-requisites**	**None**
Aim	This module deals with the theory, tools, techniques and practices in project management. Opportunities are provided to develop an understanding of the triangle of Project Management (PM) – time, cost and performance and to use PM techniques to achieve objectives within triangle constrains. The application of the theory, tools, techniques and practices is an objective. This takes the form of a multidisciplinary project i.e. development of a small scale engineering		
Content	Introduction to Project Management Introduction to Project Planning and Life Cycle Project Scope Management Project Time Planning and Network Costing Project and Financial Statement Managing Project Resources Managing Risk in Projects Project Quality Management Project Human Resource Project Contracts Trade-off Analysis in a Project Environment Project Closeout Tools include, but are not limited to, WBS, CPM, Gantt Chart,		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Mechanical Engineering Machine Element Design III**		
Code	**5MEC312**	**Department**	**Engineering**
Prerequisites	**5MEC331(DP)**	**Co-requisites**	**None**
Aim	This Module aims to facilitate the further development and skills that will allow students to address complex design problems with creativity and rigor		
Content	The aims will be achieved by generating and selecting concept designs, performing etailed design of machine components and assemblies that will perform and can be produced in accordance with appropriately specified development requirements. The communication of the design process with design reports including engineering drawings is also covered in the Module		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Dynamics II**		
Code	**5MEC322**	**Department**	**Engineering**
Prerequisites	**5MEC222**	**Co-requisites**	**None**
Aim	This Module provides an introduction to engine balancing, kinematic analysis of gear trains, energy storage in flywheels and single-degree-of-freedom models in vibration analysis. Students will learn to analyze the dynamic behaviour of common engineering systems and components, for example gear trains, rotating and reciprocating machinery, flywheels and gyroscopes		
Content	**Gears:** Gear types: spur, bevel, helical, worm; transmission ratio and efficiency; epicyclic gears and differentials **Vibrations:** Free and forced vibration, viscous damping, Single-degree-of-freedom systems Resonance **Rotating Unbalance:** Static balancing, Dynamic balancing, examples of balancing in Practice **Engine Balancing:** Components of an engine, Determination of unbalanced forces and couples, Single cylinder engines, Multi-cylinder engines V- engines **Flywheels:** Energy storage; pulse smoothing torque and speed fluctuations,Crank- effort diagrams, applications - engines and pressing operations **Gyroscopes:** Gyroscopic motion; steady precession only **Laboratory Sessions:** Epicyclic gearbox, Rotating Unbalance		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Thermofluids III**		
Code	**5MEC332**	**Department**	**Engineering**
Prerequisites	**5MEC321(DP)**	**Co-requisites**	**None**
Aim	This Module aims to develop an advanced understanding of thermofluids		
Content	Topics include: Boundary layer theory; forced and natural convection (laminar and turbulent flow along plates and tubes); compressible flow in pipes; rotodynamics machines. ; gas power cycles, engine cycles and measures of performance; properties of gas and vapour mixtures; air-conditioning; combustion chemistry; air/fuel ratio and stoichiometry; fuel sources and composition; energy of reacting systems; heat of combustion; adiabatic flame temperature; heat exchangers; and availability		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	Materials under stress		
Code	5MEC342	Department	Engineering
Prerequisites	5MEC221	Co-requisites	None
Aim	This Module in materials under stress aims to develop an advanced understanding of elasticity and the importance of modulus in engineering design.		
Content	Topics include: the influence of bond strength and crystal structure; plastic flow in crystals and polycrystals by dislocation movement; strengthening mechanism in metals and alloys; annealing and heat treatment procedures; design for safety; stress concentration and residual stress considerations; failure in metals; ductile and brittle fractures; critical flaw size for crack propagation; fracture toughness of materials; stress conditions for fatigue and creep deformation; fracture mechanics; and failure analysis and failure case studies.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	Culture and Society in Africa		
Code	1ANT172	Department	Social
Prerequisites	None	Co-requisites	None
Aim	This is a Complementary Studies Module for Electrical Engineering students aimed at broadening student’s perspective.		
Content	Culture and Society in Africa provides students from all faculties with background knowledge about the continent on which they live. The module includes an examination of the concepts of culture, race, society, ethnicity and nation-state, a perspective on African worldviews and ways of thought, and a consideration of the role of Africa in a changing world.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	Professional Communications		
Code	5EEE232	Department	Engineering
Prerequisites		Co-requisites	None
Aim	The aim of the module is to equip students with theory of oral and written communication, and to give them practical skills that will enable them to communicate more effectively at the University and in their professional careers.		

Content	Referential Style and Academic writing and presentation; Planning & Discourse of technical written and oral messages; Reports – investigative/ evaluative; Executive Summaries/ Synopses; Individual presentations; graphics and visual literacy. Module content covers the following areas: Communication theory: • aim of communication • barriers to communication • audience and readership analysis • modes of communication Planning and Discourse: • definitions and schools • reasons for codes and rules • professional practice as defined by ECSA • corporate governance and King III report Reports: • types: investigative and feasibility • research: citation and referencing • different formats for types of reports • sections within reports (introduction, methods, results, conclusions, recommendations) and their functions • preliminary sections such as Table of Contents • final sections such as Appendices Summaries: • purpose of an executive summary to a technical or professional report • structure and components of a good executive summary • style and language for a persuasive and comprehensive summary Graphic and PowerPoint Design: • fundamental principles of visual literacy for text documents and presentations • types of graphics • types of visual aids that support and enhance a good presentation • visual literacy and creating PowerPoint slides. Individual presentations: • criteria for giving an effective oral presentation • vocal delivery • techniques for planning and balance in a presentation • audience reach • managing questions
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

<table>
<tr><td>Title</td><td colspan="3">Mechanical Vibrations</td></tr>
<tr><td>Code</td><td>5MEC411</td><td>Department</td><td>Engineerin</td></tr>
<tr><td>Prerequisites</td><td>5MEC322</td><td>Co-requisites</td><td>None</td></tr>
<tr><td>Aim</td><td colspan="3">This Module aims to introduce students to the modelling of vibration in machines and structures. This will include single- and multi- degree of freedom models; analytical and numerical solution techniques; and practical applications. Formulation of equations of motion for single- and multi- degrees of freedom by Newton’s laws and energy methods; solution techniques for equations of motion via analytical and numerical methods; modal analysis; application of techniques to analysis and design; and continuous systems.</td></tr>
<tr><td>Content</td><td colspan="3">1. Single degree of freedom systems:
1.1 Formulation of the equation of motion of linear SDOF system by
a) Newton’s Law
b) Energy Method(s)
1.2 Solution of equation of motion by:
a) Analytical solutions
b) Numerical methods
1.3 Applications: Rotating unbalance, vibration isolation, vibration measurement
2. Multi degree of freedom systems:
2.1 Formulation of the equation of motion of linearized DMOF system
a) Analytical solutions
b) Numerical methods
2.2 Solutions of equations of motion for free and forced systems by
a) Modal analysis
b) Numerical methods
c) Application: Vibration absorbers, complex structures, mechanisms
2.3 Continuous Systems (Time Allowing)
3. Formulation of equations of motion for simple continuous systems
4. Vibration absorbers</td></tr>
<tr><td>Assessment</td><td colspan="3">Continuous Assessment 50%
Examination 50%</td></tr>
<tr><td>DP Requirement</td><td colspan="3">40% Continuous assessment mark
80% Attendance at practical’s</td></tr>
</table>

Title	**Product Design**		
Code	**5MEC421**	**Department**	**Engineering**
Prerequisites	**5MEC322**	**Co-requisites**	**None**
Aim	To facilitate the development of knowledge and skills that will allow candidates to design a conventional engineering device working in a team and individually. The design is to be performed holistically, duly considering market opportunities and product architecture, needs identification, requirement formulation, planning and managing the process, concept generation and selection, detail design and drawing, financial and technical performance analysis and communicating the design solution.		
Content	• The Design Process (Ulrich & Eppinger, Chapter 2) • Opportunity identification (Ulrich & Eppinger, Chapter 3) • Product planning and architecture (Ulrich & Eppinger, Chapters 4 & 10) • Customer needs and requirements specification (Ulrich & Eppinger, Chapters 5 & 6) • Concept generation and selection (Ulrich & Eppinger, Chapters 7 & 8) • Managing projects (Ulrich & Eppinger, Chapters 18) • Product development economics (Ulrich & Eppinger, Chapter 17) • Design for Environment, Manufacture and Assembly (Ulrich & Eppinger, Chapters 12 & 13) • Prototyping and modelling (Ulrich & Eppinger, Chapter 14) • Patents and Intellectual Property (Ulrich & Eppinger, Chapter 16) • Industrial design (Ulrich & Eppinger, Chapter 11) • Robust design (Ulrich & Eppinger, Chapter 15) • Design project (Afternoon session plus own time)		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**System Design**		
Code	**5MEC431**	**Department**	**Engineering**
Prerequisites	**5MEC322**	**Co-requisites**	**None**
Aim	The objective of the Module is to enable students to structure and plan a high level system design and to generate system and subsystem development specifications. Structuring of the development process according to the life cycle model portrayed by the V-diagram. Functional decomposition and allocation to hardware. Determination of the system and subsystem requirements by means of system modelling and simulation and creation of a system verification matrix.		
Content	This Module marks the final chapter in the design programme that covers 3 years of undergraduate engineering studies. Students are now ready to tackle engineering problems that stretch beyond disciplinary boundaries, and involve complexity that is beyond the mastery of a single engineer. This is the world of Systems Engineering where various processes and techniques are used to make a seemingly impossible problem manageable and solvable. From the previous design Modules students have learned the skills of component or product design. Now it is time to broaden the horizons and tackle systems containing several interrelated products. The fundamental skills from mathematics, physic thermofluids, dynamics and other subjects will be essential for students to master the subject of System Design. The aim of this Module is to give students an appreciation of the effort and methodologies used when developing large and complex systems like power plants, aircraft, vehicles, space stations or even transportation networks.		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Fundamentals of Control Systems**		
Code	**5MEC441**	**Department**	**Engineering**
Prerequisites	**All third year modules**	**Co-requisites**	**None**
Aim	The objective of this Module is to provide an introduction to basic techniques in control systems engineering: ▪ Mathematical modelling of elementary systems; ▪ converting governing linear differential equations by means of the Laplace transform; ▪ transfer functions and block diagram algebra; the root locus technique for stability analysis; frequency response of systems; ▪ Bode plot design of control loops; ▪ the effect of proportional, integral and derivative control; ▪ z-transforms and difference equations for digital control; • control system computer simulations.		
Content	• Basic control loops, benefits of feedback, transfer functions • Block diagram algebra • Laplace (s-) transforms • Z-transforms • Accurate and approximate s-z relations • Simulations • Delays in control loops, compensators, noise and filters • Bandwidth, Time constant, Gain and Phase revisited • Importance and meaning of poles and zeros – analyses and demonstration by simulation • Root Locus analysis – manual calculations and sketching, computer generated • Comparing Root Locus and Bode Plots • Bode Plot analysis and design, open loop, closed loop • Optimal compensator positions • From analogue to digital – revision and expansion • From digital to implementation – difference equations • Bode Plot design – digital / analogue mixed • Quantization effects, stiction / friction and noise • Noise filtering, especially anti-aliasing • Scaling • Modelling of DC motors, gearboxes and sensors • Examples of complete systems – specifying, modelling, simulation, design		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	Aeronautical Engineering		
Code	5MEC451	Department	Engineering
Prerequisites	5MEC311	Co-requisites	None
Aim	The objective of this module is to stimulate an enthusiasm for Aeronautical Engineering by introducing the history of flight, aerodynamics, aircraft propulsion, aerospace systems and spacecraft systems. Some topics are covered in detail, including: aerodynamics, aircraft design, propulsion, structures, control and instrumentation.		
Content	• The history of flight, aerodynamics, aircraft propulsion, aerospace systems. • Aspects of aerodynamics and aircraft design • Aerodynamic loads, Mach number and Reynolds number • Develop a broad understanding of the aircraft design process • 2D/3D aero foil flow characteristics, including boundary layer effects, high lift devices • Understanding of the aerodynamic forces generated on wings and bodies in incompressible flow • Evaluate the mechanism of lift generation • Flows over aero foils, wings, bodies and other aircraft components (e.g flaps, controls etc.) at low speed • Concepts in aircraft stability and control • Provide an understanding of the properties of proportional, integral and derivative controllers • Analysis of the stress distribution in aircraft components with the aid of experimental tests • Understand the basic principles of propellers, axial and centrifugal compressors and axial flow turbines		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	Engineering Professionalism		
Code	5MEC461	Department	Engineering
Prerequisites	All third year modules	Co-requisites	None
Aim	This module deals practically with the student’s transition to the workplace. The aim is to complement the student’s theoretical training by introducing (in some cases) and reinforcing (in others) the topics and issues most likely to be encountered in the engineering profession. This is part of the endeavour to produce a well-rounded mechanical engineer for industry, consulting and the design environment		

Content	Professional registration – ECSA, the Washington Accord, code of conduct, due diligence, government certificate of competence, mentorship in industry. Types of engineering employment – details of the options available for graduates, the realities of the workplace and industry training, career path management.Engineering economics – working capital, cash flow, salaries and wages, depreciation, tax considerations, rate of return, payback period. Health and Safety – managing disease and health in the workplace, occupational safety and related legislation, practical HAZOP analysis, safe work permits and lockouts. Industrial law – Overview of employment law, labour relations and employment equity contracts, basis of offer and acceptance. Quality, reliability and maintenance management and their importance in the engineering profession. Environment – legislation, ISO140001, aspects of engineering operations and Likely impacts, considerations of the created environment as well as the impacts on socio-economic and cultural systems.
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Professional Communication Studies**		
Code	**5MEC412**	**Department**	**Engineering**
Prerequisites	**5EEE232**	**Co-requisites**	**None**
Aim	Professional Writing including: Business Proposals; Graphic Communication and Readability; Posters; Group presentations with Power-point		

Content	Referential and Academic writing and presentation; Persuasive argument; Formats for business plans and proposals; group presentations; graphics and visual literacy. Module content covers the following areas: Group theory and Team work: • aim of communication • barriers to communication • why groups are formed • types of groups • group dynamics and how teams are formed • advantages of groups. • different types of leaders • process and benefits of Brainstorming • different approaches to Problem-solving and decision-making. • negotiation skills Ethics: • definitions and schools • reasons for codes and rules • professional practice as defined by ECSA • corporate governance and King III report Business Plans and Proposals: • solicited and unsolicited proposals • requests for proposals • functions of SWOT and PESTEL • Table of Contents of a Business Proposal Summaries: • purpose of an executive summary • structure and components of a good executive summary • style and language for a persuasive and comprehensive summary CVs and Covering letters • formats for and choice and ordering of content • traditional and non-traditional CVs • covering letters for responding to an advertisement or tender and for direct approach. Poster Design: • difference between stand-alone posters and accompanied posters • fundamental principles of well-designed posters. Group presentations: • criteria for giving an effective group oral presentation • vocal delivery • techniques for good cohesion, transitioning and handover to the next person in the group • types of visual aids that support and enhance a good presentation • visual literacy and creating PowerPoint slides.
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	New Venture Planning and Management		
Code	5MEC422	Department	Engineering
Prerequisites	All third year modules	Co-requisites	None
Aim	Learning Business skills involved in starting entrepreneurial businesses from products designed: feasibility analysis, business plan, presentations		
Content	The entrepreneurial perspective; developing a new venture; what is a feasibility plan? Product concept and description; market assessment; industrial analysis; marketing plan; operations, development plans and management; financial projections		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	Final Year Research Project		
Code	5MEC432	Department	Engineering
Prerequisites	Depends on the topic	Co-requisites	None
Aim	To give individual students the opportunity to tackle a real engineering project within a limited period under the guidance of a supervisor and submit a project report on the results.		
Content	The final year research project is an important opportunity for the student, at the end of the degree programme, to tackle a real engineering project. The student is expected to work on the project both individually and under the guidance of a supervisor. An engineering project involves the creative application of scientific principles to the solution of a technical problem. It involves a problem description or research hypothesis developed in consultation with a supervisor, reviewing the topic in detail and defining the boundaries (scope) carefully, confirming an understanding of the requirements of the supervisor, searching for, selecting and justifying the most appropriate approaches to solving the problem or testing the hypothesis. It also requires a student to be able to analyse, design, build, integrate and test as is appropriate for the specific project. This could include the use of hardware, software and simulation. Students are also required to evaluate the project against the success criteria and design objectives, and to write a report about the project, the findings, and any recommendations. In addition, students need to make an oral presentation and prepare an exhibit.		
Assessment	Thesis 100%		
DP Requirement	Meeting the ELO requirements		

Title	Industrial Ecology		
Code	5MEC442	Department	Engineering
Prerequisites	All third year modules	Co-requisites	None
Aim	The module is an introduction and overview of the relatively new 'field' of Industrial Ecology and its more recent trends. In the context of the module "industrial ecology" is interpreted as encompassing all of the interactions of an industrial society with the natural environment as well as the associated drivers of industrialization. A more appropriate way of thinking about the module is to rename it "the Ecology of Industrial Society". The objectives are to encourage a systems perspective of industrial activity as it is integrated with and forms part of the natural systems (lithosphere, pedosphere, biosphere, hydrosphere, atmosphere) This module is intended to be an enjoyable and enlightening experience, given the very different kind of learning that is expected. The students in the class have the responsibility to make the learning their own – to engage in debate and ask questions that will lead to the class finding out new information and reading different literature than that originally proposed – because it concerns what interests you and what you want to learn. What you learn and the effects of industry on the environment both affect your future. We are all in this together – the learning and the living. Let's do it with enthusiasm and meaning. There are however, two primary educational goals for the module. The first has to do with the content and the second with the process. Students are expected to become aware of the problem issues facing the global community that relate to the industrial impact on the environment – the ecology of industrial society. You are expected to demonstrate this awareness and the acquisition of knowledge and understanding through discussion in class, through oral arguments, quizzes, projects, an exam and a term paper. These forms of communication hint at the second set of outcomes that relate to the ability to accomplish a limited kind of research as well as communicating ideas in a professional manner. Students are expected to put into practice the skills they have acquired in their professional communication module as well as using the opportunity to improve those skills. These do not only relate to the presentation side of the skills but also to the exploratory and critical aspects – being able to ask critical questions, seek information from the internet and other sources, argue a case in discussion as well as in a formal written presentation, show logical development of a debate and a willingness to be persuaded by a counter argument.		
Content	Ecosystem deterioration, pollution Resource depletion: Fossil fuels, water, uranium, rare earth metals Climate change Systems thinking, thermodynamics Sustainability; the limits to growth Industrial Ecology concepts and tools Material Flow Analysis Life Cycle Assessment; the circular economy Design for Environment Eco-Industrial Parks: industrial symbiosis Ethics: economic paradigms, consumption Energy, Mobility,		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Degree Module Content for BEng (Electrical Engineering and Computer Engineering)

Title	**Calculus I for Engineers**		
Code	**4MTH171**	**Department**	**Mathematical Sciences**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	To introduce differential calculus with necessary prerequisites from logic and general algebra.		
Content	• Elementary Logic and Theory of Sets: sets and subsets, Venn-Euler diagrams, basic set operations, sets of numbers, elementary logic. • Inequalities: Definition, order axioms, interval notation, set builder notation, solving inequality equations. Absolute value • Functions: elementary functions, graph of a function, combination of functions, inverse functions, exponential and logarithmic functions, relations. • Limits, Continuity and Differentiation: definition of limit, continuity and the derivative • Algebra: induction, vectors and vector algebra, dot products and cross products, introduction to matrices and matrix algebra, transpose and determinants, the adjoint matrix, invertible matrix and Cramer's rule, complex numbers and De Moivre's theorem.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials.		

Title	**General Physics A for Engineers**		
Code	**4PHY171**	**Department**	**Physics**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The module is meant for entry level BEng and contains fundamental concepts in Physics and Engineering that prepares the student for later study in more advanced fields in the Physical Sciences. It contains basic concepts in mechanics, waves, optics and thermodynamics.		

Content	• Statistical concepts: Probability, distributions, histograms, standard deviation, propagation of errors. Units and measurement: Dimensions, SI-system of units, basic measurements in physics. • Mechanics: Forces, moments, couples, Newton's laws, circular motion, momentum, oscillations, momentum and impulse. • Heat and thermodynamics: Mechanisms of heat transfer, heat capacity, phase changes, gases. • Waves: Sound waves, light and light sources, laws of refraction, diffraction and reflection. • Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.
Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic mechanics concepts, laws of Newton and their practical application. ▪ The understanding of circular motion, its mathematical representation and solving of problems associated with repetitive circular motion. ▪ An understanding of wave concepts, modes of propagation and associated phenomena inside a material medium. ▪ Problems. ▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results. ▪ Learners must be able to write simple scientific reports commensurate with level 1 B.Sc.
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and Project work

Title	Introductory Computing for Engineers		
Code	**4CPS171**	**Department**	**Computer Science**
Prerequisites	**None**	**Co-requisites**	**Any Mathematics module**
Aim	**To provide an introduction to hardware and software components of computer systems.**		
Content	**Section A – Computer Architecture** Introduction to Digital logic and Digital systems; Machine level representation of data; Assembly level machine organization **Section B – Software Development Fundamentals** Fundamental Programming concepts and Object-Oriented Programming		
Outcomes	At the end of the module, the learners should be able to: ▪ Explain the organization of the classical von Neumann machine and its major functional units. ▪ Describe the internal representation of data. ▪ Represent Boolean logic problems as: truth tables and logic circuits. ▪ Design, implement, test, and debug programs that use fundamental programming constructs such as: basic computation, simple I/O, standard conditional and iterative structures, methods, and parameter passing.		
Assessment	50% Continuous assessment 50% final practical and theory examination		
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's		

Title	Engineering Drawing		
Code	**5MEC111**	**Department**	**Engineering**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The aim of this module is to use conventional drawing techniques to develop the skill of reading, interpreting and creating engineering drawings using drawing instruments and free hand sketches		
Content	1. Understand the concepts of scales and proportions, lines in space and true length and shape. 2. Understand and apply the drawing standards for international graphic communication. 3. Competently use drawing instruments to generate: • orthographic detailed drawings • pictorial views with an emphasis on isometric views • sectioned and auxiliary views of engineering components 4. Generate free hand sketches of orthographic and pictorial projections of engineering components. 5. Communicate with a workshop / manufacturing environment by means of notes and dimensions on drawings. 6. Interpret the information on an orthographic detailed working drawing.		
Assessment	Test 1: Descriptive Geometry Test 25% Test 2: Descriptive Geometry Test 25% Examination 50%		

DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork

Title	**Engineering Mechanics**		
Code	**4MTH181**	**Department**	**Mathematical Sciences**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**
Aim	Engineering Mechanics is the first module that prepares students to analyze forces and stresses that exist in structures and machines. It is therefore an extremely important foundational module. The central core of the module has to do with equilibrium of rigid bodies and fixed structures such as trusses and beams. This module continues the modelling approach begun in Physics (for particles) and extends it to rigid bodies in static equilibrium. Although not a mathematics module, aspects of mathematics are brought to bear on the formulation and solution of equilibrium problems. The engineer requires skills of both analysis and of modelling. This module, being an introduction, will emphasize the analysis but will begin to develop the modelling ability in students. The module is concerned with developing ways of "seeing" or visualizing equilibrium problems. It is crucial to develop a variety of skills and strategies that will be used in solving problems, but it is also essential that students realize that these are necessary but not sufficient conditions for problem solving. The visual aspect of recognizing equilibrium, simplifying the system, drawing free body diagrams and applying appropriate boundary conditions is what is really important to develop in students. The importance of geometric ability cannot be over-emphasized. The module aims to develop in students an appreciation of forces in their various forms or guises, internal and external, and the way in which they contribute to the equilibrium of an object. The module requires a professional approach that recognizes the need for precision in engineering problem solving, mathematical language, a logical approach to calculations, diagrams that are accurate representations of the physical situation and a layout that is neat.		

Content	1. Review of vectors a. Position, displacement and force vectors b. Line of action and transmissibility, addition of forces at a point c. Adding forces: resultants, components, unit vectors 2. Forces a. Normal reaction and friction b. Equilibrium for a particle c. Connected particles d. Limiting equilibrium: friction, toppling, sliding e. Free body diagrams 3. Parallel and non-parallel coplanar forces, a. Moment of a force, couples, principle of moments b. Addition of a force and a couple c. Resultant and equilibrium for a rigid body, internal forces, toppling and sliding d. Two-force and three-force systems e. Compound systems f. Trusses: methods of nodes and sections g. Beams: bending moments and shear forces
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials

Title	**General Chemistry for Engineers**		
Code	**4CHM172**	**Department**	**Chemistry**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The aim of this module is to give learners the necessary grounding in chemistry for further studies in analytical, inorganic, organic and physical chemistry		
Content	The nature of matter. Atomic structure and periodicity. Electron configurations and bonding. Types of chemical reactions. Chemical equations and the mole concept. The solid, liquid and gaseous states. Solutions. Thermochemistry. Chemical equilibrium. Chemical Kinetics. Redox equations and basic electrochemistry. Acids, bases and salts. Theory of acid-base titrations, including ph. Basic laboratory skills, including weighing and volume measurements and gravimetric, volumetric, and qualitative analyses		

Outcome	Learners must be able to demonstrate: ▪ an understanding of the structure of the atom, the chemical bonding which occurs between atoms and the types of chemical reactions that occur. ▪ an ability to write chemical formulas, balance equations, and apply the mole concepts in chemical calculations to mass reactions and reactions in solution. ▪ an understanding of the classification of matter and the fundamental properties of matter in the solid, liquid and gaseous phases and of solutions. ▪ a thorough grasp of the basic principles of thermochemistry, chemical equilibrium, chemical kinetics, basic electrochemistry and the characteristics of acids, bases and salts as well as the application of this knowledge to acid base titrations. ▪ an ability to perform a range of basic laboratory skills, including weighing and volume measurements and simple gravimetric, volumetric, and qualitative analyses
Assessment	50% Continuous Assessment Mark (comprising 25% practical assessments plus 25% Interim assessments.) 50% Summative assessment(comprising a 3 hour assessment after the course work has been completed)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Calculus II for Engineers**		
Code	**4MTH172**	**Department**	**Mathematical Sciences**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**
Aim	The aim of the module is to further develop concepts in calculus (integration, elementary introduction to differential equations) and to apply their techniques in problem solving.		
Content	• Differentiation: some differentiation formulas, the chain rule, implicit differentiation, the mean-value theorem and applications, some curve sketching, applications of derivatives. • Integration and Techniques of integration: the fundamental theorem of integral calculus, indefinite integrals, some area problems, • Transcendental functions: logarithmic, exponential, inverse trigonometric functions, hyperbolic functions. • Elementary Introduction to Differential Equations: First order linear equations. • Sequences: properties, limits.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

<table>
<tr><td>Title</td><td colspan="3">Physics B for Engineers</td></tr>
<tr><td>Code</td><td>4PHY172</td><td>Department</td><td>Physics</td></tr>
<tr><td>Prerequisites</td><td>4PHY171(DP)</td><td>Co-requisites</td><td>None</td></tr>
<tr><td>Aim</td><td colspan="3">The module is meant for entry level B.Sc. and contains fundamental concepts in Physics and Engineering that prepares the student for later study in more advanced fields in the Physical Sciences. It contains basic concepts in electricity, nuclear physics and modern physics.</td></tr>
<tr><td>Content</td><td colspan="3">
Electricity and Magnetism: Coulomb’s law, conductors and insulators. The electric field. Gauss’ law. Potential, electrical potential energy, line integral of electric field, Capacitance, dielectrics and properties of dielectrics, Electric circuits. Magnetic field and magnetism, motion of charges particles through magnetic fields, the cyclotron. Ampere’s law. Induced electromotive force, The R-L circuit and the L-C circuit.
Magnetic properties of matter, materials, permeability, molecular theory. Magnetization and susceptibility. Hysteresis. Magnetic field of the earth. Magnetic circuits.
Atomic Physics and radioactivity: Quantum theory of radiation. Wien and Stefan’s laws. Planck’s radiation formula. Radioactivity, natural decay series. Detectors of radiation, Nuclear reactions, conservation laws, reaction process, proton-induced, neutron-induced and other reactions. Q-values, alpha-. beta- and gamma-decay. Nuclear binding energy. Fission and fusion. Reactors, nuclear fuel, breeders.
Cosmic radiation and fundamental principles.
Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.
</td></tr>
<tr><td>Outcomes</td><td colspan="3">
An understanding of statistical concepts for data analysis and presentation.
An understanding of basic in static electricity, natural phenomena such as lightening, and the principles of machines based on static electricity concepts such as Van De Graaf Generators.
An understanding of electric current and its effects (such as heating)
The generation of electricity (Faraday’s law, Lenz’s law, etc.)
A learner should understand the basic concepts of radioactivity, constituents of the nucleus and the effect of radiation.
Learners should be able to solve problems related to theory taught.
Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results
Learners must be able to write simple scientific reports commensurate with level 1 B.Sc.
</td></tr>
<tr><td>Assessment</td><td colspan="3">50% Continuous Assessment Mark
50% Formal end of module exam (3 hours)</td></tr>
<tr><td>DP Requirement</td><td colspan="3">40% Continuous Assessment Mark
80% Attendance at practical’s and fieldwork</td></tr>
</table>

Title	**Introduction to Engineering Design**		
Code	**5MEC112**	**Department**	**Engineering**
Prerequisites	**5MEC111(DP)**	**Co-requisites**	**None**
Aim	Engineering graphics is the medium for communicating concepts and component manufacturing information. This module aims at developing the skills needed for documenting designs using drawings. Manual and computer aided methods of graphical communication will be used to introduce the fundamentals of descriptive geometry and apply the concepts of basic design for manufacturing.		
Content	1. Understand the concepts of scales and proportions, lines in space and true length and shape. 2. Understand and apply the drawing standards for international graphic communication. 3. Competently use drawing instruments to generate: • orthographic detailed drawings • pictorial views with an emphasis on isometric views • sectioned and auxiliary views of engineering components 4. Generate free hand sketches of orthographic and pictorial projections of engineering components. 5. Communicate with a workshop / manufacturing environment by means of notes and dimensions on drawings. 6. Interpret the information on an orthographic detailed working drawing. 7. Use 3D computer aided drawing software as a tool to • Generate working drawings for manufacturing with design intent. • Apply dimension standards to drawings. • Generate assembly drawings applicable to manufacturing. 8. Understand the fundamentals of Fits and Tolerances • Calculations and IT tables 9. Understand constraints and degrees of freedom in assembled mechanical components.		
Assessment	Tests 30% CAD assignments 20% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s and fieldwork		

Title	Introduction to Engineering		
Code	**5EEE112**	**Department**	**Engineering**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**
Aim	• To motivate students and help them understand the nature and scope of engineering and specifically electrical engineering • To familiarize students to electrical circuits • Introduce electrical network theorems • To introduce the concept of DC response, steady state AC response and transient response of circuits • To analyze steady state single phase AC circuits using phasor diagrams		
Content	Explanation of the engineering disciplines and some job descriptions for each discipline. Circuit terminology, basic laws of resistive networks, nodal and mesh analysis, further network theorems, energy storage elements, RC and RL circuits, second order circuit analysis, RLC circuits and resonance, introduction to sinusoids and phasors, phasors in steady state AC circuit analysis, AC steady state power in single phase circuits. Introduction to transient analysis of circuits with energy storage elements.		
Assessment	Continuous assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	Advanced calculus for Engineers		
Code	**4MTH271**	**Department**	**Mathematical sciences**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This module is designed to introduce students to the concepts of series, vector functions, differentiation and integration of vector functions and functions of several variables.		

Content	• Intro to infinite series: The integral test The comparison test, The root test & the ratio test • Absolute and conditional convergence • Taylors polynomial in x; taylors theorem in x • Taylors series in (x-a) • Vector equation for a line & Vector equation for a plane • Limits, continuity, differentiation of Vector functions • The evaluation of double integrals by repeated integrals • The double integral as the limit of a Reimann sum • Triple integrals & Reduction to repeated integrals • Cylindrical co-ordinates & Spherical co-ordinates • Jacobian
Assessment	50% continuous assessment 50% formal end of semester 3hr exam on all material covered during the semester.
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials

Title	**Introduction to Programming for Engineers**		
Code	**4CPS181**	**Department**	**Computer**
Prerequisites	**4CPS171**	**Co-requisites**	**None**
Aim	To equip students with foundational programming skills including basic data structures.		
Content	Foundational Concepts; Overview of Structured Programming; Procedure-based versus Object-based thinking; Introductory UML representation of Object concepts; Object-oriented programming; Basic Concepts: objects, strings, arrays, classes, GUI, User-defined classes, and ADTs. Inheritance and Polymorphism, Implementation of object-oriented programming concepts using Java.		
Outcomes	• Demonstrate the ability to use Java constructs to build Objects and object relationships and interactions; • Usage of UML language to represent core Object-oriented concepts such as encapsulation, inheritance and polymorphism; • Acquire skills to use basic data structure algorithms covering array, list, stack and composite data structures based on them.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% minimum must be scored by a student to qualify to write examination.		

Title	**Signals and Systems I**		
Code	**5EEE211**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**

Aim	The module provides students with the basic tools required for understanding linear systems, and the effect that such systems have on deterministic signals.
Content	• This module provides students with the tools required for understanding linear • systems, and the effect that such systems have on deterministic signals. • Upon completion, students will be able to characterize and manipulate linear time- • Invariant systems in terms of input-output relationships, using both time and frequency • domain methods. • The module includes concepts related to signal representation, linear convolution, • Fourier analysis, and sampling of continuous-time signals.
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Analogue Electronic Design**		
Code	**5EEE221**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	Students are introduced to device structures of some of the important Analog Electronic devices, their properties and models, analysis of simple circuits consisting of passive and active devices, operational amplifiers, and analysis of some practical analog electronic circuits.		
Content	• The module is delivered in the forms of lectures. There is a fixed text book for the • module, which standardizes the module. • After every 2- 3 weeks' lecture, the students are given a set of SPICE based simulation • exercises which helps them to grasp the material. The SPICE exercises are so • modelled that the students can see the importance of different device parameters and • their effect on some basic designs. • There are also four tutorials given in the module, and tutors are available on the tutorial • classes to help the struggling students. There is an end-of-semester mini project done • in groups. With this, the students try to design and analyze a bigger circuit and make a • report. This helps them to grasp some of the challenges of designing an electronic circuits.		

Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Project Management**		
Code	**5MEC231**	**Department**	**Engineering**
Prerequisites	**All first year modules**	**Co-requisites**	**None**
Aim	This module deals with the theory, tools, techniques and practices in project management. Opportunities are provided to develop an understanding of the triangle of Project Management (PM) – time, cost and performance and to use PM techniques to achieve objectives within triangle constrains. The application of the theory, tools, techniques and practices is an objective. This takes the form of a multidisciplinary project i.e. development of a small scale engineering system.		
Content	• Introduction to Project Management Introduction to Project Planning and Life Cycle Project Scope Management • Project Time Planning and Network Costing Project and Financial Statement Managing Project Resources • Managing Risk in Projects • Project Quality Management Project Human Resource Project Contracts • Trade-off Analysis in a Project Environment Project Closeout • Tools include, but are not limited to, WBS, CPM, Gantt Chart, Resource Levelling, Cash Flow Statement, Trade- off analysis and communication techniques		
Assessment	Continuous Assessment 50% Examination 50%		

Title	**Linear Algebra and Differential Equations for Engineers**		
Code	**4MTH272**	**Department**	**Mathematical sciences**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This module is designed to introduce students to the concepts of linear algebra, and to methods of finding exact solutions to ordinary differential equations		
Content	• Linear algebra: finite and infinite dimensional vector spaces, subspaces, linear transformations and matrices, systems of linear equations, determinants, change of bases, similar matrices, eigenvalues and eigenvectors. • Differential equations: study ordinary differential equations such as separable variables, exact equations, linear equations. Solutions of homogeneous differential equations with constant coefficients, Cauchy-Euler equation, systems of linear equations, nonlinear equations, Laplace transforms, homogeneous linear systems with constant coefficients.		
Assessment	50% continuous assessment (two assessments during the semester) 50% formal end of semester 3hr exam on all material covered during the semester.		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Introduction to Power Engineering**		
Code	**5EEE212**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	To provide a foundation in power engineering		
Content	Phasor diagrams for resistive, inductive and capacitive loads; transient analysis of circuits, complex power; power factor correction; 3-phase systems; magnetic circuits; the single phase transformer; dc. machines		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Embedded Systems I**		
Code	**5EEE222**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	This module aims to give students a strong foundation in embedded systems by introducing them to digital system fundamentals, including information representation, Boolean algebra, logic gate behavior, combinational and sequential digital circuits, digital building blocks and algorithmic state machines. The module also provides a basic understanding of what a microcontroller is, how it works inside and what it can be used for. These objectives will be carried out by writing code for a micro in ASM and C		
Content	• The goal in convening this module is to impart elementary knowledge and a basic • understanding of logic and computer design and the advances in the underlying • technology that have had an impact on the application of these fundamentals. • We also aim to enable the student to design a prescribed digital system and finite state • machine. At the end of the study, the student must be able to appreciate the role of • digital electronics in computer and automation systems. The topic sequence to bring • this about consists mainly of the following: • Digital systems and information representation, Binary logic, Boolean Algebra, • combinational circuits, combinational design concepts and procedures, arithmetic • functions, sequential circuits, combinational design concepts and procedures. Digital • storage and representation of data in a memory architecture. • The purpose and capabilities of a simple ARM CPU. Instruction sets, op codes and • operands. Compiling, assembling, linking and loading of code using a command line • tool chain. Debugging code in execution. Assembly conditional statements, loops and • interrupts. Peripherals: GPIO, ADC, Timers, SPI. These concepts will then be • re-iterated using the C language. An IDE will be used. Functions, pointers, function • pointers, while, for, if, logic operations.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

<table>
<tr><td>Title</td><td colspan="3">Professional Communications</td></tr>
<tr><td>Code</td><td>5EEE232</td><td>Department</td><td>Engineering</td></tr>
<tr><td>Prerequisites</td><td>All first year modules</td><td>Co-requisites</td><td>None</td></tr>
<tr><td>Aim</td><td colspan="3">The aim of the module is to equip students with theory of oral and written communication, and to give them practical skills that will enable them to communicate more effectively at the University and in their professional careers.</td></tr>
<tr><td>Content</td><td colspan="3">Referential Style and Academic writing and presentation; Planning & Discourse of technical written and oral messages; Reports – investigative/ evaluative; Executive Summaries/ Synopses; Individual presentations; graphics and visual literacy.

Module content covers the following areas:
Communication theory:
aim of communication
barriers to communication
audience and readership analysis
modes of communication
Planning and Discourse:
definitions and schools
reasons for codes and rules
professional practice as defined by ECSA
corporate governance and King III report
Reports:
types: investigative and feasibility
research: citation and referencing
different formats for types of reports
sections within reports (introduction, methods, results, conclusions, recommendations) and their functions
preliminary sections such as Table of Contents
final sections such as Appendices
Summaries:
purpose of an executive summary to a technical or professional report
structure and components of a good executive summary
style and language for a persuasive and comprehensive summary
Graphic and PowerPoint Design:
fundamental principles of visual literacy for text documents and presentations
types of graphics
types of visual aids that support and enhance a good presentation
visual literacy and creating PowerPoint slides.
Individual presentations:
criteria for giving an effective oral presentation
vocal delivery
techniques for planning and balance in a presentation
audience reach
managing questions</td></tr>
<tr><td>Assessment</td><td colspan="3">Continuous Assessment 50% Examination 50%</td></tr>
</table>

DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Electromagnetism for Engineers**		
Code	**4PHY272**	**Department**	**Physics**
Prerequisites	**4PHY171, 4PHY172**	**Co-requisites**	**None**
Aim	This module is designed to introduce students to the concepts of and theories applicable to electromagnetism and its applications		
Content	• electromagnetism • Electrostatics, Gauss's law. Dipoles. Dielectric media. Phenomena related to electron levels: Introduction to metals, semi-conductors and insulators. Contact potential. Thermoelectric effects. • Electromagnetism: Forces on moving charges in electric and magnetic fields. Magnetic scalar potential and vector potential. Ampere's law. Faraday's law. Self-induction and mutual induction. • Alternating current: M L C R circuits and A-C bridges • Magnetism: dia, para-and ferromagnetic materials. The magnetic circuit. • Applications of concepts and theories of electromagnetism • Transmission lines, microwaves, waveguides, electromagnetic interference.		
Outcomes	▪ An understanding of concepts and theories of electromagnetism. ▪ Understanding and applications of Gauss law. ▪ An understanding of laws governing electrical conduction and circuits. ▪ Understanding principles of magnetism and magnetic circuits ▪ Understanding applications of electromagnetism.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

Title	**Computer Science II for Computer Engineers**		
Code	**4CPS371**	**Department**	**Computer Science**
Prerequisites	**4CPS181**	**Co-requisites**	**None**
Aim	To provide the student with the fundamental principles and techniques of data communication, LANs and WANs, TCP/IP protocol architecture and wireless network architectures.		
Content	Data Communication: Signals, Digital and analogue transmission, Multiplexing, error control; Networks: Switching principles, LAN, MAN, WAN; TCP/IP: Network layer addressing and routing, Network layer protocols, Transport layer protocols, Application layer services; Wireless communication: principles, Wireless LAN systems, Cellular telephony, Microwave and Satellite networks.		

Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**Electronic Devices and Circuits**		
Code	**5EEE321**	**Department**	**Engineering**
Prerequisites	**5EEE231**	**Co-requisites**	**None**
Aim	To provide the student with an understanding of basic electronics concepts and also to equip the student with the necessary skills to perform detailed electronics design and analysis		
Content	Operational amplifiers, specifications and limitations and varieties and common configurations. Frequency response of amplifiers; Bodes plot Basic building blocks of analog ICs and circuits; current mirrors. Feedback and its effects in analog circuit design; stability Analog filters: filter design principles; different common ways to implement filters. Signal generators: oscillators and types of oscillators. Power Amplifiers Noise, sources and types. Switched mode power supplies and introduction to power electronics, buck, boost, buck-boost and isolated fly back topologies Safe Operating Area, mixed signal design, circuit layout, decoupling and grounding SPICE based simulations		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Signals and Systems II**		
Code	**5EEE341**	**Department**	**Engineering**
Prerequisites	**5EEE221**	**Co-requisites**	**None**
Aim	• To develop skills for the analysis of signals and noise in linear systems, and also some • non-linear systems • To convey how systems arising in electrical and electronic engineering may be analyzed in the time domain and the frequency domain. • To develop concepts such as bandwidth, response time, power spectral density, and signal to noise ratio for quantifying signals and noise in linear systems • To gain familiarity with basic modulation schemes used in communication systems and • instrumentation.		

Content	**Part A:** Random signals and processes in continuous /discrete time, probability distribution/density functions, random signals calculus (mean, variance, moment generation function), transforms of random signals, Bayesian Theorem, covariance and correlation, Central Limit theorem, Gaussian processes, random signals spectrum and bandwidth, power spectral density (PSD), Wiener-Khinchine Theorem, entropy function, estimation/filtering of random signals. **Part B:** Time and frequency domain signal processing for electronic systems (carrier-wave radio and instrumentation), continuous-time Fourier theory, sampled signals and use of the discrete Fourier transform, propagation of signals and noise through linear systems, complex analytic signal representation, power calculations using PSD functions, pulse detection using correlation and the matched filter, analog carrier-wave modulation/demodulation, amplitude modulation (double sideband and single sideband; suppressed carrier and large carrier), heterodyning, angle modulation (frequency and phase modulation), signal to-noise ratio calculations.
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Embedded Systems II**		
Code	**5EEE351**	**Department**	**Engineerin**
Prerequisites	**5EEE222**	**Co-requisites**	**None**
Aim	To introduce the student to the design and programming of an embedded system controlled, for example, by a RISC processor (eg. ARM Cortex). After the initial embedded coding practice, the tool chains for loading, testing and debugging the code are introduced, followed by more advanced topics of hardware/software interfacing. By the end of the module embedded operating systems are used. The implications of multitasking real time operations, safety and maintenance are covered.		
Content	This module focuses on embedded systems and computer architecture, covering embedded operating systems, theory and practices for the design and analysis of computer architecture and an introduction to Hardware Description Language (HDL) programming. This module builds on Embedded Systems I module. The module is split into two parts. Part 1 (8 credits) concerns the design process, modelling and analysis of embedded systems designs, the structure of an operating system, cross-compiling toolchains, and relevant related theories. Techniques for execution time analysis, resource control protocols, and methods for modelling and simulation of computer systems are studied. Practicals concern using and embedded operating system, cross-compiling applications, and using a single board computer embedded platform. Part 2 (4 credits) introduces HDL programming techniques and tools for developing gateware and simulating designs. A mini-project is performed which involves implementing a state machine and performing thorough analysis of its design and performance.		
Assessment	Continuous Assessment 40% Examination 60%		

DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Statistics for Engineers**		
Code	**4STT171**	**Department**	**Mathematical Sciences**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This Module aims to introduce engineering students to the basic concepts and tools of Statistics which are of particular relevance in an engineering context, and to enable students to apply these to data collected from engineering experiments.		
Content	Topics include: Random variables, sampling and basic statistical measures; Normal, t, F and Chi-square distributions; Confidence intervals; Statistical models, such as the means and the effects models; t, F and Chi-square tests; Regression and correlation; One-way analysis of variance; Introduction to the design of experiments; Application of statistical tools to experimental data in an engineering setting.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Control Engineering**		
Code	**5EEE312**	**Department**	**Engineering**
Prerequisites	**4MTH271, 4MTH272, 5EEE231**	**Co-requisites**	**None**
Aim	To train and educate students in control engineering methods for SISO control problems, including formulation of elementary problems as block diagrams, analysis of system interconnected systems, design and synthesis of feedback control systems in terms of input-output and state-space models. To introduce students to open-ended control engineering projects by means of a team project centered around a control problem.		
Content	Terminology: Open and closed loop configurations, block diagrams, dynamic system modelling, transient response, stead state error criterion. System stability: Routh Hurwitz criterion, Root Locus. Frequency responses. Nyquist lots, Bode diagrams, Nichols Charts. Compensation: Lead-lag circuits, minor loops, feedforward and three-term controllers. Sensitivity functions, minimum prototype response controllers, bilinear transformation, frequency response methods. State variables, state space models and design methods. Robustness, observability controllability, stability and performance.		
Assessment	Continuous Assessment 50% Examination 50%		

DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**Power Systems**		
Code	**5EEE322**	**Department**	**Engineering**
Prerequisites	**5EEE212**	**Co-requisites**	**None**
Aim	To create an interest in power systems engineering, to provide a sound basis of study for those who will continue studies in this subject and, for those who do not continue with power modules, to provide useful information relevant to future needs		
Content	Structure of power system, ac power theory, electrical loads, customer tariffs and power factor correction, introduction to power systems analysis, including: 3-ph transformer representation, Per unit calculations, Load flow and fault calculations; AC and DC power distributors, Transmission efficiency and conductor efficacy; Protection principles and Matlab programming.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Communications and Networks**		
Code	**5EEE332**	**Department**	**Engineering**
Prerequisites	**5EEE231**	**Co-requisites**	**None**
Aim	To provide a basic understanding of communication systems and the architecture, technology, and protocols of computer networks		
Content	**Module A:** Introduction to Networks: Internet, protocol, network edge, core network and access networks, circuit switching and packet switching, LAN topology, physical media, layered architecture, performance, protocol model. Application layer: service, client-server paradigm, network applications: web and http, ftp, email, ssh, DNS, p2p file sharing, socket programming. Transport layer: transport layer services, multiplexing/demultiplexing, Network layer: Introduction, virtual circuit and datagram networks, router, Internet Protocol datagram, fragmentation, IPv4, Physical layer: Digital information, Digital communication system, Sampling, Pulse modulation, Quantization, Pulse code modulation, Bandpass modulation schemes ASK, FSK, PSK, Phase-shift keying and amplitude phase keying in vector representation, Orthogon **Module B:** Communication system and network design II : Transport layer: UDP, reliable data transfer, TCP, connection management, congestion and congestion control. Network layer: ICPM, IPv6, link-state algorithm, distance vector routing algorithm, routing in Internet, broadcast and multicast routing. Data link layer: link layer services, error detection and correction. Multiple access: TDMA, Aloha, CSMA. LAN technologies: IEEE 802 family, MAC, LAN addressing, ARP, Ethernet, Token Rings, hubs and switches, PPP, ATM, MPLS, all IP networks. Physical layer: Information theory and entropy, Channel capacity, Source coding, Probability of error, Eb/n performance, Matched filter detection, ISI and pulse shaping, Equalization, Bandpass demodulation/detection schemes with ASK, FSK, PSK, Probability of Error with bandpass detection, MSK		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	Electrical Engineering and Computer Engineering Design		
Code	5EEE352	Department	Engineering
Prerequisites	5EEE321, 5EEE341, 5EEE351	Co-requisites	None
Aim	To tackle a design and research project in Electrical Engineering		
Content	In this module students will be assigned a design problem relevant to the Electrical Engineering discipline within which they will need to design a prototype and test a sub- system. This will provide insight to understand the intricacies of real-life complex sub system design. Students will be expected to solve an Electrical Engineering problem methodically using the skills they have gathered over the previous semesters of the curriculum, especially from the Design 1 module. Financial constraints required to complete the project and financial decision making will be reported.		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	Culture and Society in Africa		
Code	1ANT172	Department	Social Anthropology
Prerequisites	None	Co-requisites	None
Aim	This is a Complementary Studies Module for Electrical Engineering students aimed at broadening student's perspective.		
Content	Culture and Society in Africa provides students from all faculties with background knowledge about the continent on which they live. The module includes an examination of the concepts of culture, race, society, ethnicity and nation-state, a perspective on African worldviews and ways of thought, and a consideration of the role of Africa in a changing world.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	Process Control and Instrumentation		
Code	5EEE411	Department	Engineering
Prerequisites	5EEE312	Co-requisites	None
Aim	Aims to provide an integrated view of the principles and practice of modern industrial control and its applications		
Content	Various topics will be covered including: Measurement of physical variables, industrial transducers, integration of programmable logic controllers (PLCS), supervisory control and data acquisition (SCADA) systems and management information systems (MIS), signal transmission and conditioning, microcontrollers, computer interfacing, realtime multitasking in computer control, nonlinear and advanced control methods.		

Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**Engineering Systems Design**		
Code	**5EEE421**	**Department**	**Engineering**
Prerequisites	**5EEE342**	**Co-requisites**	**None**
Aim	To understand and apply the principles of engineering design		
Content	**Design environment** - Project, production and manufacturing processes. The pessimistic mind view - worst-case design, tolerances, reliability and statistical yield. Standards and codes. STEEP analysis - social, technical, environmental, economic and political context. EDA and CAD *Design methods* - Synthesis of candidate concepts and selection of an optimum concept; development of specifications and user requirements; modelling, simulation, reality checks; design work; qualification and acceptance tests; documentation. Case histories **Formal Design Methodology** - Common features of formal design methodologies. IBM's Rational Unified Process. Phases and iterations -inception, elaboration, construction, transition. **Disciplines** - business modelling, requirements gathering, analysis and design, implementation, testing, deployment, project management, configuration and change management, environment. **Project** – Two assignments will be tackled, and a poster will be prepared and presented.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Power Systems Engineering**		
Code	**5EEE441**	**Department**	**Engineering**
Prerequisites	**5EEE322**	**Co-requisites**	**None**
Aim	To develop an understanding of power systems and protection		

Content	Distribution and transmission systems, protection systems, steady state operation of transmission lines, high voltage engineering, electricity pricing, microgrids and smart grids. Topics include: Loads - Electrical load characteristics (PIR, transient, statistical distribution and probabilistic load model), Non Linear Loads, non- active power, unbalance, Load data collection, Data analysis, Time series, parametric, sectoral and spatial load forecasting High Voltage Engineering - Introduction and fields, Gas discharges, solids, liquids; Over voltages, insulation coordination Branches – Cables, LV feeders voltage drop calculations, Herman Beta spread sheet, Overhead lines: design, safety, electric machinery regulations,3-ph overhead lines: types of structures and conductors, conductor selection, load capacity, line parameters; 3- ph overhead lines: cost, MV voltage drop and losses – radial feeder with point loads, minimum route length; Mechanical design of overhead lines, 2-ph and SWER lines: capacity, design, safety/reliability, unbalance; Comparison of alternative overhead lines, HVDC transmission.; Nodes - Small substations; Large substations; Unconventional: CCS, Captap, SWS; DG: Energy resources, environment and cost,: Voltage rise constraints Protection - Protection philosophy, switchgear and surge arresters, instrument transformers, , OC and DOC relays, Relay settings grading, Protection testing and commissioning, protection lab, , Unit feeder protection(circulating current ,pilot wire), Distance protection, Transformer protection delivery processes and policy - Delivery processes: planning design, construction, O&M (incl condition monitoring), EIA, QA,standards; Logframe for planning and evaluation of electrification; Electrification in SA, NEP, future electrification, EDI restructuring, Power Quality/Quality of Supply; Reliability; Financial evaluation of projects (IRR, NPV, inflation, losses, economics of pf correction); Pricing policy, rationalization, residential tariffs, BEST/
Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**Telecommunications**		
Code	**5EEE451**	**Department**	**Engineering**
Prerequisites	**5EEE332**	**Co-requisites**	**None**
Aim	To enhance an understanding of and competence in analyzing and designing wireless communication systems to specified performance criteria. To extend your study of principles of communication engineering towards current design topics.		

Content	Selected topics in (1) digital communication systems (24 lectures) and (2) radio frequency & wireless systems (24 lectures). Digital Communication Systems Content: Any topics from: *Digital Modulation*: highlights; *Formatting and Source Coding*; *Synchronization*; *Reducing Signal* *Degradation*: signals, spectra and noise, communications link analysis, coding and interleaving to mitigate fading effects, main parameters of *Fading Channel Models*, applications. *Modulation and Coding* trade-offs; *Error Performance* of communication systems corrupted by noise. [Fundamental Digital Communication Systems Concepts: *Communication theory* enables us to understand how to insert, protect, transmit and extract information by applying successive transformations and forcing functions to enable signals to propagate through a number of stages (modules) from the source to the destination. *Digital formatting and modulation* in wireless systems are transformation techniques for encoding information into some digital format at low frequencies, mapping the sequence onto a high frequency and high energy sinusoid for transfer through the air or free space and then reversing the process at the receiving destination [insertion, protection, transmission and extraction]. *Random process theory* enables us to use probabilistic and Fourier models in time, space and frequency to describe and estimate signals when their characteristics at an instant are not fully accessible for measurement. We apply random process theory to real voice, data, video, noise and interference signals. *Linear systems theory along with information theory and Fourier techniques* provide a modelling framework for describing, analyzing and testing signals and circuits used in transferring information from selected sources to intended destinations. Through that framework, we can determine things like the maximum density of distinct signals we can pack into a single channel of finite bandwidth, creating logical channels out of physical versions, how we can insert a driving function at some point in the system and measure a delayed effect (convolution, impulse response, transfer function) elsewhere across the system by assuming distortionless transmission of amplitude, frequency and phase information, modelling a channel as a filter for shaping and controlling the bandwidths of signals in it, and analyzing the frequency components of a received information signal. *How do we know when we are doing well or badly in this field of work?* An analysis of *spectral efficiency* reveals how many bits per second per Hertz of bandwidth we can push through a channel using a given approach to modulate and allocate resources for the available bandwidth. On the other hand, an analysis of the minimum amount ofenergy required to reduce the rate of occurrence of errors in a given transmission to a desired level reveals the *energy efficiency* of a given coding/modulation/multiple- access (i.e., resource allocation) plan and implementation.] RF & Wireless Systems Content: Any topics from: Microwave and RF components and transmission lines; Mobile communication systems; Radar systems; Noise and distortion in microwave systems; Frequency planning; Regulatory aspects of Spectrum usage; Antenna technology; Satellite communication systems; Global Positioning Systems (GPS); Use of microwave test equipment.

Assessment	Continuous Assessment 50% Examination 50%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**Engineering Professionalism**		
Code	**5EEE461**	**Department**	**Engineering**
Prerequisites	**All 3rd year modules**	**Co-requisites**	**None**
Aim	This module deals practically with the student’s transition to the workplace. The aim is to complement the student’s theoretical training by introducing (in some cases) and reinforcing (in others) the topics and issues most likely to be encountered in the engineering profession. This is part of the endeavour to produce a well-rounded mechanical engineer for industry, consulting and the design environment		
Content	Professional registration – ECSA, the Washington Accord, code of conduct, due diligence, government certificate of competence, mentorship in industry. Types of engineering employment – details of the options available for graduates, the realities of the workplace and industry training, career path management. Engineering economics – working capital, cash flow, salaries and wages, depreciation, tax considerations, rate of return, payback period. Health and Safety – managing disease and health in the workplace, occupational safety and related legislation, practical HAZOP analysis, safe work permits and lockouts. Industrial law – Overview of employment law, labour relations and employment equity contracts, basis of offer and acceptance. Quality, reliability and maintenance management and their importance in the engineering profession. Environment – legislation, ISO140001, aspects of engineering operations and likely impacts, considerations of the created environment as well as the impacts on socio- economic and cultural systems.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Computer Science III for Computer Engineers**		
Code	**4CPS471**	**Department**	**Computer Science**
Prerequisites	**4CPS371**	**Co-requisites**	**None**
Aim	To introduce the concepts of programming the computer at the system level with particular emphasis on operating systems and formal language recognizer’s		
Content	**Section A** – Foundational Concepts Introduction to Assembly Language; Assembling; Linking and Running Assembly Language programs; **Section B** – Operating Systems Principles Process and thread management, Device management, Memory management, File systems, and Input/output and concurrency principles.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	Professional Communication Studies		
Code	5EEE412	Department	Engineering
Prerequisites	5EEE241	Co-requisites	None
Aim	Professional Writing including: Business Proposals; Graphic Communication and Readability; Posters; Group presentations with Power-point		
Content	Referential and Academic writing and presentation; Persuasive argument; Formats for business plans and proposals; group presentations; graphics and visual literacy. Module content covers the following areas: Group theory and Team work: • aim of communication • barriers to communication • why groups are formed • types of groups • group dynamics and how teams are formed • advantages of groups. • different types of leaders • process and benefits of Brainstorming • different approaches to Problem-solving and decision-making. • negotiation skills Ethics: • definitions and schools • reasons for codes and rules • professional practice as defined by ECSA • corporate governance and King III report Business Plans and Proposals: • solicited and unsolicited proposals • requests for proposals • functions of SWOT and PESTEL • Table of Contents of a Business Proposal Summaries: • purpose of an executive summary • structure and components of a good executive summary • style and language for a persuasive and comprehensive summary CVs and Covering letters • formats for and choice and ordering of content • traditional and non-traditional CVs • covering letters for responding to an advertisement or tender and for direct approach. Poster Design: • difference between stand-alone posters and accompanied posters • fundamental principles of well-designed posters. Group presentations: • criteria for giving an effective group oral presentation • vocal delivery • techniques for good cohesion, transitioning and handover to the next person in the group • types of visual aids that support and enhance a good presentation • visual literacy and creating PowerPoint slides.		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	New Venture Planning and Management		
Code	5EEE422	Department	Engineering
Prerequisites	All third year modules	Co-requisites	None
Aim	Learning Business skills involved in starting entrepreneurial businesses from products designed: feasibility analysis, business plan, presentations		
Content	The entrepreneurial perspective; developing a new venture; what is a feasibility plan? Product concept and description; market assessment; industrial analysis; marketing plan; operations, development plans and management; financial projections		
Assessment	Continuous Assessment 50% Examination 50%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	Final Year Research Project		
Code	5EEE432	Department	Engineering
Prerequisites	Depends on the topic	Co-requisites	None
Aim	To give individual students the opportunity to tackle a real engineering project within a limited period under the guidance of a supervisor and submit a project report on the results.		
Content	The final year research project is an important opportunity for the student, at the end of the degree programme, to tackle a real engineering project. The student is expected to work on the project both individually and under the guidance of a supervisor. An engineering project involves the creative application of scientific principles to the solution of a technical problem. It involves a problem description or research hypothesis developed in consultation with a supervisor, reviewing the topic in detail and defining the boundaries (scope) carefully, confirming an understanding of the requirements of the supervisor, searching for, selecting and justifying the most appropriate approaches to solving the problem or testing the hypothesis. It also requires a student to be able to analyze, design, build, integrate and test as is appropriate for the specific project. This could include the use of hardware, software and simulation. Students are also required to evaluate the project against the success criteria and design objectives, and to write a report about the project, the findings, and any recommendations. In addition, students need to make an oral presentation and prepare an exhibit.		
Assessment	Thesis 100%		
DP Requirement	Meeting the ELO requirements		

Title	**Industrial Ecology**		
Code	**5EEE442**	**Department**	**Engineering**
Prerequisites	**All third year Modules**	**Co-requisites**	**None**
Aim	The module is an introduction and overview of the relatively new ‘field’ of Industrial Ecology and its more recent trends. In the context of the module “industrial ecology” is interpreted as encompassing all of the interactions of an industrial society with the natural environment as well as the associated drivers of industrialization. A more appropriate way of thinking about the module is to rename it “the Ecology of Industrial Society”. The objectives are to encourage a systems perspective of industrial activity as it is integrated with and forms part of the natural systems (lithosphere, pedosphere, biosphere, hydrosphere, atmosphere) This module is intended to be an enjoyable and enlightening experience, given the very different kind of learning that is expected. The students in the class have the responsibility to make the learning their own – to engage in debate and ask questions that will lead to the class finding out new information and reading different literature than that originally proposed – because it concerns what interests you and what you want to learn. What you learn and the effects of industry on the environment both affect your future. We are all in this together – the learning and the living. Let’s do it with enthusiasm and meaning. There are however, two primary educational goals for the module. The first has to do with the content and the second with the process. Students are expected to become aware of the problem issues facing the global community that relate to the industrial impact on the environment – the ecology of industrial society. You are expected to demonstrate this awareness and the acquisition of knowledge and understanding through discussion in class, through oral arguments, quizzes, projects, an exam and a term paper. These forms of communication hint at the second set of outcomes that relate to the ability to accomplish a limited kind of research as well as communicating ideas in a professional manner. Students are expected to put into practice the skills they have acquired in their professional communication module as well as using the opportunity to improve those skills. These do not only relate to the presentation side of the skills but also to the exploratory and critical aspects – being able to ask critical questions, seek information from the internet and other sources, argue a case in discussion as well as in a formal written presentation, show logical development of a debate and a willingness to be persuaded by a counter argument.		
Content	Ecosystem deterioration, pollution Resource depletion: Fossil fuels, water, uranium, rare earth metals Climate change Systems thinking, thermodynamics Sustainability; the limits to growth Industrial Ecology concepts and tools Material Flow Analysis Life Cycle Assessment; the circular economy Design for Environment Eco-Industrial Parks: industrial symbiosis Ethics: economic paradigms, consumption Energy, Mobility,		
Assessment	Continuous Assessment 50% Examination 50%		

DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Degree Module Content for BEng (Mechatronic Engineering)

Title	**Calculus I for Engineers**		
Code	**4MTH171**	**Department**	**Mathematical**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	To introduce differential calculus with necessary prerequisites from logic and general algebra.		
Content	• Elementary Logic and Theory of Sets: sets and subsets, Venn-Euler diagrams, basic set operations, sets of numbers, elementary logic. • Inequalities: Definition, order axioms, interval notation, set builder notation, solving inequality equations. Absolute value • Functions: elementary functions, graph of a function, combination of functions, inverse functions, exponential and logarithmic functions, relations. • Limits, Continuity and Differentiation: definition of limit, continuity and the derivative • Algebra: induction, vectors and vector algebra, dot products and cross products, introduction to matrices and matrix algebra, transpose and determinants, the adjoint matrix, invertible matrix and Cramer’s rule, complex numbers and De Moivre’s theorem.		
Assessment	40% Continuous Assessment Mark 60% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials.		

Title	**General Physics A for Engineers**		
Code	**4PHY171**	**Department**	**Physics**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The module is meant for entry level BEng and contains fundamental concepts in Physics and Engineering that prepares the student for later study in more advanced fields in the Physical Sciences. It contains basic concepts in mechanics, waves, optics and thermodynamics.		

Content	• Statistical concepts: Probability, distributions, histograms, standard deviation, propagation of errors. Units and measurement: Dimensions, SI-system of units, basic measurements in physics. • Mechanics: Forces, moments, couples, Newton's laws, circular motion, momentum, oscillations, momentum and impulse. • Heat and thermodynamics: Mechanisms of heat transfer, heat capacity, phase changes, gases. • Waves: Sound waves, light and light sources, laws of refraction, diffraction and reflection. • Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.
Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic mechanics concepts, laws of Newton and their practical application. ▪ The understanding of circular motion, its mathematical representation and solving of problems associated with repetitive circular motion. ▪ An understanding of wave concepts, modes of propagation and associated phenomena inside a material medium. ▪ Problems. ▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results. ▪ Learners must be able to write simple scientific reports commensurate with level 1 B.Sc.
Assessment	40% Continuous Assessment Mark 60% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and Project work

Title	**Introductory Computing for Engineers**		
Code	**4CPS171**	**Department**	**Computer Science**
Prerequisites	**None**	**Co-requisites**	**Any Mathematics**
Aim	**To provide an introduction to hardware and software components of**		
Content	**Section A – Computer Architecture** Introduction to Digital logic and Digital systems; Machine level representation of data; Assembly level machine organization **Section B – Software Development Fundamentals** Fundamental Programming concepts and Object-Oriented Programming		

Outcomes	At the end of the module, the learners should be able to: ▪ Explain the organization of the classical von Neumann machine and its major functional units. ▪ Describe the internal representation of data. ▪ Represent Boolean logic problems as: truth tables and logic circuits. ▪ Design, implement, test, and debug programs that use fundamental programming constructs such as: basic computation, simple I/O, standard conditional and iterative structures, methods, and parameter passing.		
Assessment	15% practical tests, 15% theory tests, 10% assignments (40% Continuous assessment) 60% final practical and theory examination		
DP Requirements	40% Continuous Assessment Mark, 80% Attendance at practical's		

Title	**Engineering Drawing**		
Code	**5MEC111**	**Department**	**Engineering**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The aim of this module is to use conventional drawing techniques to develop the skill of reading, interpreting and creating engineering drawings using drawing instruments and free hand sketches		
Content	1. Understand the concepts of scales and proportions, lines in space and true length and shape. 2. Understand and apply the drawing standards for international graphic communication. 3. Competently use drawing instruments to generate: • orthographic detailed drawings • pictorial views with an emphasis on isometric views • sectioned and auxiliary views of engineering components 4. Generate free hand sketches of orthographic and pictorial projections of engineering components. 5. Communicate with a workshop / manufacturing environment by means of notes and dimensions on drawings. 6. Interpret the information on an orthographic detailed working drawing.		
Assessment	Test 1: Descriptive Geometry Test 20% Test 2: Descriptive Geometry Test 20% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork		

Title	**Engineering Mechanics**		
Code	**4MTH181**	**Department**	**Mathematical Sciences**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**

Aim	Engineering Mechanics is the first module that prepares students to analyze forces and stresses that exist in structures and machines. It is therefore an extremely important foundational module. The central core of the module has to do with equilibrium of rigid bodies and fixed structures such as trusses and beams. This module continues the modelling approach begun in Physics (for particles) and extends it to rigid bodies in static equilibrium. Although not a mathematics module, aspects of mathematics are brought to bear on the formulation and solution of equilibrium problems. The engineer requires skills of both analysis and of modelling. This module, being an introduction, will emphasize the analysis but will begin to develop the modelling ability in students. The module is concerned with developing ways of "seeing" or visualizing equilibrium problems. It is crucial to develop a variety of skills and strategies that will be used in solving problems, but it is also essential that students realize that these are necessary but not sufficient conditions for problem solving. The visual aspect of recognizing equilibrium, simplifying the system, drawing free body diagrams and applying appropriate boundary conditions is what is really important to develop in students. The importance of geometric ability cannot be over-emphasized. The module aims to develop in students an appreciation of forces in their various forms or guises, internal and external, and the way in which they contribute to the equilibrium of an object. The module requires a professional approach that recognizes the need for precision in engineering problem solving, mathematical language, a logical approach to calculations, diagrams that are accurate representations of the physical situation and a layout that is neat.

Content	Review of vectors a. Position, displacement and force vectors b. Line of action and transmissibility, addition of forces at a point c. Adding forces: resultants, components, unit vectors 2. Forces a. Normal reaction and friction b. Equilibrium for a particle c. Connected particles d. Limiting equilibrium: friction, toppling, sliding e. Free body diagrams 3. Parallel and non-parallel coplanar forces, a. Moment of a force, couples, principle of moments b. Addition of a force and a couple c. Resultant and equilibrium for a rigid body, internal forces, toppling and sliding d. Two-force and three-force systems e. Compound systems f. Trusses: methods of nodes and sections g. Beams: bending moments and shear forces
Assessment	40% Continuous Assessment Mark 60% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials

Title	**General Chemistry for**		
Code	**4CHM172**	**Department**	**Chemistry**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	The aim of this module is to give learners the necessary grounding in chemistry for further studies in analytical, inorganic, organic and physical chemistry		
Content	The nature of matter. Atomic structure and periodicity. Electron configurations and bonding. Types of chemical reactions. Chemical equations and the mole concept. The solid, liquid and gaseous states. Solutions. Thermochemistry. Chemical equilibrium. Chemical Kinetics. Redox equations and basic electrochemistry. Acids, bases and salts. Theory of acid-base titrations, including ph. Basic laboratory skills, including weighing and volume measurements and gravimetric, volumetric, and qualitative analyses		

Outcome	Learners must be able to demonstrate: ▪ an understanding of the structure of the atom, the chemical bonding which occurs between atoms and the types of chemical reactions that occur. ▪ an ability to write chemical formulas, balance equations, and apply the mole concepts in chemical calculations to mass reactions and reactions in solution. ▪ an understanding of the classification of matter and the fundamental properties of matter in the solid, liquid and gaseous phases and of solutions. ▪ a thorough grasp of the basic principles of thermochemistry, chemical equilibrium, chemical kinetics, basic electrochemistry and the characteristics of acids, bases and salts as well as the application of this knowledge to acid base titrations. ▪ an ability to perform a range of basic laboratory skills, including
Assessment	40% Continuous Assessment Mark (comprising 20% practical assessments plus 20% Interim assessments.) 60% Summative assessment(comprising a 3 hour assessment after the course work has been completed)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Calculus II for Engineers**		
Code	**4MTH172**	**Department**	**Mathematical Sciences**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**
Aim	The aim of the module is to further develop concepts in calculus (integration, elementary introduction to differential equations) and to apply their techniques in problem solving.		
Content	• Differentiation: some differentiation formulas, the chain rule, implicit differentiation, the mean-value theorem and applications, some curve sketching, applications of derivatives. • Integration and Techniques of integration: the fundamental theorem of integral calculus, indefinite integrals, some area problems, • Transcendental functions: logarithmic, exponential, inverse trigonometric functions, hyperbolic functions. • Elementary Introduction to Differential Equations: First order linear equations. • Sequences: properties, limits.		
Assessment	40% Continuous Assessment Mark 60% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**General Physics B for Engineers**		
Code	**4PHY172**	**Department**	**Physics**
Prerequisites	**4PHY171(DP)**	**Co-requisites**	**None**

Aim	The module is meant for entry level B.Sc. and contains fundamental concepts in Physics and Engineering that prepares the student for later study in more advanced fields in the Physical Sciences. It contains basic concepts in electricity, nuclear physics and modern physics.
Content	• Electricity and Magnetism: Coulomb's law, conductors and insulators. The electric field. Gauss' law. Potential, electrical potential energy, line integral of electric field, Capacitance, dielectrics and properties of dielectrics, Electric circuits. Magnetic field and magnetism, motion of charges particles through magnetic fields, the cyclotron. Ampere's law. Induced electromotive force, The R-L circuit and the L-C circuit. • Magnetic properties of matter, materials, permeability, molecular theory. Magnetization and susceptibility. Hysteresis. Magnetic field of the earth. Magnetic circuits. • Atomic Physics and radioactivity: Quantum theory of radiation. Wien and Stefan's laws. Planck's radiation formula. Radioactivity, natural decay series. Detectors of radiation, Nuclear reactions, conservation laws, reaction process, proton-induced, neutron-induced and other reactions. Q-values, alpha-. beta- and gamma-decay. Nuclear binding energy. Fission and fusion. Reactors, nuclear fuel, breeders. • Cosmic radiation and fundamental principles. • Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.

Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic in static electricity, natural phenomena such as lightening, and the principles of machines based on static electricity concepts such as Van De Graaf Generators. ▪ An understanding of electric current and its effects (such as heating) ▪ The generation of electricity (Faraday's law, Lenz's law, etc.) ▪ A learner should understand the basic concepts of radioactivity, constituents of the nucleus and the effect of radiation. ▪ Learners should be able to solve problems related to theory taught. ▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results ▪ Learners must be able to write simple scientific reports commensurate with level 1 B.Sc.
Assessment	40% Continuous Assessment Mark 60% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

Title	**Introduction to Engineering Design**		
Code	**5MEC112**	**Department**	**Engineering**
Prerequisites	**5MEC111(DP)**	**Co-requisites**	**None**
Aim	Engineering graphics is the medium for communicating concepts and component manufacturing information. This module aims at developing the skills needed for documenting designs using drawings. Manual and computer aided methods of graphical communication will be used to introduce the fundamentals of descriptive geometry and apply the concepts of basic design for manufacturing.		

Content	1. Understand the concepts of scales and proportions, lines in space and true length and shape. 2. Understand and apply the drawing standards for international graphic communication. 3. Competently use drawing instruments to generate: • orthographic detailed drawings • pictorial views with an emphasis on isometric views • sectioned and auxiliary views of engineering components 4. Generate free hand sketches of orthographic and pictorial projections of engineering components. 5. Communicate with a workshop / manufacturing environment by means of notes and dimensions on drawings. 6. Interpret the information on an orthographic detailed working drawing. 7. Use 3D computer aided drawing software as a tool to • Generate working drawings for manufacturing with design intent. • Apply dimension standards to drawings. • Generate assembly drawings applicable to manufacturing. 8. Understand the fundamentals of Fits and Tolerances • Calculations and IT tables 9. Understand constraints and degrees of freedom in assembled mechanical components.
Assessment	Tests 25% CAD assignments 15% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's and fieldwork

Title	**Introduction to Engineering**		
Code	**5EEE112**	**Department**	**Engineering**
Prerequisites	**4MTH171(DP)**	**Co-requisites**	**None**

Aim	• To motivate students and help them understand the nature and scope of engineering and specifically electrical engineering • To familiarize students to electrical circuits • Introduce electrical network theorems • To introduce the concept of DC response, steady state AC response and transient response of circuits • To analyze steady state single phase AC circuits using phasor diagrams
Content	Explanation of the engineering disciplines and some job descriptions for each discipline. Circuit terminology, basic laws of resistive networks, nodal and mesh analysis, further network theorems, energy storage elements, RC and RL circuits, second order circuit analysis, RLC circuits and resonance, introduction to sinusoids and phasors, phasors in steady state AC circuit analysis, AC steady state power in single phase circuits. Introduction to transient analysis of circuits with energy storage elements.
Assessment	Continuous assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Degree Module Content for Shared second year for Mechanical Engineering + Mechatronic Engineering

Title	**Advanced calculus for Engineers**		
Code	**4MTH271**	**Department**	**Mathematical sciences**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This module is designed to introduce students to the concepts of series, vector functions, differentiation and integration of vector functions and functions of several variables.		

Content	• Intro to infinite series: The integral test The comparison test, The root test & the ratio test • Absolute and conditional convergence • Taylors polynomial in x; taylors theorem in x • Taylors series in (x-a) • Vector equation for a line & Vector equation for a plane • Limits, continuity, differentiation of Vector functions • The evaluation of double integrals by repeated integrals • The double integral as the limit of a Reimann sum • Triple integrals & Reduction to repeated integrals • Cylindrical co-ordinates & Spherical co-ordinates • Jacobian
Assessment	40% continuous assessment 60% formal end of semester 3hr exam on all material covered during the semester.
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials

Title	**Signals and Systems I**		
Code	**5EEE211**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	The module provides students with the basic tools required for understanding linear systems, and the effect that such systems have on deterministic signals.		
Content	• This module provides students with the tools required for understanding linear • systems, and the effect that such systems have on deterministic signals. • Upon completion, students will be able to characterize and manipulate linear time- • Invariant systems in terms of input-output relationships, using both time and frequency • domain methods. • The module includes concepts related to signal representation, linear convolution, • Fourier analysis, and sampling of continuous-time signals.		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Analogue Electronic Design**		
Code	**5EEE221**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**

Aim	Students are introduced to device structures of some of the important Analog Electronic devices, their properties and models, analysis of simple circuits consisting of passive and active devices, operational amplifiers, and analysis of some practical analog electronic circuits.
Content	The module is delivered in the forms of lectures. There is a fixed textbook for the module, which standardizes the module. After every 2- 3 weeks' lecture, the students are given a set of SPICE based simulation exercises which helps them to grasp the material. The SPICE exercises are so modelled that the students can see the importance of different device parameters and their effect on some basic designs. There are also four tutorials given in the module, and tutors are available on the tutorial classes to help the struggling students. There is an end-of-semester mini project done in groups. With this, the students try to design and analyze a bigger circuit and produce a report. This helps them to grasp some of the challenges of designing an electronic circuit.
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Mechanics of Solids I**		
Code	**5MEC211**	**Department**	**Engineering**
Prerequisites	**4MTH172, 4MTH182**	**Co-requisites**	**None**
Aim	A student who successfully completes this Module will have a thorough grounding in the essential principles of Mechanics of Solids. He or she will also have the understanding and capability to formulate and undertake problem solving in the areas of (i) simple direct stress and strain, (ii) shearing force and bending moment, (iii) bending stress, (iv) deflection, (v) torsion, and (vi) analysis of complex stress and strain (in 2 dimensions). In addition, they would be aware of the limitations of the mathematical modelling, (e.g. St Venant's principle, "point" loads, stress concentrations, symmetric sections, isotropic materials) as well as the value of free body diagrams,		

Content	Simple Stress and strain: • Understanding of material tensile stress behaviour, Young's modulus and Poisson's ration. • Formulation of solving of direct stress problems, including pre-stress and temperature induced loads. Shearing of force and bending moment: • Determination of reactions and subsequently drawing up free body diagrams for loaded structures. • Accurate drawing up of shear force and bending moment diagrams on the exploded structure. Bending Stress. • Clear understanding of the relationship between moment M, second moment of area I, stress δ, distance to outer fibre y, Young's modulus E and radius of curvature R. • Calculation of second moment of areas for symmetrical and non-symmetrical sections as well as compound beams. Determination of stress under various loads. Defection of beams: • Calculation of beam deflection using direct integration, Macaulay's method and moment area techniques. Torsion: • Strong understanding of the relationship between Torque T, polar moments of J, shear stress τ, radius R, shear modulus G, and angular twist θ/L, for round sections. Calculation of polar moments of area, and determination of torsional stresses and general torsional behaviour, including power transmission. Analysis of complex stress and strain: • Understanding of shear stress and strain in two dimensions. Calculation of stresses on an inclined plane. Determination of principal stresses and planes and use of Mohr's circle.
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Materials Science in Engineering**		
Code	**5MEC221**	**Department**	**Engineering**
Prerequisites	**4MTH172,** **4MTH182**	**Co-requisites**	**None**
Aim	Any design engineer should know how to select materials which best fit the demands of a particular design – economic and aesthetic demands, as well as demands of strength and durability. This Module is intended to give a broad introduction to these properties and limitations. It cannot make you a materials expert, but it can teach you how to make a sensible choice of material, how to avoid mistakes that have led to embarrassment or tragedy in the past, and where to turn to for further, more detailed assistance.		

Content	Overview of the classification, price and availability of engineering materials. • Structure-property relationships of metallic materials, with particular emphasis on the transition from elastic to plastic behaviour. • Description and measurement of mechanical properties of metals. • Modification of the properties of metals by deformation and heat treatment (consider plain carbon steels and low alloy steels as examples). • Structure-property relationships of ceramic and amorphous (glass) materials, with particular emphasis on brittle behaviour and crack growth. • Measurement of fracture toughness in relation to the energy required to propagate a crack. • Modification of the properties of ceramics and glasses by controlled processing (eg thermal treatment to induce residual stress) and composite design (eg influence of fibres on crack propagation). • Structure-property relationships of polymeric materials, with particular emphasis on the classification of thermoplastics, thermosets and elastomers. • Description of the manufacture of polymer components using processes such as extrusion, spinning, and injection and blow moulding. • The principles of reinforcement and design on the properties of composite materials. • Relationship between structure and the electrical behaviour of engineering materials. • Influence of environmental effects (particularly corrosion) on the deterioration and degradation of materials. the Cambridge Engineering Selector (CES): • The first steps in optimising the selection of materials in design (translation, screening, documentation). • Ranking materials suitability using material indices. • Several case studies in materials selection.
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**Linear Algebra and Diff Equations for Engineers**		
Code	**4MTH272**	**Department**	**Mathematical sciences**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This module is designed to introduce students to the concepts of linear algebra, and to methods of finding exact solutions to		

Content	• Linear algebra: finite and infinite dimensional vector spaces, subspaces, linear transformations and matrices, systems of linear equations, determinants, change of bases, similar matrices, eigenvalues and eigenvectors. • Differential equations: study ordinary differential equations such as separable variables, exact equations, linear equations. Solutions of homogeneous differential equations with constant coefficients, Cauchy-Euler equation, systems of linear equations, nonlinear equations, Laplace transforms, homogeneous linear systems with constant coefficients.
Assessment	40% continuous assessment (two assessments during the semester each carrying a weight of 20%) 60% formal end of semester 3hr exam on all material covered during the semester.
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials

Title	**Thermofluids I**		
Code	**5MEC212**	**Department**	**Engineering**
Prerequisites	**4MTH172, 4MTH182**	**Co-requisites**	**None**
Aim	The aim of this Module is to introduce students to the thermodynamics and fluid mechanics sciences. In particular, students will gain an understanding of the 1st law of thermodynamics, mechanisms of heat transfer, as well as hydrostatic forces, pressure and momentum associated with fluid		
Content	The subject will be covered by presenting both the theory as well as solving examples related to the individual topics. The Module will cover principles and examples of: ▪ The fundamentals of pressure, temperature and forms of energy. ▪ The origin and calculation of hydrostatic forces and pressure and their application. ▪ The First Law of Thermodynamics and its application to closed systems and control		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Dynamics I**		
Code	**5MEC222**	**Department**	**Engineering**
Prerequisites	**4MTH172, 4MTH182**	**Co-requisites**	**None**

Aim	The objective of this Module is to review and extend the fundamental principles and formulations of the kinematics and kinetics of Newtonian mechanics in the context of problems involving the dynamics of particles and rigid bodies.
Content	Particle Kinematics: Rectilinear, plane and curvilinear motion Relative and constrained motion Particle Kinetics: Newton's 2nd law Work, kinetic energy and potential energy (power and efficiency) Linear and angular impulse-momentum and impact D'Alembert's principle Rigid Body Kinematics: Rotation and absolute motion Instantaneous centres of zero velocity Relative velocity and acceleration Motion relative to rotating axes (Coriolis acceleration)
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Mechanical Engineering Machine Element Design I**		
Code	**5MEC232**	**Department**	**Engineering**
Prerequisites	**5MEC112, 5MEC122**	**Co-requisites**	**None**
Aim	The aim of this module is to introduce students to the design process for Mechanical Engineering Machine elements.		
Content	This Module introduces the basic engineering design process, applied to selection of simple machine components and development of basic machine assemblies. It draws on basic engineering science (Solid Mechanics, Materials Science, Dynamics) and applied engineering topics (Manufacturing Processes) to understand how machine components are selected and sized, depending on the required application and function. Computer Aided Modelling and Design (CAD) principles, which are introduced in first year, are developed further in the modelling and analysis of more realistic and complex machine assemblies. Topics to be covered during the Module will include: Elementary Design Process; manufacturing processes; tolerances of size and geometry; bearing type selection and sizing; gear type selection and kinematics; flexible drive selection and kinetics; fasteners and sealing; and design for static strength and stiffness.		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Introduction to Power Engineering**		
Code	**5EEE212**	**Department**	**Engineering**
Prerequisites	**5EEE112**	**Co-requisites**	**None**
Aim	To provide a foundation in power engineering		
Content	Phasor diagrams for resistive, inductive and capacitive loads; transient analysis of circuits, complex power; power factor correction; 3-phase systems; magnetic circuits; the single-phase transformer; dc. machines		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Mechanics of Solids II**		
Code	**5MECH311**	**Department**	**Engineering**
Prerequisites	**5MEC211**	**Co-requisites**	**None**
Aim	Solid Mechanics is the study of load carrying structures in terms of forces, deformations, and stability. The main objective is to develop the skills that will allow students to understand materials. under different loading conditions.		
Content	**Strain Energy and Theories of Failure** Understanding combined loading conditions and formulating point of failure. Failure theories including maximum principal stress theory, maximum shear stress theory, maximum principal strain theory, maximum shear strain energy theory, Coulomb-Mohr shear stress theory. Determination of component failure using elastic failure theories. **Deflection using Castigliano’s Energy Method.** Calculation of beam deflection using Energy Methods, for different loading conditions. **Thin and thick cylinders** Understanding and calculation of the stresses developed in vessels under pressure, shrink fits and compound cylinders. **Strains beyond the elastic limit** Understanding of material behaviour beyond its yield stress where deformation is permanent and non-reversible. Calculation of additional load capacity when considering plasticity. **Rotating discs** Understanding the stresses developed in discs under rotary motion. **Two laboratory sessions on tensile testing and loading of structures**.		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Thermofluids II**		
Code	**5MEC321**	**Department**	**Engineering**
Prerequisites	**5MEC212**	**Co-requisites**	**None**
Aim	The Module consists of two topics, Thermodynamics and Fluid Dynamics. The main objectives are to develop the skills that will allow students to solve engineering problems and also to communicate the outcomes of a laboratory session in a report.		

Content	Different types of flow. ▪ Application of the conservation of mass in fluid flow. ▪ Application of the conservation of momentum in fluid flow. ▪ Application of the conservation of energy in fluid flow. ▪ Application of dimensional analysis and similarity for reduced • Experimentation and scaling. ▪ The velocity of pressure waves in fluids. ▪ Laminar and turbulent flows in pipe flows. Revision of basic concepts: ○ energy ○ properties of pure substances ○ energy analysis of closed systems ○ mass and energy analysis of control volumes. ○ Constant volume and constant pressure processes ○ enthalpy Second Law of Thermodynamics, heat source and sink, thermal efficien perpetual motion machines, reversible and irreversible processes, Carno cycle, entropy, isentropic processes. Efficiency of compressors, steady flow devices, isothermal, polytropic ar isentropic processes, isentropic efficiencies for turbines, compressors, pu nozzles. Gas cycles: ○ Otto, ○ Diesel, ○ Stirling, ○ Ericsson, ○ Brayton and jet-propulsion cycles. Vapour and combined cycles: ○ Rankine cycle: ▪ reheat, ▪ regeneration, ▪ co-generation, ○ Refrigeration cycles: ▪ vapour-compression cycles, heat pumps, absorption refrigeration (basic concept) Gas and vapour mixtures, psychrometric charts. (basic concept)

Title	Mechanical Engineering Machine Element Design II		
Code	5MEC331	Department	Engineering
Prerequisites	5MEC232	Co-requisites	None
Aim	To introduce students to machine design methods.		
Content	This Module aims to facilitate the development of knowledge and skills that will allow students to address design problems with both creativity and rigor, by generating concept designs, designing machine components and assemblies that will perform and can be produced in accordance with appropriately specified development requirements, and the creation of suitable engineering drawings for parts and assemblies. Topics include: Concept generation, machine component design and basic machine system design, CAD modelling and creation of part and assembly drawings including tolerances. Specific knowledge areas are static and fatigue failure theories; standard machine design for joints (welding, threaded and non-threaded fasteners), and power screws and includes basic design projects on the machine level.		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	Project Management		
Code	5MEC231	Department	Engineering
Prerequisites	All first year modules	Co-requisites	None
Aim	This module deals with the theory, tools, techniques and practices in project management. Opportunities are provided to develop an understanding of the triangle of Project Management (PM) – time, cost and performance and to use PM techniques to achieve objectives within triangle constrains. The application of the theory, tools, techniques and practices is an objective. This takes the form of a multidisciplinary project i.e. development of a small scale engineering system.		

Content	• Introduction to Project Management Introduction to Project Planning and Life Cycle Project Scope Management • Project Time Planning and Network Costing Project and Financial Statement Managing Project Resources • Managing Risk in Projects • Project Quality Management Project Human Resource Project Contracts • Trade-off Analysis in a Project Environment Project Closeout • Tools include, but are not limited to, WBS, CPM, Gantt Chart, Resource Levelling, Cash Flow Statement, Trade- off analysis
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**Energy Conversion**		
Code	**5EEE331**	**Department**	**Engineering**
Prerequisites	**5EEE212**	**Co-requisites**	**None**
Aim	To introduce students to the fundamentals of AC Electrical Machines and Power Electronics. Two machine types are studied, i.e. induction and synchronous machines. The constructional features, operational differences, capability and characteristics of each machine type are studied. Uncontrolled rectifier circuits and DC-DC converters are also being introduced. Industrial applications of power electronics and electrical machines are analyzed.		
Content	AC machine windings, rotating magnetic field in AC machines, induction and synchronous machine equivalent circuits, determination of equivalent circuit parameters, induction and synchronous machine performance characteristics, uncontrolled rectification, controlled rectification, dc-dc converters		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s		

Title	**Statistics for Engineers**		
Code	**4STT171**	**Department**	**Mathematical Sciences**
Prerequisites	**4MTH171, 4MTH172**	**Co-requisites**	**None**
Aim	This Module aims to introduce engineering students to the basic concepts and tools of Statistics which are of particular relevance in an engineering context, and		

Content	Topics include: Random variables, sampling and basic statistical measures; Normal, t, F and Chi-square distributions; Confidence intervals; Statistical models, such as the means and the effects models; t, F and Chi-square tests; Regression and correlation; One-way analysis of variance; Introduction to the design of experiments; Application of statistical tools to experimental data in an engineering setting.
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Professional Communications**		
Code	**5EEE232**	**Department**	**Engineering**
Prerequisites	**All second year modules**	**Co-requisites**	**None**
Aim	The aim of the Module is to equip students with theory of oral and written communication, and to give them practical skills that will enable them to communicate more effectively at the University and in their professional careers		

Content	Referential Style and Academic writing and presentation; Planning & Discourse of technical written and oral messages; Reports – investigative/ evaluative; Executive Summaries/ Synopses; Individual presentations; graphics and visual literacy. Module content covers the following areas: Communication theory: • aim of communication • barriers to communication • audience and readership analysis • modes of communication Planning and Discourse: • definitions and schools • reasons for codes and rules • professional practice as defined by ECSA • corporate governance and King III report Reports: • types: investigative and feasibility • research: citation and referencing • different formats for types of reports • sections within reports (introduction, methods, results, conclusions, recommendations) and their functions • preliminary sections such as Table of Contents • final sections such as Appendices Summaries: • purpose of an executive summary to a technical or professional report • structure and components of a good executive summary • style and language for a persuasive and comprehensive summary Graphic and PowerPoint Design: • fundamental principles of visual literacy for text documents and presentations • types of graphics • types of visual aids that support and enhance a good presentation • visual literacy and creating PowerPoint slides. Individual presentations: • criteria for giving an effective oral presentation • vocal delivery • techniques for planning and balance in a presentation • audience reach • managing questions
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**Control Engineering**

Code	**5EEE312**	**Department**	**Engineering**
Prerequisites	**4MTH271, 4MTH272, 5EEE231**	**Co-requisites**	**None**
Aim	To train and educate students in control engineering methods for SISO control problems, including formulation of elementary problems as block diagrams, analysis of system interconnected systems, design and synthesis of feedback control systems in terms of input-output and state-space models. To introduce students to open-ended control engineering projects by means of a team project centered around a control problem.		
Content	Terminology: Open and closed loop configurations, block diagrams, dynamic system modelling, transient response, stead state error criterion. System stability: Routh Hurwitz criterion, Root Locus. Frequency responses. Nyquist lots, Bode diagrams, Nichols Charts. Compensation: Lead-lag circuits, minor loops, feedforward and three-term controllers. Sensitivity functions, minimum prototype response controllers, bilinear transformation, frequency response methods. State variables, state space models and design methods. Robustness, observability controllability, stability and performance.		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Embedded Systems II**		
Code	**5EEE322**	**Department**	**Engineering**
Prerequisites	**5EEE222**	**Co-requisites**	**None**
Aim	To introduce the student to the design and programming of an embedded system controlled, for example, by a RISC processor (eg. ARM Cortex). After the initial embedded coding practice, the tool chains for loading, testing and debugging the code are introduced, followed by more advanced topics of hardware/software interfacing. By the end of the module embedded operating systems are used. The implications of multitasking real time operations, safety and maintenance are covered.		

Content	This module focuses on embedded systems and computer architecture, covering embedded operating systems, theory and practices for the design and analysis of computer architecture and an introduction to Hardware Description Language (HDL) programming. This module builds on Embedded Systems I module. The module is split into two parts. Part 1 (8 credits) concerns the design process, modelling and analysis of embedded systems designs, the structure of an operating system, cross-compiling toolchains, and relevant related theories. Techniques for execution time analysis, resource control protocols, and methods for modelling and simulation of computer systems are studied. Practicals concern using and embedded operating system, cross-compiling applications, and using a single board computer embedded platform. Part 2 (4 credits) introduces HDL programming techniques and tools for developing gateware and simulating designs. A mini-project is performed which involves implementing a state machine and performing thorough analysis of its design and performance.
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Dynamics II**		
Code	**5MEC322**	**Department**	**Engineering**
Prerequisites	**5MEC222**	**Co-requisites**	**None**
Aim	This Module provides an introduction to engine balancing, kinematic analysis of gear trains, energy storage in flywheels and single-degree-of-freedom models in vibration analysis. Students will learn to analyze the dynamic behaviour of common engineering systems and components, for example gear trains, rotating and reciprocating machinery, flywheels and gyroscopes		
Content	**Gears:** Gear types: spur, bevel, helical, worm; transmission ratio and efficiency; epicyclic gears and differentials **Vibrations:** Free and forced vibration, viscous damping, Single-degree-of-freedom systems Resonance **Rotating Unbalance:** Static balancing, Dynamic balancing, examples of balancing in Practice **Engine Balancing:** Components of an engine, Determination of unbalanced forces and couples, Single cylinder engines, Multi-cylinder engines V- engines **Flywheels:** Energy storage; pulse smoothing torque and speed fluctuations,Crank- effort diagrams, applications - engines and pressing operations **Gyroscopes:** Gyroscopic motion; steady precession only **Laboratory Sessions:** Epicyclic gearbox, Rotating Unbalance		

Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Culture and Society in Africa**		
Code	**1ANT172**	**Department**	**Social Anthropology**
Prerequisites	**None**	**Co-requisites**	**None**
Aim	This is a Complementary Studies Module for Electrical Engineering students aimed at broadening student's perspective.		
Content	Culture and Society in Africa provides students from all faculties with background knowledge about the continent on which they live. The module includes an examination of the concepts of culture, race, society, ethnicity and nation-state, a perspective on African worldviews and ways of thought, and a consideration of the role of Africa in a changing world.		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Mechanical Vibrations**		
Code	**5MEC411**	**Department**	**Engineering**
Prerequisites	**5MEC322**	**Co-requisites**	**None**
Aim	This Module aims to introduce students to the modelling of vibration in machines and structures. This will include single- and multi- degree of freedom models; analytical and numerical solution techniques; and practical applications. Formulation of equations of motion for single- and multi- degrees of freedom by Newton's laws and energy methods; solution techniques for equations of motion via analytical and numerical methods; modal analysis; application of techniques to analysis and design; and continuous systems.		

Content	1. Single degree of freedom systems: 1.1 Formulation of the equation of motion of linear SDOF system by c) Newton's Law d) Energy Method(s) 1.2 Solution of equation of motion by: c) Analytical solutions d) Numerical methods 1.3 Applications: Rotating unbalance, vibration isolation, vibration measurement 2. Multi degree of freedom systems: 2.1 Formulation of the equation of motion of linearized DMOF system c)Analytical solutions d) Numerical methods 2.2 Solutions of equations of motion for free and forced systems by d) Modal analysis e) Numerical methods f) Application: Vibration absorbers, complex structures, mechanisms 2.3 Continuous Systems (Time Allowing) 3. Formulation of equations of motion for simple continuous systems 4. Vibration absorbers
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Product Design**		
Code	**5MEC421**	**Department**	**Engineering**
Prerequisites	**5MEC312**	**Co-requisites**	**None**
Aim	To facilitate the development of knowledge and skills that will allow candidates to design a conventional engineering device working in a team and individually. The design is to be performed holistically, duly considering market opportunities and product architecture, needs identification, requirement formulation, planning and managing the process, concept generation and selection, detail design and drawing, financial and technical performance analysis and communicating the design solution.		

Content	• The Design Process (Ulrich & Eppinger, Chapter 2) • Opportunity identification (Ulrich & Eppinger, Chapter 3) • Product planning and architecture (Ulrich & Eppinger, Chapters 4 & 10) • Customer needs and requirements specification (Ulrich & Eppinger, Chapters 5 & 6) • Concept generation and selection (Ulrich & Eppinger, Chapters 7 & 8) • Managing projects (Ulrich & Eppinger, Chapters 18) • Product development economics (Ulrich & Eppinger, Chapter 17) • Design for Environment, Manufacture and Assembly (Ulrich & Eppinger, Chapters 12 & 13) • Prototyping and modelling (Ulrich & Eppinger, Chapter 14) • Patents and Intellectual Property (Ulrich & Eppinger, Chapter 16) • Industrial design (Ulrich & Eppinger, Chapter 11) • Robust design (Ulrich & Eppinger, Chapter 15) • Design project (Afternoon session plus own time)
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Title	**System Design**		
Code	**5MEC431**	**Department**	**Engineering**
Prerequisites	**5MEC312**	**Co-requisites**	**None**
Aim	The objective of the Module is to enable students to structure and plan a high level system design and to generate system and subsystem development specifications. Structuring of the development process according to the life cycle model portrayed by the V-diagram. Functional decomposition and allocation to hardware. Determination of the system and subsystem requirements by means of system modelling and simulation and creation of a system verification matrix.		

Content	This Module marks the final chapter in the design programme that covers 3 years of undergraduate engineering studies. Students are now ready to tackle engineering problems that stretch beyond disciplinary boundaries, and involve complexity that is beyond the mastery of a single engineer. This is the world of Systems Engineering where various processes and techniques are used to make a seemingly impossible problem manageable and solvable. From the previous design Modules students have learned the skills of component or product design. Now it is time to broaden the horizons and tackle systems containing several interrelated products. The fundamental skills from mathematics, physic thermofluids, dynamics and other subjects will be essential for students to master the subject of System Design. The aim of this Module is to give students an appreciation of the effort and methodologies used when developing large and complex systems like power plants, aircraft, vehicles, space stations or even transportation networks.
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Engineering Professionalism**		
Code	**5MEC461**	**Department**	**Engineering**
Prerequisites	**All third year modules**	**Co-requisites**	**None**
Aim	This module deals practically with the student's transition to the workplace. The aim is to complement the student's theoretical training by introducing (in some cases) and reinforcing (in others) the topics and issues most likely to be encountered in the engineering profession. This is part of the endeavour to produce a well-rounded mechanical engineer for industry, consulting and the design environment		
Content	Professional registration – ECSA, the Washington Accord, code of conduct, due diligence, government certificate of competence, mentorship in industry. Types of engineering employment – details of the options available for graduates, the realities of the workplace and industry training, career path management. Engineering economics – working capital, cash flow, salaries and wages, depreciation, tax considerations, rate of return, payback period. Health and Safety – managing disease and health in the workplace, occupational safety and related legislation, practical HAZOP analysis, safe work permits and lockouts. Industrial law – Overview of employment law, labour relations and employment equity contracts, basis of offer and acceptance. Quality, reliability and maintenance management and their importance in the engineering profession. Environment – legislation, ISO140001, aspects of engineering operations and likely impacts, considerations of the created environment as well as the impacts on socio-economic and cultural systems.		

Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's

Title	**Mechatronic Control and Instrumentation**		
Code	**5MEC471**	**Department**	**Engineering**
Prerequisites	**All third year modules**	**Co-requisites**	**None**
Aim	This module will acquaint students with various electronic measurement systems; the signal processing needed to use these measurements and the conversion of the results through power elements into physical actions. Related topics such as digital communications, electronic circuits and programming will be dealt with as necessary		
Content	● Transistors and H-bridge amplifiers ● Op-amps – gains and filters ● Brushed and Brushless DC motors, Servo motors, Stepper motors, controlling these motors electronically ● Speed and position sensing for use with rotating devices ● Measurement: Temperature, Pressure, Strain, Displacement, Acceleration, Light level, Humidity ● Measurement problems, noise versus filter bandwidth, shielding, line drivers, differential measurements ● Communication with external devices such as IIC, SPI, SCI ● Introduction, equipment, tools ● Op-amp circuitry ● Analogue control system Practical Laboratory Sessions ● Introduction, equipment, tools ● Transistors ● PWM and H-bridge ● Op-amp circuitry ● Analogue control system ● C-intro and Interrupts ● ADC and timer module ● Communication ● Start combined analogue/micro project ● Complete combined analogue/micro project, including report		
Assessment Strategy	The module is assessed as follows: Assignments 10% Class Tests 30% Exam 60%		

Title	**Professional Communication Studies**		
Code	**5MEC412**	**Department**	**Engineering**
Prerequisites	**5EEE241**	**Co-requisites**	**None**
Aim	Professional Writing including: Business Proposals; Graphic Communication and Readability; Posters; Group presentations with Power-point		

Content	Referential and Academic writing and presentation; Persuasive argument; Formats for business plans and proposals; group presentations; graphics and visual literacy. Module content covers the following areas: Group theory and Team work: • aim of communication • barriers to communication • why groups are formed • types of groups • group dynamics and how teams are formed • advantages of groups. • different types of leaders • process and benefits of Brainstorming • different approaches to Problem-solving and decision-making. • negotiation skills Ethics: • definitions and schools • reasons for codes and rules • professional practice as defined by ECSA • corporate governance and King III report Business Plans and Proposals: • solicited and unsolicited proposals • requests for proposals • functions of SWOT and PESTEL • Table of Contents of a Business Proposal Summaries: • purpose of an executive summary • structure and components of a good executive summary • style and language for a persuasive and comprehensive summary CVs and Covering letters • formats for and choice and ordering of content • traditional and non-traditional CVs • covering letters for responding to an advertisement or tender and for direct approach. Poster Design: • difference between stand-alone posters and accompanied posters • fundamental principles of well-designed posters. Group presentations: • criteria for giving an effective group oral presentation • vocal delivery • techniques for good cohesion, transitioning and handover to the next person in the group • types of visual aids that support and enhance a good presentation • visual literacy and creating PowerPoint slides.

Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**New Venture Planning and Management**		
Code	**5MEC422**	**Department**	**Engineering**
Prerequisites	**All third year modules**	**Co-requisites**	**None**
Aim	Learning Business skills involved in starting entrepreneurial businesses from products designed: feasibility analysis, business plan, presentations		
Content	The entrepreneurial perspective; developing a new venture; what is a feasibility plan? Product concept and description; market assessment; industrial analysis; marketing plan; operations, development plans and management; financial projections		
Assessment	Continuous Assessment 40% Examination 60%		
DP Requirement	40% Continuous assessment mark 80% Attendance at practical's		

Title	**Final Year Research Project**		
Code	**5MEC432**	**Department**	**Engineering**
Prerequisites	**All third year modules**	**Co-requisites**	**None**
Aim	To give individual students the opportunity to tackle a real engineering project within a limited period under the guidance of a supervisor and submit a project report on the results.		

Content	The final year research project is an important opportunity for the student, at the end of the degree programme, to tackle a real engineering project. The student is expected to work on the project both individually and under the guidance of a supervisor. An engineering project involves the creative application of scientific principles to the solution of a technical problem. It involves a problem description or research hypothesis developed in consultation with a supervisor, reviewing the topic in detail and defining the boundaries (scope) carefully, confirming an understanding of the requirements of the supervisor, searching for, selecting and justifying the most appropriate approaches to solving the problem or testing the hypothesis. It also requires a student to be able to analyse, design, build, integrate and test as is appropriate for the specific project. This could include the use of hardware, software and simulation. Students are also required to evaluate the project against the success criteria and design objectives, and to write a report about the project, the findings, and any recommendations. In addition, students need to make an oral presentation and prepare an exhibit.
Assessment	Thesis 100%
DP Requirement	Meeting the ELO requirements

Title	**Industrial Ecology**		
Code	**5MEC442**	**Department**	**Engineering**
Prerequisites	**All third year modules**	**Co-requisites**	**None**

Aim	The module is an introduction and overview of the relatively new 'field' of Industrial Ecology and its more recent trends. In the context of the module "industrial ecology" is interpreted as encompassing all of the interactions of an industrial society with the natural environment as well as the associated drivers of industrialization. A more appropriate way of thinking about the module is to rename it "the Ecology of Industrial Society". The objectives are to encourage a systems perspective of industrial activity as it is integrated with and forms part of the natural systems (lithosphere, pedosphere, biosphere, hydrosphere, atmosphere) This module is intended to be an enjoyable and enlightening experience, given the very different kind of learning that is expected. The students in the class have the responsibility to make the learning their own – to engage in debate and ask questions that will lead to the class finding out new information and reading different literature than that originally proposed – because it concerns what interests you and what you want to learn. What you learn and the effects of industry on the environment both affect your future. We are all in this together – the learning and the living. Let's do it with enthusiasm and meaning. There are however, two primary educational goals for the module. The first has to do with the content and the second with the process. Students are expected to become aware of the problem issues facing the global community that relate to the industrial impact on the environment – the ecology of industrial society. You are expected to demonstrate this awareness and the acquisition of knowledge and understanding through discussion in class, through oral arguments, quizzes, projects, an exam and a term paper. These forms of communication hint at the second set of outcomes that relate to the ability to accomplish a limited kind of research as well as communicating ideas in a professional manner. Students are expected to put into practice the skills they have acquired in their professional communication module as well as using the opportunity to improve those skills. These do not only relate to the presentation side of the skills but also to the exploratory and critical aspects – being able to ask critical questions, seek information from the internet and other sources, argue a case in discussion as well as in a formal written presentation, show logical development of a debate and a willingness to be persuaded by a counter argument.

Content	Ecosystem deterioration, pollution Resource depletion: Fossil fuels, water, uranium, rare earth metals Climate change Systems thinking, thermodynamics Sustainability; the limits to growth Industrial Ecology concepts and tools Material Flow Analysis Life Cycle Assessment; the circular economy Design for Environment Eco-Industrial Parks: industrial symbiosis Ethics: economic paradigms, consumption Energy, Mobility,
Assessment	Continuous Assessment 40% Examination 60%
DP Requirement	40% Continuous assessment mark 80% Attendance at practical’s

Department of Geography and Environmental Studies

STAFF

Associate Professor	I Moyo, BAHons, GRAD CE (Zim), MA, PhD (UNISA)
Senior Lecturers	NB Mbatha, BSc (Physics & Electronics) (UNIZULU), BScHons, MSc (Physics) (UWC), PhD (Atmospheric Physics) (UKZN)
	ML Mdoka, BScHons (Applied Physics, NUST), GradDip Meteorology (Australia), MSc (Climatology), PhD (Climatology) (UCT)
Lecturers	AT Mthembu, BEd, BAHons, STD, MA (UNIZULU)
	NP Ndimande, BAHons (UNIZULU), MSc (Oklahoma State)
	N Xulu, BScHons (UNIZULU), MSc (UNIVEN)
NGAP Lecturer	J Mzimela, BSc, BScHons, MSc (Environmental Science) (UKZN)
Laboratory Assistant	LC Shongwe, BA (Enviro. Plan. & Dev.), BAHons (UNIZULU)
Administrator	D Khumalo, NSC (Swinton Rd Col), BCom, BAHons (UNIZULU)

Title	**Introduction to Physical and Environmental Geography**		
Code	**4GES111**	**Department**	**Geography & Environmental Studies**
Prerequisites	None	Co-requisites	None
Aim	This course introduces the student to man's physical environment i.e. earth's landform and atmospheric processes and environmental management. It provides the skills and knowledge to understand the global patterns and the natural processes involved in the landforms formation and the analysis of air temperature, atmospheric moisture and precipitation, wind and global circulation and weather systems. The course also introduces students to major environmental issues confronting the society.		
Content	● Materials of the Earth's crust ● The lithosphere and plate tectonics ● Volcanic and tectonic landforms ● Landforms of weathering and mass wasting ● Landforms and rock structure ● Landforms made by wind, waves and currents ● Air temperature ● Atmospheric moisture and precipitation ● Winds and global circulation ● Weather systems ● Ethical and philosophical foundations of environmental management ● Environmental problems ● Land use planning and environmental management ● Environmental management approaches ● Case studies on environmental management		
Assessment	50% Continuous Assessment Mark 50 % Formal end of module theory (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory and practical classes		

Title	**Introduction to Human Geography**

Code	**4GES112**	**Department**	**Geography and Environmental Studies**
Prerequisites	None	Co-requisites	None
Aim	This course covers two aspects of human geography namely cultural and tourism Geography. The course introduces the students to the discipline of human geography which deals with the various sub-disciplines which include population dynamics, cultural environments, spatial behaviour and urban geography. The course is intended to provide students with an awareness of the value of human geography as a discipline that aids understanding of the complex and ever-changing world. Tourism geography aims to provide knowledge and understanding of the long-term consequences of tourism development: the socio-cultural, economic and environmental impacts of tourism as well as the economics of the tourism industry.		
Content	● Aspects to be studied will include: ● Philosophies in geography ● Population dynamics ● Cultural geography ● Geography of spatial behaviour ● Urbanisation ● Inequality within a state ● Tourism Industry: planning and development ● Tourism and Economic Development ● Tourism development and the Environment ● Social and Cultural Aspects of Tourism ● Pro-Poor Tourism Strategies		
Outcomes	On completion of this module the learners will be able to demonstrate: ▪ Understanding of various philosophies of geography ▪ A sound knowledge of sub-disciplines of geography which include population, cultural, behavioural and urban geography. ▪ An understanding of tourism development and its impact on the environment. ▪ A sound knowledge of pro-poor tourism strategies.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (2 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory and practical classes		

Title	**4GES211: Global landforms and Cartography**		
Code	**4GES211**	**Department**	**Geography and Environmental Studies**
Prerequisites	4GES111	Co-requisites	None
Aim	The course covers two areas: geomorphology and cartography. The geomorphology part of the module deals with forces and processes involved in the formation of landscape on a global and local scale. The forces and processes are studied in terms of their spatial distribution and their respective intensities. Resultant landforms are noted and classified according to physical form, regional distribution, and the types of processes involved. Environmental implications of the processes and forms are considered. The cartography part of the module deals with the factual basis for making decisions concerning the design and interpretation of maps. The module is designed to stimulate interest in cartographic issues that play an important role in the various fields of study.		
Outcomes	▪ On completion of this module the learners will be able to: ▪ Distinguish the approaches to geomorphology ▪ Evaluate the processes contributing to the different types of landforms		

	▪ Identify drainage basin characteristics ▪ Design and interpret maps ▪ Describe map projections ▪ Describe Geographic Information System
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory practical classes

Title	**4GES212: Demographics, Health and Sustainable Development**		
Code	**4GES212**	**Department**	**Geography and Environmental Studies**
Prerequisites	4GES122	Co-requisites	None
Aim	This course intends to introduce students to concepts, principles and challenges in the field medical geography and sustainable development. Students are to examine the relationships between the environment, health and sustainable development. Its main objectives are: (1) to improve students' ability to think critically, read closely and to argue well about environmental, demographics and health issues and sustainable development, (2) to introduce students to some text and major controversies on environmental issues and developmental issues and (3) to help students in arriving at their own rational and clear minded views about matters under discussion.		
Content	● Aspects to be studied will include: ● Introduction to medical geography ● Diseases of poverty ● Population distribution in South Africa ● Social and spatial inequalities in health ● Distribution of diseases and provision of health care services ● Health status in South Africa ● Introduction to sustainable development ● Sustainable development, poverty and the environment ● Natural resources and sustainable development ● Sustainable development in Africa: A challenge for the 21st century ● Sustainable development in rural South Africa ● Globalization and sustainable development ● The sustainable development strategy of South Africa		
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours) and practical exams		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory and practical classes		

Title	**4GES 222 Hydrometeorology**		
Code	**4GES 222**	**Department**	**Geography and Environmental Studies**
Prerequisites	4GES 111	Co-requisites	None
Aim	*This course covers* the occurrence and movement of energy and water vapour fluxes in the atmosphere and on the land surface, develops quantitative approaches for measurement of the surface energy fluxes and evapotranspiration using various hydrometeorological methods, and discusses the measurement and processing of data sets necessary for hydrologic modelling. The module aims at acquainting students with the nature of climate in the boundary layer and the region in which the energy that drives atmospheric processes originate, and also where we live, produce our food and release the bulk of the atmospheric pollution). Energy and mass fluxes as well as atmospheric interactions producing distinctive weather patterns and/or		

	climates in the boundary layer are discussed. Also covered are the various methods for the estimation/measurements of the surface fluxes. The knowledge gained in this module is essential and finds application in agricultural, environmental and water resources studies, among others.
Content	● Introduction (radiation laws, radiant flux, insolation determination, -radiation and energy budget) ● Energy and mass exchanges; Subsurface climates (soil heat flux and soil temperature, -soil water flow and soil moisture) ● Surface layer climates (momentum flux and wind, sensible heat flux and air temperature, latent heat flux and water vapour) ● Outer layer climates ● Evaluation of energy and mass fluxes (radiative fluxes (measurement and theoretical approaches), convective fluxes , -water balance) ● Energy balance of non-vegetated surfaces; Climates of vegetated surfaces Climates of non-uniform terrain (spatial inhomogeinity and topographic effects) Man-modified atmosphere (shelter effects, greenhouse) ● Unintentionally-modified climates ● Estimation of surface fluxes (methods and instrumentation) (eddy covariance, Bowen ratio-Energy balance, scintillometry, surface renewal Penman-Monteith ● Evapotranspiration and water loss from various surfaces ● Application of remote sensing in surface fluxes estimations
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory and practical classes

Title	**4GES311: Urban environment and Recreation Planning**		
Code	**4GES311**	**Department**	**Geography and Environmental Studies**
Prerequisites	4GES212	Co-requisites	None
Aim	This course addresses spatial and development problems that were created by Apartheid planning policies. Apart from studying strategies for integrating the fragmented South African cities, the module goes further and interrogates the concept of integrated settlement planning. The module enquires if this concept is appropriate within the present socio-economic environment. The module also addresses the concept of recreation spaces. Special attention will be given to the connection between recreation planning and other types of planning and environment design, describe alternative approaches to recreation planning and how, where and when these approaches can be used. Students are expected to be able to make meaningful contributions towards shaping a South African city that is integrated and offers more opportunities of economic advancement to its residents		
Content	● Aspects to be studied will include: ● Introduction to urban and regional planning ● Urbanization, unemployment and philosophical approach to urban management and job creation ● Urban development and economic integration ● Structuring elements of settlements, Urban nodes, Activity corridors, A metropolitan open space system ● Housing, integration of urban development and the compact city debate ● Unravelling the different meanings of integration: The Urban Development Framework of the SA government ● Planning for integration: The Case of the Metropolitan Cape Town		

	● Alternative Urban Planning and Management in Brazil: Instructive examples for other countries in the South ● Interpretation of sustainable development and urban sustainability in low-cost housing and settlements in South Africa ● Introduction to Recreation Planning; Concepts and Principles; Benefits of recreation ● Recreation Supply and Demand analysis ● Strategic Plans ● Facilities Planning and Design ● Planning Methodology ● Coastal Recreation Planning and Design
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory and practical classes

Title	**4GES321 Atmospheric processes and pollution**		
Code	**4GES321**	**Department**	**Geography and Environmental Studies**
Prerequisites	4GES222	Co-requisites	None
Aim	This module is designed to enable students comprehend a wide range of weather-producing phenomena. It deals primarily with the environment of the southern hemisphere, and particularly the atmospheric phenomena affecting the weather and climate of southern Africa. It lays a foundation for specialised modules in climatology and applied climatology offered at senior and postgraduate levels of study. The objectives of this module will be met and tested through formal lectures, tutorials, practical sessions and two assessments.		
Content	● Global and thermal circulations o Large-scale pressure patterns and circulation systems o Hadley cells and annual cycle o Governing dynamics o Mid-latitude jet streams ● Circulation in the Southern hemisphere o Seasonal mean conditions o Storms tracks ● Weather over southern Africa o Sub-tropical anticyclones, wave disturbances o Synoptic sequence and classification ● Tropical weather analysis of the Indian Ocean ● Air pollution meteorology ● Atmospheric stability ● Air pollution measurement methods and modelling ● Environmental and health effects of air pollution ● Air pollution control and management		
	The learners will: ▪ Describe and evaluate atmospheric processes and pollution and indicate ability to make recommendations and predict scenarios. ▪ Identify and evaluate large, medium and small-scale atmospheric processes and pollution and make recommendations. ▪ Distinguish, describe and apply methods of investigating atmospheric processes and pollution and make recommendations. ▪ Identify, design and evaluate models that apply to forecasting techniques in atmospheric processes and pollution.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours)		

DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory and practical classes

Title	**4GES 331: Land Use and Natural Resource Management**		
Code	**4GES 331**	**Department**	**Geography and Environmental Studies**
Prerequisites	4GES211	Co-requisites	None
Aim	This course introduces the student to land use concepts, systems, and management and evaluation techniques. In addition, the course introduces natural resources, their types, distribution, rational use, decision–making systems and management. The course also introduces students to major land use and natural resource management issues confronting society.		
Content	● Landscape form and function in planning ● Physiographic and parametric approaches to terrain evaluation ● Topography, slope and land use planning ● Application of terrain analysis in soil surveys ● The application of geomorphological terrain analysis in soil engineering ● Utilisation of topographical features in determination of soil types ● and land capability in agriculture ● Vegetation, Land use and Environmental Assessment ● Landscape Ecology, Land use and Habitat Conservation planning ● Types, location and management of Natural Resources ● Ethics, Aesthetics, Culture, Assumptions, Theories in Economics of Natural resources ● Principles of Economics and Sustainable Natural Resource Management ● Natural Resource Valuation Techniques ● Environmental management approaches ● Case studies on Land Use and Natural Resource Management		
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory and practical classes		

Title	**Climate Dynamics, Weather Variability and Prediction**		
Code	**4GES341**	**Department**	**Geography and Environmental Studies**
Prerequisites	4GES222	Co-requisites	None
Aim	This module introduces students to the atmospheric circulation of the southern hemisphere particularly southern Africa. Most emphasis is on the tropical atmosphere and oceans. The planetary-scale circulation of the atmosphere and ocean are discussed as a background for subsequent topics with a focus on African climate. The climatology of tropical weather systems is discussed with emphasis on structure, distribution, seasonal characteristics, and their role in the regional climates and inter-annual climate variability. The associated manifold environmental and societal consequences are covered in the inter-annual variability of the atmosphere-ocean system sessions. The module, in addition, deals with weather variability of the tropics and sub-tropics. The module will help a student develop the ability to analyse tropical and sub-tropical circulation systems over southern Africa. Concepts derived from previous atmospheric circulation modules are vital for understanding weather variability.		

Content	• Meteorological scale, Large-scale weather producing processes and systems; • The atmospheric circulation and weather over southern Africa; • Ocean circulation; • Climatology of weather systems; • Inter-annual variability of the atmosphere ocean system; • Human impact; • Introduction to weather variability; • Moisture and precipitation; • Moisture related concepts, rain droplet growth, rainfall augmentation; • Vertical motion and cumulus convection; • Radar reflectivity patterns, storm types; • Prediction of future conditions; • Atmospheric laws and numerical prediction; • Synoptic cycle of sub-tropical weather; • Surface weather patterns over southern African; • Upper level structure & jet stream waves; • Numerical forecasting of weather; Climate modelling & prediction; • Climate change scenarios for southern Africa
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours) and practical exams
DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory and practical classes

Title	**4GES 312 : Environmental Management**		
Code	**4GES 312**	**Department**	**Geography and Environmental Studies**
Prerequisites	4GES212 or 4GES222	Co-requisites	None
Aim	This course introduces the student to environmental management concepts, its problems, concepts, problems and policies. It provides the skills and knowledge to understand the solutions to the debate around environment and sustainable development. The course also introduces students to major environmental issues confronting a developing society.		
Content	• Environment and Environmental Law • Environment and the Constitution • International Environmental Law • Water Law and the Environment • Conservation of Resources • Pollution Control Law • Land Use and Planning Law • Strategic Environmental Assessment • Integrated Environmental Management • Environmental Management Tools (Environmental Impact Assessment (EIA), Environmental Management Standards (EMS) & Environmental Law • Water pollution, Waste Management • Coastal zone management • Case studies on environmental management • Environmental Justice • South Durban Industrial Basin • Emission levels exceedences e.g. Forskor • Visit to Richards Bay Clean Air Association • Used tyre dumping on gullies in rural areas • Municipal Bye Laws e.g. UMhlathuze Municipality • DWAF regulations		

	● Comparison of RSA's Environmental and Water Laws with those of the USA
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours) and practical exams
DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory and practical classes

Title	**4GES322: Environmental Fieldwork and Research**		
Code	**4GES322**	**Department**	**Geography and Environmental Studies**
Prerequisites	4GES211 AND 4GES212 OR 4GES222	Co-requisites	None
Aim	This course introduces students to techniques in geographical research leading to a successful project report. The module provides a framework for geographical research methodology, including how to ask pertinent questions, set short-term goals, uncover background material, collect and analyse field data, and interpret information in a critical scientific manner.		
Content	● Aspects to be studied will include: ● Introduction to Geographical research methods ● Writing a research proposal ● Literature review ● Sampling methods ● Questionnaire development ● Field data collection ● Entry and preliminary analysis of data ● Oral presentation of research results ● Writing of research report		
Assessment	50% Continuous Assessment Mark 50% Formal end of module theory (3 hours) and practical exams		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of theory and practical classes Submission of final research report		

Department of Human Movement Science

STAFF

Professors	Vacant
Senior Lecturers	A van Biljon, BA (Human Movement Science) (UP), BScHons (Kinderkinetics), MSc (Kinderkinetics) (UNIZULU), PhD (Kinderkinetics) (UNIZULU
	ML Mathunjwa, BSc (Sport Science), BScHons (Sport Science), MSc (Sport Science) (UNIZULU), PhD (Sport Science) (UNIZULU)
	C Gouws, BA (Human Movement Science), BAHons (Kinderkinetics) (NWU), MSc (Kinderkinetics) (UNIZULU), PhD (Kinderkinetics) (UNIZULU
	G Breukelman, BA (Human Movement), BScHons (Biokinetics), MSc (Sport Science) (UNIZULU), PhD (Sport Science) (UNIZULU)
	H Erasmus, Hons. B.Sc. (Biokinetics N.W.U/Potchefstroom), M.Sc. (Constraints to Physical activity and Wellness, N.W.U.), Ph.D. (Rugby injury prevention, Movement Education, N.W.U.), Diploma Sport & Movement Science (Leipzig University, Germany)
	L Millard, B (Human Movement Science) BAHons (Human Movement Science: Sport Science), M (Human Movement Science) (NMU). PhD (Sport Science) (UNIZULU)
Lecturers	PB Ndluvo, BScHons (Sport Science) (NUST), MSc (Sport Science) (SU)
Secretary	N Nxele Dip (Office Admin) (Varsity College)
Laboratory Assistant	Mr Sneyimani BSc hons (Biokinetics)UNIZULU

Human Movement Science

Code	**4HMS111**	**Department**	**Human Movement Science**
Title	Human Movement Science 1A		
Prerequisites	None	Co-requisites	None
Aim	**Paper 1: Concepts of Human Movement** This module is designed to serve as an introduction to the cognate disciplines in the field of Human Movement Science and Sport. **Paper 2: Functional Anatomy** The aim of this module is to provide the necessary foundation to the sciences of anatomy and physiology: Basic orientation and terminology: Systematic study of osteology, and adequate knowledge with regards to the skeletal, muscular, cardiovascular and respiratory systems.		
Content	**Paper 1: Concepts of Human Movement** The Centre-M: A conceptual model for studying human movement, Sporting origins; Academic disciplines that make up the Human Movement Science degree; Historical influences into the professional and academic development of Human Movement Science degree; Biomechanics; Exercise Physiology; Fitness and Health; Sport Psychology. **Paper 2: Functional Anatomy** Definitions and terminology of basic anatomy and physiology concepts; Levels of organization; homeostasis; Study of bones and their landmarks, joints and related structures, movement capabilities; muscle tissue & muscular system; cardiovascular system (Blood, arteries, veins); respiratory system (structure and function).		
Assessment	50% Continuous assessments		

	50% Formal end of module theory (3 hours) exam
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical sessions

Code	**4HMS112**	**Department**	**Human Movement Science**
Title	Human Movement Science 1B		
Prerequisites	None	Co-requisites	None
Aim	**Paper 1: Sociology of Human Movement** Learners credited with this module are able to acknowledge the relationship between sport and society; acquire the history of sport; and understand the social significance of sport in modern society. The module allows learners with a capacity for independent inquiry and critical thinking. **Paper 2: Sport and Leisure Management** The aim of the module is to serve as an introduction to the principles, concepts and theories of the sport and leisure management field.		
Content	**Paper 1: Sociology of Human Movement** Theoretical Approaches; Socializing in and through Sport; Sport and Gender; Deviance in Sport; Sport and Youth; Violence and Aggression in Sport; Sport and Media; Sport and Religion. **Paper 2: Sport and Leisure Management** Managing sports; the sport industry environment; creative problem solving and decision making; strategic and operational planning; organizing and delegating work; managing change; human resources management; behavior in organizations; team development, communication in sport; leading; facilities and events.		
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam		
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical sessions		

Code	**4HMS211**	**Department**	**Human Movement Science**
Title	Human Movement Science 2A		
Prerequisites	4HMS112	Co-requisites	None
Aim	**Paper 1: Kinesiology and Biomechanics** The module serve to introduce learners to an investigation of internal and external forces that affect human performance and the effect those forces has on performance through the branch of physics called mechanics. **Paper 2: Adapted Physical Education** This course is designed to provide learners with competence and knowledge to evaluate, plan, and implement therapeutic programmes and meeting the needs of individuals with multiple disabilities.		
Content	**Paper 1: Kinesiology and Biomechanics** Biomechanics Definition and Perspective; Forms of Motion; Standard Reference Terminology; Joint Movement Terminology; Inertia, Mass, Force; Centre of Gravity; Weight; Pressure; Volume; Density; Torque; Impulse; Mechanical Loads on the Human Body; Composition and Structure of Bone; Bone Growth and Development; Bone Response to Stress; Osteoporosis; Joint Architecture, Joints Stability; Joint Flexibility; Common Joint Injuries and Pathologies; Linear Kinematics of Human Movement; Angular Kinematics of Human Movement; Linear Kinetics of Human Movement; Human Movement in a Fluid Environment. **Paper 2: Adapted Physical Education**		

	Introduction to Adapted Physical Education; Meeting Unique Needs of Athletes with Disabilities; Instructional Models for Therapeutic Modalities; Adapted Activities for different stages of disability; Water Therapy; Planning and Administration for Adapted Physical Programmes.
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical sessions

Code	**4HMS212**	**Department**	**Human Movement Science**
Title	Human Movement Science 2B		
Prerequisites	4HMS111	Co-requisites	None
Aim	**Paper 1: Exercise Physiology** This module serves to describe and explain the functional and metabolic changes brought about by a single (acute) or repeated exercise sessions (chronic exercise) often with the objective of improving exercise response. The learners will investigate and evaluate the key changes that occur to the various physiological systems at rest, during a single bout of exercise and following chronic exercise. **Paper 2: Laboratory Technology** To introduce the student to laboratory administration, maintenance and safety of the apparatus, and specific physiological measurements needed for exercise testing		
Content	**Paper 1: Exercise Physiology** Control of the Internal Environment; Bioenergetics; Exercise Metabolism; Cell Signalling and the Hormonal Responses to Exercise; Exercise and the Immune System; The Nervous System: Structure and Control of Movement; Skeletal Muscle: Structure and Function; Circulatory Responses to Exercise; Acid-Base Balance During Exercise; Risk Factors and Inflammation: Links to Chronic Disease. **Paper 2: Laboratory Technology** Laboratory administration, maintenance and safety; Risk Stratification; Criteria for Test termination; Testing Environment; measurement of heart rate; blood pressure; body composition and flexibility, Isokinetic equipment, ECG; VO2 testing and Cardiometabolic screening; feedback and report writing .		
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam		
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical sessions		

Code	**4HMS311**	**Department**	**Human Movement Science**
Title	Human Movement Science 3A		
Prerequisites	4HMS211 & 4HMS212	Co-requisites	None
Aim	**Paper 1: Exercise Science** This course is an introduction to basic principles of fitness and wellness that will provide students with a working knowledge of exercise prescription for apparently healthy groups and special populations. **Paper 2: Health Education**. The aim of this module is to give learners the necessary grounding in the concepts of human- development and –health. Knowledge on sexual health, diseases, relationships, and death. The individual will be encouraged to increase one’s own health as well as the community.		

Content	**Paper 1: Exercise Science** Physical Activity, Health, and Chronic Disease; Principles of Prescription and Exercise Program Adherence; Designing Cardiorespiratory Exercise Programs; Designing Resistance Training Programs; Resistance Training and Spotting Techniques; Designing Weight Management and Body Composition Programs; Designing Programs for Flexibility and Low Back Care; Exercise Prescription for Special Cases. **Paper 2: Health Education** Define Health Education. Definitions and terminology; Identify the principles of good health; levels of health prevention; limitations to health prevention. Infectious- & Noninfectious diseases. Gerontological aspects. Outline the development of a healthy personality, healthy emotions, how to manage stress. Define psychopathology and identify the causes. Nutrition and weight management, Personal and interpersonal skills to enhance relationships; Human sexuality, development and expression; Marriage, parenthood and family planning; Conception, pregnancy and child birth. Substance abuse; effects, symptoms, and treatment of substances abuse.
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical sessions

Code	**4HMS321**	**Department**	**Human Movement Science**	
Title	Human Movement Science 3C			
Prerequisites	4HMS211 & 4HMS212	Co-requisites	None	
Aim	**Paper 1: Aetiology of Sports Injuries** The aim of the module is to provide learners with the necessary knowledge, skills and techniques to understand the aetiology of sports injuries; identify signs and symptoms of sports injuries, and the ability to provide safe, effective assessment and management of soft tissue and sport related injuries, sustained during different phases of training and/or competition. **Paper 2: Motor Learning** This course will focus on the neural control of movement, students will gain a deep understanding of how movements are planned, coordinated, and executed.			
Content	**Paper 1: Aetiology of Sports Injuries** Injury and the stages of an injury; Risk factors and prevention of sports injuries; Classification of Injuries; Injuries due to trauma; Joint ligament injuries; Dislocations; Muscle injuries; Tendon Injuries; Overuse injuries; Concussion; Whiplash; Carpal Tunnel Syndrome; Acromioclavicular Dislocation; Rotator Cuff; Biceps Tendinopathy; Tennis and Golfers Elbow; Scheurmann's Disease; Sciatica and Piriformis Syndrome; Adductor and Abductor Strain; Anterior Knee Pain; Runner's Knee; Anterior Cruciate Ligament (ACL); Tibial Stress Syndrome; Compartment Syndrome; Ankle Sprains and Plantar Fasciitis. **Paper 2: Motor Learning** An Introduction to Motor Learning; The Nervous System; Selective Attention; The Process of Sensation; The Process of Forming a Perception; The Process of Planning Actions; The Process of Producing Actions, Learning Motor Skills.			
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam			
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical sessions			
Code	**4HMS322**	**Department**	**Human Movement Science**	

Title	Human Movement Science 3D		
Prerequisites	4HMS211 & 4HMS212	Co-requisites	None
Aim	**Paper 1: Measurement and Evaluation** The aim of this module is provide the skills necessary to perform various tests and measurements for all age and/or fitness levels groups within a physical activity framework and in all realms of sport. **Paper 2: Research Methodology** The aim of this module is to serve as an introduction to sport-and-exercise-science related research methodology. This module serves to provide the background knowledge and skills in sport-and-exercise-science related scientific research.		
Content	**Paper 1: Measurement and Evaluation** Significance of measurement and evaluation for research findings. Value of testing in sport - why do we test and why is the results significant for sport scientists? Factors affecting sport testing – specificity, validity and reliability of different sport related tests. Sport related motor & physical fitness testing (strength tests; isokinetic testing; explosive power; speed tests; muscle aerobic & anaerobic endurance; agility; flexibility & body composition; and reaction time). Specific testing of different sporting codes of all age and/or fitness levels groups. Report writing and analysing results and findings **Paper 2: Research Methodology** The nature of sport-and-exercise-science related research; different ways of problem solving; different types of research; research ethics; the literature review, defining and delimiting the research problem; the research hypothesis, formulation the research method; the needs for statistics; Communication, discussion and interpretation of research findings; drawing communicable conclusions.		
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam		
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical sessions		

Code	**4HMS312**	**Department**	**Human Movement Science**
Title	Human Movement Science 3B		
Prerequisites	4HMS211 & 4HMS212	Co-requisites	None
Aim	**Paper 1: Exercise Science 2** This course is designed to provide a comprehensive overview of strength and conditioning. Emphasis is placed on the specific factors influencing sport training and performance. **Paper 2: Movement Psychology** The purpose of this module is to provide learners with an overview of the theoretical and applied aspects of the psychology of sport.		
Content	**Paper 1: Exercise Science 2** High-Level Performance Training; Periodization; Physiological Responses to Exercise; Healthful Nutrition for Fitness and Sport; Performance-Enhancing Substances; Special Populations; Facility Layout and Scheduling. **Paper 2: Movement Psychology** Participation Motivation; Achievement Motivation; Personality and Sport; Attention in Sport; Attentional Strategies; Arousal, Anxiety, and Motor Performance; Arousal Control; Aggression in Sport; Spectators and Sport; Imagery; Psychology of injuries.		
Assessment	50% Continuous assessments 50% theory (3 hours) exam		
DP Requirements	40% Continuous Assessment Mark 80% Attendance at practical sessions		

401 NATIONAL DIPLOMA IN SPORT AND EXERCISE TECHNOLOGY (MODULE DESCRIPTIONS)

MODULE CODE	MODULE NAME	CREDITS	NQF LEVEL	PRE-REQUISITE
FIRST YEAR				
4HMD 119	**Sport Didactics and Coaching** This module seeks to develop students' abilities to practically apply didactics and coaching principles in the training of diverse population groups in various sports and fitness training programmes. Students will acquire didactic competencies which they will engage to enable their clients to learn skills and strategies in the context of game play.	30	4	None
4HMD129	**Sport Management** This module is an introduction to the principles, concepts and theories of management in sport and leisure discipline. This module will prepare students for entry-level positions in the business of sport such as sport club management, sport consultancy, sport marketing and governing body administrations.	30	4	None
4HMD139	**Sport & Exercise Technology** This module will give students an understanding of fitness, basic concepts behind fitness programmes and the practical application of the basic principles in constructing a basic training programme for diverse population groups.	30	5	None
4HMD149	**Sport & Physical Recreation Studies 1** This module will enable the students to gain knowledge of the human body as well as how the body works and interacts with different parts of the body. Included in this module is the study of bones, joints and related structures, movement capabilities, muscle tissue as well as muscular system. Students will also gain knowledge of concepts of leisure, recreation play and work. In addition, students will learn the guidelines to writing a sponsorship letter; risk assessment; emergency procedure; safety equipment and management of sport injuries as well as service learning.	30	5	None
SECOND YEAR				

4HMD 219	**Human Movement Science** This course will focus on the neural control of movements as well as an understanding of how movements are planned, coordinated and executed.	30	5	None
4HMD 229	**Exercise Physiology II** This module is an extension of the anatomy module in the first year. In this module, students will study the functions of the body in detail with special reference to the interdependence of the different body systems.	30	5	4HMD 149
4HMD 239	**Kinesiology** This module is an introduction to the internal and external forces that affect human performance and the effect those forces have on performance through the branch of physics such as mechanics.	30	5	None
4HMD249	**Sport & Exercise Technology II** This module entails the study of the code of ethics, validity and reliability of sport. Components of fitness including body composition; agility; balance; co-ordination; power; reaction time; speed as well as flexibility are discussed. Also included are topics of injuries, gym training, and periodization and sport specific training programs.	30	5	4HMD 139
THIRD YEAR				
4HMD 319	**Sport Psychology** This module provides an overview of the theoretical and applied aspects of the psychology of sport. It focusses specifically on topics related to psychological variables influencing participation in sport, competitive nature of sport environments as well as psychological strategies used to enhance sport performance.	30	5	4HMD 119 4HMD 129 4HMD 139 4HMD 149
4HMD 329	**Health Science** This module will focus on health as well as how to improve health by preventing and managing diseases.	30	5	4HMD 119 4HMD 129 4HMD 139 4HMD 149
4HMD339	**Exercise Physiology III** This module builds on the knowledge that you have gained in Exercise Physiology II. This module will focus be on physiological adaptations and responses to exercise as it release to human performance, training and limitations.	30	5	4HMD 119 4HMD 129 4HMD 139 4HMD 149 4HMD 229

4HMD349	**Sport and Exercise Technology III** This module covers the study of medical history and patient details. Also included will be lung function, heart rate and blood pressure testing. Healthy life style choices regarding diet and physical activity as well as stress, sleep, alcohol and smoking. SISA protocols. Aerobic an Anaerobic testing. Components of fitness.	30	5	4HMD 119 4HMD 129 4HMD 139 4HMD 249

Department of Hydrology

STAFF

Professor	V Elumalai, MSc (Madras), PhD (Anna) Pr. Sci. Nat.
Lecturer	F Mathivha, PhD
	SC Mazibuko BSc (Hydrology & Computer Science) (UNIZULU), BScHons (Hydrology)(UNIZULU), MSc (Hydrology)
nGap Lecturer	Vacant
Senior Technician	MG Makwela BScHons (UNIZULU) Cand. Sci. Nat
Laboratory Assistant	DBX Makhathini, BAdmin (UNIZULU)

Hydrological Research Unit

Acting Director	BK Rawlins, BScHons (Exeter), MSc (UNIZULU) Pr. Sci. Nat.

Title	**Introduction to Geology**		
Code	**4HYD112**	**Department**	**Hydrology**
Prerequisites	None	Co-requisites	None
Aim	The aim of this module is to give learners the necessary grounding in geology for the further study of geohydrology and physical geography		
Content	● Mineralogy and elementary crystallography; Mineral properties, classification and description of rock forming minerals; ● Origin and Classification of Igneous Metamorphic and Sedimentary rocks ● Description and classification of common igneous, metamorphic and sedimentary rocks. ● The origin and development of the earth; Plate tectonics; ● Concepts of structural geology; Structural types (faults, folds and joints); ● Principles of stratigraphy; Overview of South African geology.		
Outcomes	▪ A fundamental knowledge of the development and deformation of the earth's crust and the role of plate tectonics in crustal evolution ▪ An ability to identify and classify the most important rock forming minerals and the major generic rock types ▪ An ability to identify, interpret and describe the main structural types (folds, faults, joints) from geological maps and the field and be able to solve structural problems ▪ An informed understanding of the principles of stratigraphy, stratigraphic successions, paleontology and the rock record. ▪ A fundamental knowledge of the South African geological record ▪ An ability to interpret the geology of South Africa from geological maps ▪ An ability to solve simple stratigraphic problems. ▪ An ability to write a brief overview of the geology of South Africa		
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam and practical		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

Title	**Introduction to Surface Water Hydrology**		
Code	**4HYD211**	**Department**	**Hydrology**
Prerequisites	4GES111	Co-requisites	None
Aim	This module is designed to introduce students to the concepts of and theories applicable to surface water hydrology		
Content	Introduction to hydrology. Definition and scope of the subject. Systems approach to hydrology. The hydrological cycle. Global hydrology. Hydrology in South and southern Africa. Variability of hydrological systems,		

	Surface water measurement techniques. Gauging network design. Sampling errors. Techniques of surface water data analysis. Runoff generation theories. Hydrograph structure, components and separation. Factors affecting runoff (physical, climatic and anthropogenic). Flood generation theories. Flood assessment, control and protection. Sources of solutes. Water quality parameters of interest. Water quality variability. Temperature variability. Dissolved oxygen. Biological and microbiological aspects. Solute transport. Measurement of surface water quality.
Outcomes	A sound comprehension of the functioning of the hydrological cycle. An ability to apply a systems approach to depict hydrological systems, interactions and pathways. A sound understanding of the basics of hydrology in the global and South African contexts. A practical knowledge of the instrumentation used for measuring surface hydrological parameters An ability to site, install, maintain and use surface water hydrological instrumentation An ability to design a surface flow gauging network A sound understanding the runoff generation process A capability to undertake simple hydrograph separation exercises. A sound knowledge of how both meteorological and physical catchment characteristics affect the spatial and temporal variability of streamflow A critical awareness of the factors that contribute to flooding and the ability to describe basic strategies for flood control and flood protection.
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam and practical
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

Title	**Introduction to Subsurface Hydrology**		
Code	**4HYD212**	**Department**	**Hydrology**
Prerequisites	4HYD112	Co-requisites	None
Aim	This module is designed to introduce students to the concepts of and theories applicable to soil hydrology and groundwater hydrology		
Content	Basic soil classification Soil hydraulic characteristics Infiltration process and measurement Soil moisture process and measurement Soil moisture movement principles Geological background to groundwater studies Occurrence of groundwater (aquifer types) Groundwater balance (recharge, discharge) Geohydrological parameters Principles of porosity, permeability, storativity and transmissibility Basics of groundwater movement Basics of borehole construction and design.		
Outcomes	On completion of this module, learners will have: An ability to classify a soil A sound understanding of the concepts of field capacity, wilting point and available water An ability to determine experimentally the permeability, porosity and bulk density of a soil A familiarity with the concepts of infiltration and percolation of water into and through a soil An ability to measure the infiltration capacity of a soil		

	A sound understanding of the principles of soil water movement An ability to use direct and indirect methods of soil moisture measurement. The necessary geological background for further study in geohydrology An ability to identify various aquifer materials A sound knowledge of the factors that affect the porosity and permeability of aquifer materials A capability to solve simple groundwater flow problems An ability to use and construct groundwater maps An ability to determine the groundwater balance of a simple aquifer system A sound understanding of the principles of borehole construction		
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		
Title	**Geographical Information Systems**		
Code	**4HYD222**	**Department**	**Hydrology**
Prerequisites	None	Co-requisites	4GES211
Aim	This module is designed to give an introduction to the concepts and principles of GIS development and use. It is a prerequisite or co-requisite for honours level study in Hydrology and Geography		
Content	● mapping ● cartographic principles ● cartographic data ● spatial analysis ● GIS concepts and components ● raster based GIS ● vector based GIS ● Review of GIS programs (ArcInfo, ArcView, ArcExplorer, Atlas, IDRISI, Regis etc) ● Review of related systems (CAD) ● Applications and developments in GIS ● Application exercise in ArcView ● Project using ArcView and satellite imagery		
Outcomes	On completion of this module, learners will have ▪ A sound understanding of the geographic components of mapping ▪ An ability to think spatially ▪ A sound knowledge of cartographic structures and components ▪ A sound knowledge of data types, data storage and editing ▪ An ability to undertake elementary spatial analysis ▪ A sound understanding of the concepts and components of a GIS ▪ An ability to use raster based GIS at an introductory level ▪ An ability to use vector based GIS at an introductory level (ArcView) ▪ A working knowledge of the concepts and applications of GIS ▪ A critical understanding of how GIS is related to other systems such as CAD, DEM, DSS ▪ A practical ability in using GIS		
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam and practical		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

Title	**Surface Water Hydrology**		
Code	**4HYD311**	**Department**	**Hydrology**
Prerequisites	4HYD211, 4STT122	Co-requisites	None

Aim	To create an understanding of the dynamics of river flow, and of probability theory and frequency analysis with reference to their applications in hydrological modelling.
Content	● Hydro-statics; Hydro-dynamics; derivation of Bernoulli equation for pipe section; Flow routing through channels; Flow routing through reservoirs ● Definition of chance and random numbers; counting methods constrained by order and replacement; Combinations, permutations; definition of probability; Conditional probability; Discrete and continuous probability concepts; ● Probability distribution; Probability density function; method of moments, maximum likelihood; Normal distribution; Transformation, location, power; other probability functions; ● Data/frequency transformations (log, powers); Parameter estimation; Data requirements / sets; Extreme value distributions; Frequency analysis; Applications to hydrological examples
Outcomes	▪ An introductory understanding of hydrostatics and hydrodynamics ▪ An understand the basic applications of hydrostatics and dynamics to fluid flow in a pipe (Bernoulli Equation) ▪ An understanding of the basic application of the Bernoulli equation to fluid flow in an open channel ▪ The ability to apply the theory to rating of flow control structures/ flow in porous media/ flood routing ▪ Develop and understanding of the basic types of flow control structures ▪ Understand the basic models for routing flow through an open channel system ▪ A basic understanding of probability theory covering the concepts of chance, random numbers, counting (order/replacement), permutation, combination and probability. An understanding of the transformations - location, weighting (logarithmic, power functions) and probability functions ▪ The ability to apply and graphically describe these concepts ▪ An understanding of the application of probability theory to stochastic modelling using probability density functions and probability distributions ▪ An understanding of the methods for quantifying and describing probability distributions using simple parameters - method of moments and maximum likelihood ▪ The ability to apply the theory to applications in hydrology through frequency analysis and model selection.
Assessment	50% Continuous assessments 50% Formal end of module theory (3 hours) exam and practical
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

Title	**Groundwater Hydrology**		
Code	**4HYD321**	**Department**	**Hydrology**
Prerequisites	4HYD212	Co-requisites	None
Aim	This module is designed to give learners an understanding of the use and application of groundwater exploration and extraction methodologies and of the principles of groundwater movement and of the geohydrological parameters required to determine groundwater flow properties. It further explains the concepts of pump testing under varied geohydrological conditions.		
Content	geological methods used in groundwater exploration; remote sensing in groundwater studies; geophysical methods for surface and subsurface exploration; borehole drilling methods; geological logging; geophysical logging.; Principles of groundwater hydraulics; Darcy's law; Permeability		

	and hydraulic conductivity (theoretical and practical determination); Concepts of anisotropy and inhomogeneity in aquifers; Flow nets; General flow equations; Steady and unsteady groundwater flow in confined and unconfined aquifers; Methods of pump testing; Solution methods for pump tests (Theis, Cooper-Jacob, Chow); Recovery tests; Effects of boundary conditions; Multiple well problems; Well losses; Specific capacity and well efficiency.
Outcomes	On completion of this module, learners will: ▪ have a practical knowledge of the methods and means of groundwater exploration ▪ have a practical knowledge of applicable drilling methods and techniques ▪ have the ability to operate basic geophysical instruments and techniques and be able to interpret the data gained from these methods ▪ be able to identify, interpret and describe relevant geological and groundwater associated features from maps and aerial photographs ▪ have the ability to construct and interpret groundwater maps, geotechnical maps and flow nets. ▪ be fully conversant with Darcy's Law of groundwater flow ▪ be able to determine hydraulic conductivity in the laboratory ▪ be able to construct and interpret flow nets ▪ be aware of the methods of conducting pump tests ▪ be able to determine geohydrological parameters from pump test data using various solution methods ▪ be able to determine well losses, specific capacity and well efficiency from pump test data
Assessment	50% CAM 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

Title	**Hydrological Modeling**		
Code	**4HYD332**	**Department**	**Hydrology**
Prerequisites	4HYD211 and 4HYD212	Co-requisites	4HYD311 and 4HYD321
Aim	Develop an understanding of surface and ground-water modelling techniques as used in hydrological studies		
Content	Introduction to and classification of hydrological models; modelling concepts and a review of available models; the use and application of an integrated surface water/groundwater model; the role of models in water studies; conceptual models of groundwater dynamics; assumptions and constraints involved in the use of models, developing and testing the numerical model using a set of quantitative hydrogeological data that fall into two categories: a) data that define the physical framework of the groundwater basin b) data that describe hydrological stress		
Outcomes	Understand the role of models in hydrological problem solving, ▪ be able to present the results of hydrogeological investigations in the form of maps, geological sections and tables ▪ prepare specific sets of maps: o contour maps of aquifer upper and lower boundaries o maps of aquifer characteristics o maps of aquifer net recharge		

	▪ be able to classify hydrological models and be aware of their advantages and limitations ▪ understand conceptual models for basic surface processes and storage ▪ understand the role of models in groundwater studies ▪ be able to classify groundwater models (graphical, textual, physical, and numerical - stochastic and deterministic) ▪ understand the structure, parameterisation and components required for groundwater models ▪ design, use and interpret an integrated model
Assessment	50% CAM 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 95% Attendance at lectures, practical's and fieldwork

Title	**Water Resources Management**		
Code	**4HYD342**	**Department**	**Hydrology**
Prerequisites	4HYD211	Co-requisites	None
Aim	This module is designed to enable learners to have a full comprehension of water resources management issues both from a theoretical perspective and as applied to South Africa in practice. It will also cover theoretical and practical aspects of water yield assessment and modelling		
Content	● Water Resources of South Africa and SADC; ● Water law in South Africa and International legal agreements; ● Water demand (urban, rural, agricultural, industrial, environmental). ● Water Demand Management, ● Water Supply Management. ● Water management in South Africa (National Water Resources Strategy; Water Management areas and Catchment Management Agencies, The Reserve and its definition and application). ● Social, developmental and economic aspects of water resources management. ● Forecasting of water demand ● Water availability assessments; ● Alternatives for water supply (groundwater, conjunctive use; water re-use) ● Yield assessment and modelling. ● Water Resources management models.		
Outcomes	On completion of this module, learners will be: ▪ Knowledgeable of the water resources situation in South Africa and SADC ▪ Conversant with relevant laws and agreements relating to the use, control, and conservation of water in South Africa ▪ Fully conversant with the water requirements of the full range of water user sectors ▪ Aware of the economic, socio-political, health and physical constraints to water resources management ▪ Able to apply predictive techniques for water demand forecasting ▪ Conversant with the principles of surface and groundwater resources management as well as their conjunctive use. ▪ Able to conduct water yield assessments for single and multiple water sources. ▪ Familiar with water resources management models currently in use.		
Assessment	50% CAM 50% Formal end of module exam (3 hours)		

DP Requirement	40% Continuous Assessment Mark and 80% attendance at practical’s

Department of Mathematical Sciences

STAFF

Associate Professor	M Matadi, BScHons (Maths) (University of Kinshasa), MSc, PhD (Applied Maths) (UKZN). PGDIP (UKZN)
	S Krishnannair, BEd (Maths) (India), MSc (Maths) (India), MSc (Eng) (SU), PhD (SU), PGDIP (UKZN)
Senior Lecturer	Vacant
Lecturers	J Cloete, BScHons (Natal), PGDIP (UKZN)
	MW Kubheka, MSc (UKZN)
	NM Mkhize, MSc (UKZN)
	PL Zondi, BScHons (UNIZULU), MSc (AIMS), MSc (UNIZULU)
	S Sibiya, BScHons (UKZN), MSc (UKZN)
	S Ndebele, BScHons (UKZN), MSc (UKZN)
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Secretary	OD Zibani, BA, Dip (Public Admin), PGCE (UNIZULU)

APPLIED MATHEMATICS

Title	**Discrete Mathematics**		
Code	**4AMT111**	**Department**	**Mathematical Sciences**
Prerequisites	None	Co-requisites	4MTH111
Aim	To introduce basic concepts of discrete mathematics.		
Content	• Applied Logic: Combinatorial circuits. Logic tables. Karnaugh maps. Predicates. • Counting and Numbers: Representation of numbers in different bases. Elementary number theory. Arithmetic modulo n, Common algorithms in number theory. Permutations and combinations. Binomial theorem • Recurrence relationships and difference equations: Tower of Hanoi problem. Derangements. Fibonacci sequences. Cattallan numbers. Solving linear difference equations • Applied graph theory and networks: Basic definitions of graphs, networks and trees. Euler circuits. Hamiltonian paths. Special graphs. Solution of graph problems like the instant insanity problem. De Bruin sequences, Gray codes, Hypercube graphs and their use in hard disk control. Tree traversals. Search trees. Postfix and infix notation. • Coding theory: Error correcting codes. Variable length codes. Huffman codes. • Algorithm: Euclid’s algorithm. Synthetic division. Computing powers. Tilling a deficient board with Trominoes. Order notation		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials.		

Title	Further Discrete Mathematics		
Code	**4AMT122**	**Department**	**Mathematical Sciences**
Prerequisites	None	Co-requisites	4MTH111, 4AMT111
Aim	Introduction to operations research and further discrete mathematics		
Content	• Elementary number theory and methods of proof (direct proof and counterexample, rational numbers, divisibility, floor and ceiling, contradiction and contradiction, classical theorems). • Numerical analysis (roots of transcendental equations, Euler method of solving differential equations, numerical integration and differentiation). • Population modeling (logistic and Malthusian growth)		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials.		

Title	Dynamical Systems and Mathematical Modelling		
Code	**4AMT211**	**Department**	**Mathematical Sciences**
Prerequisites	4AMT122 4MTH111 4AMT111 4MTH112	**Co-requisites**	4MTH221
Aim	To study how to convert problems in the field of population studies, traffic flow, epidemics and physiological processes into a system of differential-, partial differential- and difference equations. To study the qualitative behaviour of the solutions of the equations, and the behaviour of dynamical systems like bifurcation and chaos. Where possible analytic solutions will be investigated, and if not, a numerical or Monte Carlo simulation of the equations will be performed.		
Content	• Modelling process illustrated by dimensional analysis and scaling behaviour of systems • Population growth models • Interacting populations – Lotka-Voltera type of equations • Epidemic models • Dynamical system behaviour – phase plane analysis, bifurcation, oscillation and chaotic systems • Study of a particular modelling process from either industry (e.g., traffic flow models) or the soft sciences (modelling the heart)		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at tutorials and lectures		

Title	Introduction to Operations Research		
Code	**4AMT212**	**Department**	**Mathematical sciences**
Prerequisites	4MTH112 4MTH111	**Co-requisites**	4MTH222
Aim	To introduce students to linear and nonlinear programming and operations research		
Content	• Introduction to operations research • Lanchester's model of war of attrition, problems in business, e.g., scheduling, leading to optimization problems.		

	● Introduction to Linear Programming ● Well known linear programming problems like finding the cheapest mixture of foodstuffs which would satisfy the nutritional requirements of animals. ● The standard linear programming problem ● Maximize the objective function cx subject to the equality constraint Ax = b and the inequality constraint x > 0. ● Methods of converting a problem to the standard form. Introduce standard terminology – feasible solution, extreme points, and basic solution. ● The Simplex method ● This algorithm is developed ● Applying the Simplex Method ● Programs for implementing the simplex method and commercial LP packages is investigated ● Nonlinear programming ● Integer, geometric and other programming methods are discussed
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at tutorials and lectures.

Title	**Applied Mathematical Methods**		
Code	**4AMT321**	**Department**	**Mathematical sciences**
Prerequisites	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	Co-requisites	None
Aim	This module is designed to introduce students to the mathematical methods used in physics and engineering		
Content	● Orthogonal polynomials ● Concept of orthogonality of functions. The Gram 4CHMidt process for finding an orthogonal basis of functions ● Special functions ● Legendre polynomials ● Hermite polynomials ● Solution of ordinary differential equations using a series expansion (Frobenius method) ● Bessels functions ● Introduction of Fourier series and transforms ● The subject is introduced and some of its applications are treated. ● Introduction to partial differential equations ● Derivation of standard differential equations. Solution of first order partial differential equations. Cauchy's method of characteristics ● Classification of second order partial differential equations ● Method of characteristics		

	- Solution of partial differential equations - Solution of the wave equation, parabolic and elliptic equations and some practical applications
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials

Title	**Classical Mechanics**		
Code	**4AMT312**	**Department**	**Mathematical Sciences**
Prerequisites	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	**Co-requisites**	None
Aim	To introduce rigid body motion and alternative formulations to Newtonian mechanics		
Content	Rigid body motion, Lagrange and Hamilton approach, variational methods.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Numerical Methods**		
Code	**4AMT322**	**Department**	**Mathematical sciences**
Prerequisites	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	Co-requisites	None
Aim	This module introduce students to numerical analysis		
Content	Introduction to Numerical analysis Origin of problems. Error analysis. Types of error Numerical solution of equations Bisection, fixed point, Newton-Raphson method and others are introduced to find the root of an equation. Interpolation Existence of interpolating polynomial. Difference tables. Standard interpolating polynomials. Numerical differentiation and numerical solution of differential equations Numerical differentiation. Euler's and Runge-Kutta methods. Boundary value methods Numerical integration Newton–Cotes integration. Gaussian quadrature Solution of linear equations Gaussian reduction. LU decomposition Matrix calculations Finding eigenvalues numerically.		
Assessment	20% Continuous Assessment Mark 30% Practical mark		

	50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures, practical's and tutorials

Title	**Tensor Analysis**		
Code	**4AMT331**	**Department**	**Mathematical sciences**
Prerequisites	LEVEL 1: 4MTH111, 4MTH112, 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, 4AMT211, 4AMT212	Co-requisites	None
Aim	To introduce tensors and its applications to relativity		
Content	Vectors and tensors Lorentz transformation and applications Electromagnetism Tensor Analysis Christoffel symbols Field equations Calculations of tensors using computers		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

MATHEMATICS			
Title	**Calculus I**		
Code	**4MTH111**	**Department**	**Mathematical Sciences**
Prerequisites	None	Co-requisites	None
Aim	To introduce differential calculus with necessary prerequisites from logic and general algebra.		
Content	● Elementary Logic and Theory of Sets: sets and subsets, Venn-Euler diagrams, basic set operations, sets of numbers, elementary logic. ● Functions: elementary functions, graph of a function, combination of functions, inverse functions, exponential and logarithmic functions, relations. ● Limits, Continuity and Differentiation: definition of limit, continuity and the derivative ● Algebra: induction, vectors and vector algebra, dot products and cross products, introduction to matrices and matrix algebra, transpose and determinants, the adjoint matrix, invertible matrix and Cramer's rule, complex numbers and De Moivre's theorem.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials.		

Title	Calculus II		
Code	**4MTH112**	**Department**	**Mathematical Sciences**
Prerequisites		Co-requisites	4MTH111
Aim	The aim of the module is to further develop concepts in calculus (integration, elementary introduction to differential equations) and to apply their techniques in problem solving.		
Content	● Differentiation: some differentiation formulas, the chain rule, implicit differentiation, the mean-value theorem and applications, some curve sketching, applications of derivatives. ● Integration and Techniques of integration: the fundamental theorem of integral calculus, indefinite integrals, some area problems, ● Transcendental functions: logarithmic, exponential, inverse trigonometric functions, hyperbolic functions. ● Elementary Introduction to Differential Equations: First order linear equations. ● Sequences: properties, limits.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	Mathematics and Statistics for Earth and Life Sciences		
Code	**4MTH122**	**Department**	**Mathematical Sciences**
Prerequisites	None	Co-requisites	None
Aim	To supply basic mathematical knowledge necessary for life science students.		
Content	● Basic general mathematics: powers, estimation and proportion. Numerical and algebraical skills. Equations, inequalities, systems of equations. Functions and graphs. Exponential and logarithmic functions. ● 2. Statistics: Frequency distributions and their graphs. Histograms. Mean, median, mode. Standard deviation, variance.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials.		

Title	Linear Algebra and Differential Equations		
Code	**4MTH222**	**Department**	**Mathematical sciences**
Prerequisites	4MTH112 4MTH111	Co-requisites	
Aim	This module is designed to introduce students to the concepts of linear algebra, and to methods of finding exact solutions to ordinary differential equations		
Content	Linear algebra: finite and infinite dimensional vector spaces, subspaces, linear transformations and matrices, systems of linear equations, determinants, change of bases, similar matrices, eigenvalues and eigenvectors. Differential equations: study ordinary differential equations such as separable variables, exact equations, linear equations. Solutions of		

	homogeneous differential equations with constant coefficients, Cauchy-Euler equation, systems of linear equations, nonlinear equations, Laplace transforms, homogeneous linear systems with constant coefficients.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	50% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Advanced calculus**		
Code	**4MTH221**	**Department**	**Mathematical sciences**
Prerequisites	4MTH112	Co-requisites	None
Aim	This module is designed to introduce students to the concepts of advanced calculus		
Content	The study of, series, vector functions and the calculus of vector functions, functions of several variables. Continuity and Partial differentiation, Taylor's theorem, gradient, double and triple integrals, the Jacobian and line integrals		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Abstract Algebra**		
Code	**4MTH311**	**Department**	**Mathematical Sciences**
Prerequisites	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	Co-requisites	None
Aim	To introduce students to the theories of groups, rings and fields.		
Content	• Theory of Groups: Fundamentals (Mappings, binary operations, relations). • The integers. Groups. Subgroups. Cyclic groups. Isomorphisms. Homomorphisms. Finite permutation groups. Cayley's theorem. Normal subgroups. Quotient groups. Some applications of the theory of groups. • Theory of Rings and Fields: Rings. Integral domains. Fields. Ideals. Quotient Rings. Ring homomorphism. The field of real numbers. Complex numbers. Quaternions. Polynomials over a ring.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark		

	80% Attendance at lectures and tutorials

Title	**Real Analysis**		
Code	**4MTH321**	**Department**	**Mathematical Sciences**
Prerequisites	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	Co-requisites	None
Aim	To introduce students to the theory of functions of real variables and metric spaces.		
Content	● Real numbers and real functions. Topology of real line and plane. Compactness. Completeness. Countability. Cardinality. Order ● Metric and normed spaces. Metrics. Norms. Properties of metric and normed spaces. ● Riemann integral. Upper and lower Riemann integrals. Riemann integrability. Properties of the Riemann integral.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Graph Theory**		
Code	**4MTH312 A**	**Department**	**Mathematical Sciences**
Prerequisites	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	Co-requisites	None
Aim	To explore proof techniques in graph theory and explore its applications in pure and applied mathematics		
Content	● Introduction to Graph theory ● Types of graph, representation of graphs, Hamiltonian and Euler circuits ● Graph theorems, Vertex and edge colorings ● Practical applications of graphs		

	• Network problems. • Mathematical applications • Representation of an equation by means of a graph .Elementary aspects of category theory
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 90% Attendance at lectures, practical's and tutorials

Title	**Complex analysis**		
Code	**4MTH322**	**Department**	**Mathematical Sciences**
Prerequisites	LEVEL 1: 4MTH111, 4MTH112, OPTIONAL: 4AMT111, 4AMT122 LEVEL 2: 4MTH221, 4MTH222, OPTIONAL: 4AMT211, 4AMT212	Co-requisites	None
Aim	To introduce students to the theory of functions of complex variables.		
Content	Complex functions, their limits and continuity. Complex differentiation. Cauchy- Riemann equations. Complex integration. Cauchy's theorem and formulas. Infinite series. The residue theorem and its application in evaluation of integrals and series. Conformal mapping.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

STATISTICS

Title	**Elementary Statistics for Science students**		
Code	**4STT111**	**Department**	**Mathematical Sciences**
Prerequisites	None	**Co-requisites**	None
Aim	To introduce elementary concepts of descriptive and inferential statistics to science students.		
Content	Types of data; Basic sampling techniques; Frequency distributions; Graphical data summaries – various charts, dot-plots, stem-and-leaf, histograms, polygons, and ogives; Numerical data summaries – measures of location, spread, relative position; Boxplots; Sample space, events, and operations; Counting techniques; Probability versus relative frequency; Laws of probability; Conditional probability; Independent events; Bayes' theorem; Discrete random variables; Probability mass functions and cumulative distribution functions; Moments of discrete random variables; Special discrete distributions; The normal distribution; Single-sample hypothesis tests for means, variances, and proportions; Single-sample confidence intervals for means, variances, and proportions; Two-sample hypothesis tests for means, variances, and proportions; Two-sample confidence intervals for means, variances, and proportions; The p-value; Contingency tables and the test for		

	independence; Scatterplots, simple linear regression, correlation, and hypothesis tests for the intercept and slope.
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures, practical's and fieldwork

Title	**Mathematics and Statistics for Commerce**		
Code	**4STT121**	**Department**	**Mathematical Sciences**
Prerequisites	None	**Co-requisites**	None
Aim	To introduce mathematics used in the field of commerce and to explore some aspects of Financial Mathematics		
Content	Fractions and decimals – addition, multiplication, division, and subtraction; Exponential and logarithmic functions; Graphs – axes, scale, coordinates, straight lines, and intersections; Elementary interest – simple interest, compound interest, present and future values, changing interest rates; Annuities – ordinary annuity due, ordinary annuity certain, and deferred annuities; Index numbers – simple- and compound index numbers, important indices, rate of change, and inflation; Introduction to time series – moving averages and seasonal adjustments.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% attendance at lectures and tutorials		

Title	**Statistics for Science students**		
Code	**4STT112**	**Department**	**Mathematical Science**
Prerequisites	None	**Co-requisites**	4STT111 4MTH112
Aim	To introduce students to sets, probability spaces, random variables, and discrete distributions.		
Content	Counting techniques continued; Sets revisited – fields, sigma fields; Probability – events, axioms, operations, conditional- and independence, Bayes' Theorem; Discrete random variables – probability mass functions, cumulative distribution functions, moments; Discrete bivariate distributions – marginal distributions, and conditional distributions; Linear functions of a discrete random variable; Independent random variables; Special discrete random variables.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Elementary Statistics for Commerce Students**		
Code	**4STT122**	**Department**	**Mathematical Sciences**
Prerequisites	None	**Co-requisites**	None
Aim	To introduce elementary concepts of descriptive and inferential statistics to students of commerce and administration.		
Content	Types of data; Basic sampling techniques; Frequency distributions; Graphical data summaries; Numerical data summaries – measures of location, spread, relative position; Sample space, events, and operations; Counting techniques; Probability versus relative frequency; Laws of probability; Conditional probability; Independent events; Bayes'		

	theorem; Discrete random variables; Probability mass functions and cumulative distribution functions; Moments of discrete random variables; Special discrete distributions; The normal distribution; Single-sample hypothesis tests for means, variances, and proportions; Single-sample confidence intervals for means, variances, and proportions; Two-sample hypothesis tests for means, variances, and proportions; Two-sample confidence intervals for means, variances, and proportions; The p-value; Contingency tables and the test for independence; Simple linear regression, correlation, and hypothesis tests for the intercept and slope.
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% attendance at lectures and tutorials

Title	**Distribution Theory**		
Code	**4STT211**	**Department**	**Mathematical Sciences**
Prerequisites	4STT112	**Co-requisites**	4MTH221
Aim	To introduce fundamental continuous distributions and their properties which will be used in Statistical Inference and which will form the foundation for all third year level statistics modules.		
Content	Random variables of the continuous type; Continuous distributions – probability density function, cumulative distribution function, and moments; Special continuous distributions; Distributions of functions of random variables; Mixed distributions; Distributions of two continuous random variables; Correlation coefficients; Marginal distributions; Conditional distributions; The bivariate normal distribution; Transformations of random variables; Independent random variables; Distributions of sums of independent random variables; Random functions associated with the normal distribution; Approximations for discrete distributions; The central limit theorem; Limiting distributions; Chebychev's inequality and convergence in probability.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Statistical Inference**		
Code	**4STT212**	**Department**	**Mathematical Sciences**
Prerequisites	4STT112	**Co-requisites**	4STT211 4MTH222
Aim	To introduce students to estimation, and parametric- and nonparametric hypothesis tests.		
Content	Order statistics; Maximum likelihood, methods-of-moments, and ordinary least squares estimation methods; Properties of estimation; Point estimation of means, variances, proportions, and differences; Sampling distributions; Confidence intervals for means, variances, proportions, and differences; Sample size calculations; Distribution-free confidence intervals; Simple linear regression – point- and interval estimation of regression parameters; Hypothesis tests for single parameters (mean, variance, proportion, and regression parameters) and differences (between means, variances, proportions, and regression parameters); Contingency tables - goodness-of-fit test, and test for independence; Introduction to ANOVA; Nonparametric tests –		

	Wilcoxon, Kolmogorov-Smirnov, and Runs test; Sufficient statistics; Power of a statistical test; Best critical regions; Uniformly most powerful tests; Likelihood ratio tests.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Random Processes**		
Code	**4STT311**	**Department**	**Mathematical Sciences**
Prerequisites	4STT211 4STT212	**Co-requisites**	None
Aim	To introduce students to probability models.		
Content	Probability spaces revisited; Random variables revisited – discrete, continuous, and mixed; Conditional probability and conditional expectation; Computing probability, expectation, and variances by conditioning; Reflection principle; Generating functions; Random walks; Discrete-time Markov chains; Chapman-Kolmogorov equations; Classification of states; Limiting probabilities (discrete-time); Branching processes; Bernoulli processes; Number of successes; Time of successes; Exponential distribution and the Poisson process; Interarrival- and waiting time distributions; Birth- and death processes; Transition probability function; Limiting probabilities (continuous-time).		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures and tutorials		

Title	**Experimental Design**		
Code	**4STT321**	**Department**	**Mathematical Sciences**
Prerequisites	4STT211 4STT212	**Co-requisites**	None
Aim	To provide the student with a basic theory of experimental design, particularly in complete randomized block design and ANOVA		
Content	ANOVA, Completely randomized and randomized block design, Latin square design, introduction to factorial designs, 2^k Factorial and fractional designs, designs with confounding		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at lectures, practical’s and fieldwork		

Title	**Linear Models**		
Code	**4STT312**	**Department**	**Mathematical Sciences**
Prerequisites	4STT211 4STT212	**Co-requisites**	None
Aim	To introduce students to the theory and applications of linear models.		
Content	Linear algebra revisited; Multivariate change-of-variable techniques; Special integrals and the multivariate normal distribution; Marginal and conditional distributions of a normal random vector; Non-central distributions; Quadratic forms and their distributions; Independence conditions for quadratic and linear forms; Introduction to the general linear model; Estimation in the general linear model; Models not of full rank; Estimable functions and hypothesis testing; The general linear hypothesis; Confidence intervals; Applications of the general linear		

	model; Introduction to the multiple linear regression model; Hypothesis testing; Orthogonality in the regression model; Model selection procedures and applications.
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's, tutorials and lectures

Title	**Time Series**		
Code	**4STT322**	**Department**	**Mathematical Sciences**
Prerequisites	4MTH112 4MTH111	**Co-requisites**	None
Aim	To provide a thorough understanding of the theory and computer applications of time series techniques		
Content	Descriptive techniques for time series, Exponential smoothing and the Box-Jenkins model including the AR, MA, ARMA and ARIMA.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's, tutorials, lectures and fieldwork		

Department of Nursing Science

STAFF

Associate Professor	J Kerr, DNE, DNA, M Cur (Stellenbosch), PhD (UKZN), RN, RM, CHN, OHN
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	MA Mkhwanazi, Dip (RN), (CHN), (Psych), Mid; Dip Advanced Midwifery & Neonatal Nursing; BA Nursing (Health Service Management & Nurse Education)

Title	**Ethos and Professional practice**		
Code	**4NEP112**	**Department**	**Nursing Science**
Prerequisites	Nil	Co-requisites	Nil
Aim	To inculcate the ethical and moral codes of the nursing profession.		
Content	The learner will understand and integrate: ● History, philosophy, essence of nursing, nursing values, ethical codes and the principles in nursing profession ● Ethos of nursing and professionalization which includes the dynamics, aspects of professional practice, Legislation and control ● Continuing professional education development and health behaviour ● Professional and labor organizations for nursing, their characteristics, aims, functions and related legislation ● Health care management		

	• Management approaches and principles • Methods and techniques for the management of a nursing unit and primary health care services • Human resource management • Leadership • Safeguarding the patients' wellbeing and environment e.g. infection control • Teaching principles and methods for clinical and methods and patient teaching and teaching of lay workers • Counselling and negotiation skills
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%
DP Requirement	40% Continuous Assessment Mark, 80% Attendance at practical sessions

Title	**Fundamentals of Nursing 1**		
Code	**4NFN 110**	**Department**	**Nursing Science**
Prerequisites	None	Co-requisites	None
Aim	To develop competency in the practice of care for healthy or ill individuals in terms of basic needs throughout the life span.		
Content	• Introduction to nursing science • Impact of disease on family, community and society; Cultural differences in regard to health and illness including health practices; Sick role and implications for nursing and health; Origin, nature and development of man from conception to old age (physical, psychological, social and cultural aspects); Basic needs of man • Nutrition Basic components and kilojoule values of food; Nutritional needs of individuals in all stages of development; Nutrition within cultural context and religion; Importance of nutrition in the prevention and treatment of disease; Socio-economic aspects of nutrition; Factors influencing food production, storage and preservation; Community nutrition • Health, illness and dying • Health care structures • Cultural determinants, organization of health services in South Africa • Communication and interpersonal skills • Listening, reflecting • Supporting individuals, groups and communities • Managing emotions, managing silence • Time management, counseling		
Assessment	Continuous assessment 50%; Test Triple Jump, OSCE written assignment Final 3 hour theory exam 50%		
DP Requirement	Minimum 50% pass for all continuous assessments and work integrated learning assessments; 80% attendance of all theory		

Title	**Human Anatomy and related Medical Biophysics 1A**		
Code	**4ZOL 121**	**Department**	**Nursing Science**
Prerequisites	None	Co-requisites	None
Aim	To enable the student to extend and integrate the study of the body and related medical biophysical principles to the human anatomical structure		
Content	● Structure of the cell, various body tissues and organs. ● The musculoskeletal system; ● The digestive system; ● The respiratory system; ● The cardiovascular system; and ● The nervous system. ● The metric System and measurement ● Orthopaedic ward and muscular and unit prefix		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark, 80% Attendance at practical sessions		

Title	**Computer Literacy 1**		
Code	SCPS121/4CPS121		
Prerequisites	**Nil**	**Corequisites**	**Nil**
Aim	This module is designed to introduce students to the personal computer. It will prepare students to understand, use and apply technology in effective, efficient and ethical ways. It gives opportunities for hands on experience using computers (desktop & mobile). Emphasis is placed on the application of computers in society, and their social and ethical impact. The productivity software covered in this course include word processing, email, web browsers, search strategies, and spreadsheets		
Content	• Identify and describe basic computer categories, components and concepts • Describe types of computer software their uses and evolution. • Make recommendations on the application programs, operating system and other requirements • Compact and repair a database • Use e-mail and the Internet to communicate, collaborate and locate information • Explain the impact (both positive and negative) of computer technology and information systems on modern society • Use the operating system to set up and manage logical storage locations for easy storage and retrieval of files • Create, format and edit word processing documents • Demonstrate working knowledge in enhancing documents by using the web and other useful resources • Use and create advanced word features. • Create and deliver a presentation • Use different options to run a slide show • Demonstrate the use of animations and transitions in a Presentation • Enhance the Presentation using graphics, smart arts and videos • Understand Spreadsheets and use Microsoft Excel to enter, analyze and present quantitative data • Demonstrate the use of Functions to create Formulas • Use Charts/Graphs to visually represent a set of data values.		

Assessment	• Reading - Weekly textbook and eLearning assignments • In-Class "Hands On" exercises in the computer labs, • Hands on exercises and projects in online virtual labs. 40% Continuous Assessment (comprising 20% practical assessment plus 20% theory assessments) 60% Summative Assessment (comprising 3 hour practical and theory exam)
DP requirement	40% Continuous Assessment Mark

Title	**Human Anatomy 1B**		
Code	**4ZOL122**	**Department**	**Nursing Science**
Prerequisites	None	Co-requisites	None
Aim	To enable the student to extend and integrate the study of various body systems and related medical biophysical principles to the human anatomical structure		
Content	● The endocrine system; ● The reproductive system; ● The urinary system; and ● The special senses. ● Respiratory ward and client care: interactions between lungs and atmosphere ● Intensive care unit: electricity and magnetism in the body		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark, 80% Attendance at practical sessions		

Title	**General Nursing Science 1A**		
Code	**4GN211**	**Department**	**Nursing Science**
Prerequisites	Fundamentals of Nursing (4NFN110); 4ZOL121 &122	Co-requisites	General Nursing Science 1A
Aim	to equip nursing students with knowledge and skills, and to develop competence in the management of medical and surgical problems at all levels of health care and the provision of safe, effective management of a patient on medication therapy		
Content	● Cardiovascular disorders, related surgery, diet therapy and pharmacotherapy. ● ● General causes, clinical manifestations and investigative procedures performed on Cardio Vascular System disorders. ● Congenital conditions atrial and ventricular septal defects; patent ductus arteriosus; Fallot's tetralogy. ● Infective conditions i.e. pericarditis, endocarditis, rheumatic fever etc. ● Hypertensive disorders i.e. hypertension, hypotension ● Cardiac failure right and left heart failure, CorPulmonale ● Venous Disorders, varicose veins, arteriosclerosis ● Haematologic disorders- different types of anaemia i.e. decreased erythropoiesis etc. ● Related pharmacotherapy ● Ischaemic heart diseases		

	• Angina pectoris • Myocardial infarction • Diet therapy for each disorder Related surgery • Respiratory System Disorders and Related Surgery, Diet Therapy and Pharmacotherapy • General causes, clinical manifestations, investigative procedures of pulmonary diseases i.e. Bronchoscopy, laryngoscopy, bronchoscopy e.t.c • Chronic obstructive pulmonary diseases such as asthma, chronic bronchitis, bronchiectasis pulmonary emphysema • Traumatic conditions i.e flail chest, pneumothorax, rib fractures haemothorax. -infective conditions i.e pneumonia, acute bronchitis, empyema, pleurisy. • Failure i.e. Respiratory failure. • Thoracic surgery i.e. thoracotomy, lobectomy, pneumonectomy, tracheostomy, under water seal drainage system. • Related diet therapy • Related pharmacotherapy. • Routes of administration of drugs and reasons for such. • Principles of drug action i.e. absorption, distribution metabolism and excretion. • Therapeutic effect of a drug - adverse reactions • Drug interactions • Drug incompatibility • The nursing process in medication administration • Patient teaching and medication therapy • Medication and special populations • Indications, contra indications, side effects, drug interaction and nursing responsibilities • Antihypertensive drug • Diuretics -Anticoagulants –Antibiotics • Bronchodilator and • Anti inflammatory • Anti-anginal
Assessment	Continuous assessment 50%,; Test, Assignment [Written evidenced-based reports (Portfolio of Evidence/Reflective Journal)] Final 3 hour theory exam 50%; Written Examination , Triple jump, OSCE
DP Requirement	Minimum 50% pass for all continuous assessments and work integrated learning assessments; 80% attendance of all theory

Title	Medical Biophysics		
Code	**4NHP121**	**Department**	**Nursing Science**
Prerequisites	4ZOL121 or 4ZOL122	Co-requisites	
Aim	To enable the student to extend and integrate the study of various body parts' functioning based on the science of chemistry.		
Content	● Fundamental measurements: length, weight, mass and time ● Vector and scalar quantities such as: speed, time, velocity and acceleration, impulse, weight, momentum, force, pressure. ● Gravity: specific gravity, centre of gravity and gravitational acceleration. ● Force: Impulse, work, energy and momentum: Their physical meaning, measurement units, practical examples and implementation in medical profession. ● Energy conservation and transformation/conversion, for examples light into heat energy, kinetic energy into heat during collision, forces of body, static force. ● Principles of machines, friction and body mechanics. ● Simple mechanics- lever and body mechanics, pulley and traction, incline plane, screw: Conversion from linear into angular motion. ● Application of these principles in nursing. ● Heat: Nature, m Effects of heat on matter ● Relative humidity, specific heat ● Temperature scales ● Regulation of body temperature ● Use of heat for sterilization ● Application of these principles in nursing. ● Light: Laws of reflection ● Focusing elements of eye, defective vision and its correction, use of lenses. ● Relationship between energy, frequency and wave length of light ● Biological effects of light ● Use of light in therapy. ● Application of these principles nursing. ● Pressures: Atmospheric pressure, hydrostatic pressure, osmotic pressure. ● Measurements of pressure in the body. ● Arterial and venous blood pressure ● Ocular pressure ● Intracranial pressure ● Application of these principles in nursing ● Sound: frequency, velocity and intensity ● Vocalization and hearing ● Use of ultrasound, noise pollution and its prevention ● Application of these principles in nursing. ● Electricity and electromagnetism: Nature of electricity, voltage, current, resistance and their units ● Flow of electricity in solids, electrolytes, gases and vacuum ● Electricity and human body ● ECG, EEG, EMG, ECT ● Pacemakers and defibrillation ● Magnetism and electricity ● MRI scanning, CAT scan ● Atomic energy: Structure of atoms, Isotopes and isobars, measurement, transfer of heat.		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		

DP Requirement	50% Continuous Assessment Mark 80% Attendance at practicals and fieldwork

Title	**General Nursing Science 1B**		
Code	**4GN212**	**Department**	**Nursing Science**
Prerequisites	Fundamentals of Nursing (4NFN110); 4ZOL121 &122	Co-requisites	General Nursing Science 1A
Aim	to equip nursing students with knowledge and skills, and to develop competence in the management of medical and surgical problems at all levels of health care and the provision of safe, effective management of a patient on medication therapy		
Content	● Digestive system disorders and related surgical conditions ● Gastrointestinal Conditions and related Pharmacology ● General causes, clinical manifestations, investigative procedures of the gastro-intestinal disorders. ● Diseases of the mouth: Stomatitis, Leukoplakia, Parotitis. ● Diseases of the oesophagus: Dysphagia, oesophagitis, hiatus hernia, Oesophagial Varices and Achalasia ● Diseases of the intestines, rectum and anus: Abdominal hernia, Appendicitis, Peritonitis, Ulcerative colitis, Intestinal Obstruction (small and large bowel), perianal conditions and Haemorrhoids. ● Colostomy and Ileostomy ● Diseases of the accessory organs: Pancreatic conditions, Jaundice, Gall bladder conditions and Liver conditions. ● Billiary Surgery ● Antidiarrheal & Laxative drugs ● Emetics and Anti-emetics ● Related diet therapy ● Parenteral Nutrition ● Urinary system, related surgery, diet therapy and pharmacotherapy. ● General causes, clinical manifestations, investigative procedures of urinary diseases. ● Disorders of the urethra: Urethritis ● Urinary disorders: Cystitis, Urinary Incontinence, Bladder Trauma and Bladder neoplasm. ● Disorders of the kidney: Glomerulonephritis, Pyelonephritis, Pyelitis, Nephrolithiasis and Nephrotic Syndrome. ● Disorders of the male reproductive organs: Scrotum, Testis, Penis, Urethra, Prostate Gland (includes Paediatric Urinary disorders and related surgery) ● Urinary Surgery: Vasectomy, Nephrectomy, and Prostatectomy. ● Analgesics and Sedative related diet therapy ● Syndromic approach in the management of sexually transmitted infections.		
Assessment	Continuous assessment 50%; Test, Assignment [Written evidenced-based reports (Portfolio of Evidence/Reflective Journal)] Final 3-hour theory exam 50%; Written Examination, Triple jump, OSCE		
DP Requirement	Minimum 50% pass for all continuous assessments and work integrated learning assessments; 80% attendance of all theory		

Title	**Medical Biochemistry**		
Code	**4NHP122**	**Department**	**Nursing Science**
Prerequisites	4ZOL121 &122	Co-requisites	4NHP121
Aim	To enable the student to extend and integrate the study of various body parts' functioning based on the science of chemistry.		
Content	● Atoms and Chemical Bonds ● Functional groups important in Biochemistry ● Water - chemistry and dissociation ● pH and buffering Amino Acids ● free amino acids ● peptide bonds between amino acids ● Henderson – Hasselbalch equation to predict Bicarbonate as a buffer ● Drug absorption ● Acid – Base Disorders (Metabolic and Respiratory) ● Biochemical changes in blood Structure of Proteins ● Primary and Secondary structure ● Tertiary and Quaternary structure Protein Misfolding ● Globular Proteins Enzymes ● Carbohydrates and Glycolysis – Diabetes Mellitus Krebs (TCA) Cycle ● Bioenergenics and Oxidative ● Phosphorylation		
Assessment	Continuous assessment 50%, Final 3-hour theory exam 50%		
DP Requirement	50% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

Title	**Pharmacology**		
Code	**4NPH211**	**Department**	**Nursing Science**
Prerequisites	4NFN110	Co-requisites	None
Aim	To develop a broad-based knowledge of the drugs that are used in various specialized conditions that affect all age groups.		
Content	● Basic principles of pharmacology including pharmacodynamics and pharmacokinetics ● Cholinergic, Adrenergic and CNS stimulants. ● Anaesthetic drug ● General anaesthetics ● Local anaesthetics ● Resuscitation anaesthetics ● Anticonvulsant drugs ● Antiparkinsonian and Antimyathenic drugs ● Antianginal drugs ● Antifipemic drugs ● Pituitary, Thyroid and Parathyroid drugs ● Male and female hormonal drugs ● Antidiabetic drugs and obesity ● Corticosteroids and immunosuppressant drugs ● Antifungal and anthelmintic drugs ● Antiviral drugs ● Antigout drugs		

	● Antiathritic drugs and skeletal muscle relaxant drugs ● Antineoplastic drugs ● Ophthalmic drugs ● Otic drugs ● Topical drugs (skin, nose, ears) ● Hormones and reproduction Hormones and metabolism: calcitonin, osteoporosis ● Drugs affecting the kidneys and renal function
Assessment	Continuous assessment 50%, Formative – Test, Assignment Summative Final 3-hour theory examination 50%
DP Requirement	50% Continuous Assessment Mark 80% Attendance of theory

Title	**Primary Care Nursing 1A**		
Code	**4PCN211**		
Prerequisites	4NFN110	Co-requisites	General Nursing Science 1A
Aim	To facilitate the development of an understanding of principles, theories, and approaches for the provision of holistic health care within primary health care contexts of the district health system model.		
Content	● Introduction to Primary Health Care Nursing ● History of Primary Health Care Nursing in South Africa ● Primary Health Care theories and ethical, non-judgmental practice ● District health system ● Teamwork and feedback to colleagues, patients and their significant others ● Accountability ● Communication ● Code of Ethics/ conduct and standards related to primary clinical care ● Legal Framework related to Primary health Nursing practice ● Record keeping – written and digital ● Person centered Health Education and promotion		
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidenced-based reports (Portfolio of Evidence/Reflective Journal)] Summative ● Final 3-hour theory examination 50%, Written Examination, Triple jump, OSCE		
DP Requirement	50% Continuous Assessment Mark 80% Attendance of theory and work integrated learning		

Title	Professional Informatics & Communication in Nursing		
Code	**4PIC212**		
Prerequisite	4NFN110 - Fundamentals of Nursing	**Corequisite**	**Nil**
Aim	To facilitate the development of an understanding of principles, theories and approaches for the provision of professional informatics & Communication in health care within rural contexts of the district health system model.		
Content	● Introduction to Primary Health Care Nursing		

	● Concepts – Information Literacy, Health Literacy, Standardised Clinical Terminologies, Standardised Nursing Data ● Gathering, Assessing and Using Information and Knowledge for ● Evidence-Informed Nursing ● Assisting Patients/Clients in Using Information and Communication ● Technologies in Managing Their Health ● Nursing Data and the Advancement of Nursing Practice ● The Current State of Standardized Clinical Terminologies ● International Classification for Nursing Practice (ICNP) ● Benefits of Standardized Clinical Terminologies to Nursing ● Concepts – Information Privacy, Breach of Privacy, Security Technology induced errors, ● Awareness of Legislation and Policies that Regulate the Use of ICT in ● Nursing Practice ● Information and Communication Technologies and Patient Safety ● Information and Communication Technologies and the Nurse's Clinical Judgement ● Nurses as Advocates for Health Information and Communication Technologies
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidenced-based reports (Portfolio of Evidence/Reflective Journal)] Summative ● Final 3-hour theory examination 50%, Written Examination,
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning

Title	Maternal Health and New-born Care 1A		
Code	**4MAT311**		
Prerequisite	4GNS211 - General Nursing Science 1A 4GNS212 - General Nursing Science 1B 4ZOL121 - Human Anatomy & Physiology 1A 4ZOL212 - Human Anatomy & Physiology 1B 4NHP211 - Medical Biophysics 4NHP212 - Medical Biochemistry	**Corequisite**	**Nil**
Aim	This module enables the student to demonstrate integrated knowledge, skills and attitudes required to provide preconception to women prior to becoming pregnant and responses to the needs of an individual woman before she falls pregnant and in the antenatal period of pregnancy		
Content	**PRECONCEPTION** ***Low Risk***		

	• Assessment using the steps of the nursing process • Genetic counselling • Health education • Menstrual cycle • Family planning **ANTENATAL CARE** ***Low Risk*** • Comprehensive assessment of a pregnant woman using steps of the nursing process: • History taking • Physical examination: • Abdominal palpation during pregnancy • Demonstrate knowledge of embryology • Apply rules and regulations, guidelines and high levels of ethical standards in midwifery practice. **INTRAPARTUM** ***Low Risk*** • Comprehensive assessment of a pregnant woman during labour using the steps of the nursing process • Comprehensive knowledge to differentiate the different stages of labour. • Comprehensive knowledge of the management of a woman during the different stages of labour • Comprehensive knowledge of foetal monitoring and management during labour • Comprehensive assessment of a neonate immediately after birth using the steps of the nursing process. **POSTPARTUM** ***Low Risk*** • Comprehensive assessment of a postnatal woman and the neonate using the steps of the nursing process. • Initiation of exclusive breastfeeding • Health education regarding postpartum and neonatal care • Postpartum clinic visits
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal)] Summative • Final 3-hour theory examination 50%, Written Examination • Triple Jump & OSCE
DP Requirement	50% Continuous Assessment Mark • 80% Attendance of theory and work integrated learning

Title	General Nursing Science 2A		
Code			
Prerequisite	4GNS211 - General Nursing Science 1A 4GNS212 - General Nursing Science 1B 4NHP211 - Medical Biophysics 4NHP212 - Medical Biochemistry	**Corequisite**	**Nil**
Aim	To develop knowledge and competence in the management of medical and surgical problems at all levels of health care and the		

	provision of safe, effective person-centred nursing care all age groups in life.
Content	• Endocrine System and relevant surgery, • Oncology, • Ear Nose and Throat, • Ophthalmology, • Neurology and its relevant surgery
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/case studies/case presentations & Clinical & academic ward rounds and inspections; clinical workbooks & triple jump assessments)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning

Title	Rural Health Care Priorities		
Code	**4RHP311**		
Prerequisite	4PC211 - Primary Care Nursing 1A 4PC212 - Primary Care Nursing 1B	**Corequisite**	**Nil**
Aim	To facilitate the development of an understanding of principles, theories and approaches for the provision of holistic health care within rural contexts of the district health system model.		
Content	● Introduction to the priority rural health care needs ● Situational analysis of a rural setting to determine rural health care needs within the setting ● Rural Health Care theories ● How rural health care is placed in the District health system ● Issues related to rural health care ● Disease priorities in rural Health contexts ● Health promotion in Rural Health care contexts ● TB ● HIV ● Malaria ● Maternal and Child Health ● Palliative Care ● Dealing with health care emergencies in rural contexts		
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/case studies/case presentations & Clinical & academic ward rounds and inspections; clinical workbooks & triple jump assessments)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE		
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning		

Title	General Nursing Science 2B
Code	**4NGN312**

Prerequisite	4GNS211 - General Nursing Science 1A 4GNS212 - General Nursing Science 1B	**Corequisite**	4NGN311 -General Nursing Science2 A
Aim	To develop knowledge and competence in the management of medical and surgical problems at all levels of health care and the provision of safe, effective person-centred nursing care all age groups in life.		
Content	• Female Reproductive System and relevant surgery, • Dermatology, • Metabolic and Autoimmune Conditions – HIV and related opportunistic infections, • Orthopaedic Nursing and Surgery, • Care of the Elderly and palliative care.		
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/case studies/case presentations & Clinical & academic ward rounds and inspections; clinical workbooks & triple jump assessments)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE		
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning		

Title	Maternal Health & New-born Care 1B (High Risk)		
Code	**4MAT312**		
Prerequisite	4GNS211 - General Nursing Science 1A 4GNS212 - General Nursing Science 1B 4ZOL121 - Human Anatomy & Physiology 1A 4ZOL122 - Human Anatomy & Physiology 1B 4NHP211 - Medical Biophysics 4NHP212 - Medical Biochemistry	**Corequisite**	4MAT311Maternal Health & New-Born Care 1A (Low Risk)
Aim	This module enables the student to demonstrate integrated knowledge, skills and attitudes required to provide preconception to high risk women prior to becoming pregnant and responses to the needs of an individual high risk woman before she falls pregnant and in the antenatal, intrapartum & post-partum periods of pregnancy		
Content	***PRECONCEPTION*** ***High Risk*** *Comprehensive assessment (nursing process) of men and woman with:* • *Health promotion and disease prevention (medical conditions)* • *History of infertility* • *Sexually Transmitted infections* • *Abnormalities of female reproductive organs* • *Abnormalities of male reproductive organs*		

	ANTENATAL CARE ***High Risk*** *Comprehensive management of a pregnant woman with the following conditions:* • *Hypertensive conditions* • *Infective conditions* • *Medical conditions* • *Haemorrhagic conditions* • *Multiple pregnancy* • *High-risk foetus* ***I*NTRAPARTUM** ***High Risk*** *Comprehensive assessment of a pregnant woman with the following conditions during labour:* • *ESMO* • *Hypertensive condition* • *Infective condition* • *Haemorrhagic conditions* • *Multiple pregnancy* • *Medical conditions* • *Abnormal lie and presentations* • *Comprehensive assessment of a foetus presenting with foetal distress* • *Comprehensive management of a foetus presenting with cord prolapse* **POSTPARTUM** ***High Risk*** *Assessment of a woman who presents with:* • *Postpartum haemorrhage* • *Breastfeeding problems* • *Postpartum depression/psychosis* • *Psychosocial care of pregnant women* • *Uterine sub involution.* • *EMTCT* • *Care of the preterm baby*
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/case studies/case presentations & Clinical & academic ward rounds and inspections; clinical workbooks & triple jump assessments)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning

Title	Principles and Practice of Nursing		
Code	**4PPN312**		
Prerequisite	4NEP112 - Nursing Ethos & Professional Practice	**Corequisite**	**Nil**
Aim	This module enables the graduates to demonstrate the ability to take decisions and act ethically and professionally, and to justify decisions based on ethical values and approaches within different health care settings.		
Content	• Nature and parameters of nursing practice		

	• Nursing theories and philosophy • Professional-ethical practice • Legal rights and responsibilities • Professional regulation: an organized profession • Professional and legal aspects • Professional competencies, responsibilities and accountability
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/case studies/case presentations & Clinical & academic ward rounds and inspections; clinical workbooks & triple jump assessments)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning

Title	Research Methods and Approaches in Nursing		
Code	**4RMA311**		
Prerequisite	**NIL**	**Corequisite**	**Nil**
Aim	This module enables the learners to understand the research methodologies and approaches required to conduct research in investigating nursing and health-related problems in order to improve quality of care		
Content	• Orientation to health sciences research • Research and theory • Ethical considerations in the conduct of health sciences research • An overview of the research processes • Selecting and identifying research problems • Literature review • Introduction to research designs methodologies • Sampling, data collection, data analysis and data quality • Research reports and report evaluation		
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal)] Summative ● Final 3-hour theory examination 50%, Written Examination		
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning		

Title	Nursing Service Management 1A		
Code	**4NNM411**		
Prerequisite	4NEP112	**Corequisite**	**Nil**
Aim	This module enables the student to demonstrate, understanding and apply knowledge of the theories, research methodologies, methods and techniques relevant to Nursing Management in the context of managing a Nursing unit		
Content	• Planning and Provision for Healthcare • Decision making, problem solving, • Change/Innovation • Financial Management		

	• Leadership (Directing) • Control and Risk Management • Management of Human Resources • Quality Management System
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/case studies/case presentations & Clinical & academic ward rounds and inspections; clinical workbooks & triple jump assessments)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning

Title	Maternal Health and New-born Care 2A (Low Risk)		
Code	**4MAT411**		
Prerequisite	4MAT311 - Maternal Health & New-Born Care 1A (Low Risk) 4MAT312 - Maternal Health & New-Born Care 1B (High Risk)	**Corequisite**	**Nil**
Aim	This module enables the student to demonstrate integrated knowledge, skills and attitudes required to provide preconception to women prior to becoming pregnant and responses to the needs of an individual woman before she falls pregnant and in the antenatal, Intrapartum & post-partum periods of pregnancy		
Content	**PRECONCEPTION** ***Low Risk*** • Assessment using the steps of the nursing process • Genetic counselling • Health education • Menstrual cycle • Family planning **ANTENATAL CARE** ***Low Risk*** • Comprehensive assessment of a pregnant woman using steps of the nursing process: • History taking • Physical examination: • Abdominal palpation during pregnancy • Demonstrate knowledge of embryology • Apply rules and regulations, guidelines and high levels of ethical standards in midwifery practice. **INTRAPARTUM** ***Low Risk*** • Comprehensive assessment of a pregnant woman during labour using the steps of the nursing process • Comprehensive knowledge to differentiate the different stages of labour. • Comprehensive knowledge of the management of a woman during the different stages of labour • Comprehensive knowledge of foetal monitoring and management during labour		

	• Comprehensive assessment of a neonate immediately after birth using the steps of the nursing process. **POSTPARTUM** ***Low Risk*** • Comprehensive assessment of a postnatal woman and the neonate using the steps of the nursing process. • Initiation of exclusive breastfeeding • Health education regarding postpartum and neonatal care • Postpartum clinic visits
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning

Title	Mental Health Nursing 1 A		
Code	**4MHN411**		
Prerequisite	4NGN311 - General Nursing Science 2A 4NGN312 -General Nursing Science 2B 1PSY111 - Introduction to Psychology 1SGY111 - Introduction to Sociology	**Corequisite**	**Nil**
Aim	This module equips nursing students with knowledge, skills and attitudes required to provide mental health nursing care to an individual, families and communities and enables nurses to respond appropriately and effectively to the needs of an individual, families and communities in which mental health is compromised.		
Content	• Mental health Act no 17 of 2002 • Mental health education • Home visits and community assessment. • Attention – deficit hyperactivity disorders • Evaluate community mental health service/s. • Mental Health consequences of a crisis • Assessment of crises and crisis intervention. • Causes and prevention of medico - legal risks. • Identify important factors in child mental health • Analyze the theoretical approaches to child development. • Substance abuse, suicide, HIV and AIDS, Childhood Autism, Separation anxiety as they relate to mental health issues • Assess and evaluate Play therapy		
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/case studies/case presentations & Clinical & academic ward rounds and inspections; clinical workbooks & triple jump assessments)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE		
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning		

Title	Research Project		
Code	**4NRP411**		
Prerequisite	4RMA311 - Research Methods and Approaches in Nursing 4RMA312 – Research Methods & approaches in Nursing	**Corequisite**	**Nil**
Aim	This module equips nursing students with knowledge, skills and experiential learning required to plan a research project.		
Content	• Identifying a researchable topic • Conducting a literature review • Stating the research problem, Objectives, and research questions • Planning the ethics related to the researchable topic • Stating the contribution that the research project will make to the body of Nursing Knowledge • Planning the research method, sampling, setting and data analysis for the research project • Completion of an ethics application • Completed research proposal		
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Complete Research proposal		
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory		

Title	Nursing Service Management 1B		
Code	**4NNM412**		
Prerequisite	4NEP112	**Corequisite**	**Nil**
Aim	This module aims to equip students to manage a nursing service effectively and productively within a health care facility in respect of strategic planning, bringing about change, policy formulation, conflict management, managing finances and resources and providing quality care within the nursing service		
Content	• Human Resources Management • Financial Management • Monitoring and Evaluation • Quality Management • Education and Training		
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/case studies/case presentations & Clinical & academic ward rounds and inspections; clinical workbooks & triple jump assessments)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE		
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning		

Title	Mental Health Nursing 1 B

Code	**4MHN412**		
Prerequisite	4NGN311 - General Nursing Science 2A 4NGN312 - General Nursing Science 2B	**Corequisite**	**Nil**
Aim	This module equips nursing students with knowledge, skills and attitudes required to provide mental health nursing care to respond appropriately and effectively to the needs of an individual, families and communities.		
Content	• Therapeutic environment • Nursing process • Anxiety disorders • Psychopharmacology • Communication skills and techniques • Group work • Mood disorders • Substance related disorders • Cognitive disorders, delirium, and dementia • Intellectual disability • Eating disorders • Schizophrenia • Psychosomatic, brief disorders • Attention –deficit hyperactivity disorders		
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/case studies/case presentations & Clinical & academic ward rounds and inspections; clinical workbooks & triple jump assessments)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE		
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning		

Title	Maternal Health & New-born Care 2B (High Risk)		
Code	**4MAT412**		
Prerequisite	4MAT311 - Maternal Health & New-Born Care 1A (Low Risk) 4MAT312 - Maternal Health & New-Born Care 1B (High Risk)	**Corequisite**	**Nil**
Aim	This module provides nursing students with the knowledge and ability to provide care to a pregnant woman and the foetus during the intra-partum period		
Content	***PRECONCEPTION*** ***High Risk*** *Comprehensive assessment (nursing process) of men and woman with:* • *Health promotion and disease prevention (medical conditions)* • *History of infertility* • *Sexually Transmitted infections* • *Abnormalities of female reproductive organs* • *Abnormalities of male reproductive organs* **ANTENATAL CARE** ***High Risk***		

	Comprehensive management of a pregnant woman with the following conditions: • *Hypertensive conditions* • *Infective conditions* • *Medical conditions* • *Haemorrhagic conditions* • *Multiple pregnancy* • *High-risk foetus* **/INTRAPARTUM** ***High Risk*** *Comprehensive assessment of a pregnant woman with the following conditions during labour:* • *ESMO* • *Hypertensive condition* • *Infective condition* • *Haemorrhagic conditions* • *Multiple pregnancy* • *Medical conditions* • *Abnormal lie and presentations* • *Comprehensive assessment of a foetus presenting with foetal distress* • *Comprehensive management of a foetus presenting with cord prolapse* **POSTPARTUM** ***High Risk*** *Assessment of a woman who presents with:* • *Postpartum haemorrhage* • *Breastfeeding problems* • *Postpartum depression/psychosis* • *Psychosocial care of pregnant women* • *Uterine sub involution.* • *EMTCT* • *Care of the preterm baby*
Assessment	Continuous assessment 50%, Formative – Test, Assignment [evidence-based reports (Portfolio of Evidence/Reflective Journal/case studies/case presentations & Clinical & academic ward rounds and inspections; clinical workbooks & triple jump assessments)] Summative ● Final 3-hour theory examination 50%, Written Examination ● Triple Jump & OSCE
DP Requirement	50% Continuous Assessment Mark ● 80% Attendance of theory and work integrated learning

SBSC60 - The following modules are for pipeline students ONLY

Title	**Psychiatric Nursing 3A**		
Code	**SNPN311**	**Department**	**Nursing Science**
Prerequisites	SNGN211, SNGN212, SNHP211, SNHP212, SNPR219	Co-requisites	None
Aim	To develop competency in the practice of care for healthy or mentally ill and mentally challenged individuals in terms of promotion of mental health throughout the life span		

Content	● Introduction to psychiatric nursing science ● History of mental health nursing and current models in mental health ● Aetiology, pathology, clinical manifestation, diagnosis and nursing management of psychiatric disorders ● Psychogeriatric conditions ● Legal aspects in psychiatric nursing		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's		

Title	**Midwifery 3A**		
Code	**SNMW311**	**Department**	**Nursing Science**
Prerequisites	SNGN211, SNGN212, SNHP211, SNHP212, SNPR219	Co-requisites	None
Aim	The course is designed to develop competency in the management and practice of normal midwifery at all levels of care, identify clients with problems and refer them for expect care, to ensure that qualify midwifery health care services are rendered.		
Content	● Introduction to midwifery health care ● Application of knowledge of Anatomy and physiology related to the female reproductive system, apply related biophysical & biochemical studies to midwifery science. ● Integration of the South African Nursing Council rules, regulations of country as well as those of education & training institutions. ● Embryology, diagnosis and management of a woman, their families, during antenatal period and labor. ● Establish between normal and abnormal midwifery practice during pregnancy and labor, refer for expert care.		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 5 0%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's		

Title	**Midwifery 3A**		
Code	**SNMW311**	**Department**	**Nursing Science**
Prerequisites	SNGN211, SNGN 212, SNHP211, SNHP212, SNPR219	Co-requisites	None
Aim	The course is designed to develop competency in the management and practice of normal midwifery at all levels of care, identify clients with problems and refer them for expect care, to ensure that qualify midwifery health care services are rendered.		
Content	● Introduction to midwifery health care ● Application of knowledge of Anatomy and physiology related to the female reproductive system, apply related biophysical & biochemical studies to midwifery science. ● Integration of the South African Nursing Council rules, regulations of country as well as those of education & training institutions.		

	● Embryology, diagnosis and management of a woman, their families, during antenatal period and labor. ● Establish between normal and abnormal midwifery practice during pregnancy and labor, refer for expert care.
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Pharmacology**		
Code	**SNPC311**	**Department**	**Nursing Science**
Prerequisites	None	Co-requisites	None
Aim	To develop a broad –based knowledge of the drugs that are used in various specialized conditions that affect all age groups.		
Content	● Cholinergic, adrenergic and CNS stimulants ● Anaesthetic drugs o General anaesthetics o Local anaesthetics o Resuscitation anaesthetics ● Anticonvulsant drugs ● Antiparkinsonian and Antimyathenic drugs ● Antianginal drugs ● Antilipemic drugs ● Pituitary, Thyroid and Parathyroid drugs ● Male and female hormonal drugs ● Antidiabetic drugs and obesity ● Corticosteroids and immunosuppressant drugs ● Antifungal and anthelmintic drugs ● Antiviral drugs ● Antigout drugs ● Antiathritic drugs and skeletal muscle relaxant drugs ● Antineoplastic drugs ● Ophthalmic drugs ● Otic drugs ● Topical drugs (skin, nose, ears) ● Hormones and reproduction ● Hormones and metabolism: calcitonin, osteoporosis ● Drugs affecting the kidneys and renal function		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's		

Title	**General Nursing Science 3B**		
Code	**SNGN312**	**Department**	**Nursing Science**
Prerequisites	SNGN211 and SNGN212	Co-requisites	None
Aim	To develop knowledge and competency in the management of specialized care for: Gynecological, dermatological, metabolic and auto-immune conditions. To acquire ability to examine, diagnose, treat and evaluate care for the adult and elderly person, orthopedic care and preparation and care of a patient following kidney surgery.		
Content	● Gynecology		

	● Dermatology ● Metabolic and auto-immune conditions ● Adult and elderly person ● Orthopedic care ● Invasive renal surgery ● Practicals
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Psychiatric Nursing 3B**		
Code	**SNPN312**	**Department**	**Nursing Science**
Prerequisites	SNSC211, SNSC212, SNSC231, SNSC232	Co-requisites	None
Aim	To prepare a well-rounded learner of nursing who can apply the knowledge, understanding and caring of individuals with or without psychiatric disorders or with physical and mental challenges.		
Content	● Therapeutic modalities: milieu therapy, electroconvulsive therapy, therapeutic self and therapeutic use of self. ● Psychopharmacological/psychotropic chemotherapy (minor and major tranquilizers, antidepressants, mood stabilizers ● Therapeutic response, side effects and nursing intervention related to the presenting problem ● Alternative approaches of treatment: Indigenous methods of treating mental illness ● Classify mentally challenged children and various assessment tools ● Identify features of mentally challenged children ● Preventive measures at primary, secondary and tertiary levels ● Psychosocial effects of mentally challenged child ● Principles and methods of teaching the child ● Stimulation of all senses ● Nursing care of a child with specific problems ● Home care vs institutional care		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's		

Title	**Midwifery 3B**		
Code	**SNMW312**	**Department**	**Nursing Science**
Prerequisites	SNGN211, SNGN212, SNHP211, SNHP212, SNPR219, SNMW311	Co-requisites	None
Aim	The course is designed to develop competency in the management and practice of normal midwifery at all levels of care, identify clients with problems and refer them for expect care, to ensure that qualify midwifery health care services are rendered.		
Content	● Introduction to midwifery health care related to puerperium and child care.		

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- Application of knowledge of Anatomy and physiology related to the female reproductive system, apply related biophysical & biochemical principles to puerperium and child care.
- Integration of the South African Nursing Council rules regulations laws of country and policies of education & training institutions.
- Diagnosis of and management of women, children and their families
- Establish between normal and abnormal midwifery practice during puerperium child care, refer for expert care.

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<tr><td>Assessment</td><td>Continuous assessment 50%,
Final 3 hour theory exam 50%</td></tr>
<tr><td>DP Requirement</td><td>40% Continuous Assessment Mark 80% Attendance at practical's</td></tr>
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<table>
<tr><td>Title</td><td colspan="3">Psychiatric Nursing 4A</td></tr>
<tr><td>Code</td><td>SNPN411</td><td>Department</td><td>Nursing Science</td></tr>
<tr><td>Prerequisites</td><td>SNPN311, SNPN312, SNGN311, SNGN312, SNPR319</td><td>Co-requisites</td><td>None</td></tr>
<tr><td>Aim</td><td colspan="3">To develop competency in comprehensive mental health nursing at primary secondary and tertiary levels of mental health care of individuals at all age groups</td></tr>
<tr><td>Content</td><td colspan="3">

- The approach applied in community psychiatry
- Steps carried out in the establishment of a new community psychiatric service and family therapy
- Evaluation of a community psychiatric service and research in community psychiatry
- Child psychiatric disorders
- Factors influencing the utilization of services
- Maintenance of professional confidentiality.

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<tr><td>Assessment</td><td colspan="3">Continuous assessment 50%,
Final 3 hour theory exam 50%</td></tr>
<tr><td>DP Requirement</td><td colspan="3">40% Continuous Assessment Mark 80% Attendance at practical's</td></tr>
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<table>
<tr><td>Title</td><td colspan="3">Midwifery 4A</td></tr>
<tr><td>Code</td><td>SNMW411</td><td>Department</td><td>Nursing Science</td></tr>
<tr><td>Prerequisites</td><td>SNGN311, SNGN312, SNMW311, SNMW312, SNPR319</td><td>Co-requisites</td><td>None</td></tr>
<tr><td>Aim</td><td colspan="3">To extend and integrate the knowledge of abnormalities of anatomy and physiology in the management of the woman who has abnormal condition e.g. pregnancy Induced hypertension, multiple pregnancy and obstructed labour.
To develop competency in the diagnosis and management of abnormalities in pregnancy and labour.</td></tr>
<tr><td>Content</td><td colspan="3">

- Application of knowledge of Anatomy and physiology when studying abnormalities which affect the female reproductive system.
- Prevention, diagnosis and management of abnormal conditions affecting the woman during pregnancy e.g. diseases, infections, obstructed labour and obstetrical emergencies.

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	● Integration of the South African Nursing Council rules and regulations, laws of the country and polices of education and training institutions.
Assessment	Theory: 50% Continuous Assessment Mark (tests, Assignments Presentations, and case studies) 50% Formal end of module exam (3 hours) Practical: Continuous assessment: 50%, practical examination: 50%.
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's

Title	**Psychiatric Nursing 4B**		
Code	**SNPN412**	**Department**	**Nursing Science**
Prerequisites	SNPN311, SNPN312, SNGN311, SNGN312, SNPR319	Co-requisites	None
Aim	To develop competency in comprehensive mental health nursing at primary secondary and tertiary levels of mental health care of individuals at all age groups		
Content	● Individual and group relationship ● The interactive process ● Contribution of group development ● Effectiveness and productivity characteristic in a group ● Assessment of a crisis ● Identification of supportive systems		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's		

Title	**GENERAL NURSING 411**		
Code	**SNGN411**	**Department**	**Nursing Science**
Prerequisites	SNGN311, SNGN312, SNMW311, SNMW312, SNPR319	Co-requisites	None
Aim	To equip student with competencies, experiences, knowledge and skills in the effective management of nursing unit and health care services at all levels, aiming at providing quality patient care of all types of patients in different settings using specialized and scientific knowledge and skills.		
Content	● Introduction to nursing management ● Concepts in administration and management ● Basic principles of administration and management ● Generic administrative processes ● Applied administration ● Role and functions of the nurse in charge of a health service unit ● Policy and decision making ● Organisation and management of a nursing unit (e.g. personnel management) ● Specific administrative aspects concerning provision of patient care		
Assessment	Theory: 50% Continuous Assessment Mark (tests, Assignments Presentations, and case studies) 50% Formal end of module exam (3 hours) Practical: Continuous assessment: 50%, practical examination: 50%.		

DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's		

Title	**GENERAL NURSING 412**		
Code	**SNGN412**	**Department**	**Nursing Science**
Prerequisites	SNGN311, SNGN312, SNMW311, SNMW312, SNPR319	Co-requisites	None
Aim	To equip student with competencies, experiences, knowledge and skills in the effective management of nursing unit and health care services at all levels, aiming at providing quality patient care of all types of patients in different settings using specialized and scientific knowledge and skills.		
Content	● Method and strategies of teaching in clinical practice ● Audio vision Aids, selection, use and maintenance ● Factors in nursing settings that affect teaching and learning ● Planning for teaching including orientation programme, in-service education, client/ patient teaching, ● Teaching od nursing skills to junior nursing students		
Assessment	Theory: 50% Continuous Assessment Mark (tests, Assignments Presentations, and case studies) 50% Formal end of module exam (3 hours) Practical: Continuous assessment:		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's		

Title	**Midwifery 4B**		
Code	**SNMW412**	**Department**	**Nursing Science**
Prerequisites	SNGN311, SNGN312, SNMW311, SNMW312, SNPR319	Co-requisites	None
Aim	To extend and integrate the knowledge of abnormalities of puerperium, and the new-born/child, such as puerperal sepsis and prematurity and its complications To develop competency in the diagnosis, monitoring and management of abnormalities during puerperium and of the neonate and the child.		
Content	● Application of knowledge of Anatomy and physiology in the study of abnormal conditions which affect the woman and the child. ● Prevention, diagnosis and management of abnormal conditions affecting the woman during puerperium, the baby/child e.g. Post-partum haemorrhage, hypoxic ischaemic encephalopathy. ● Integration of the South African Nursing Council rules and regulations as well as the laws of the country.		
Assessment	Theory: 50% Continuous Assessment Mark (tests, Assignments Presentations, and case studies) 50% Formal end of module exam (3 hours) Practical Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's		

PROGRAMME RULES (B Cur E et A)

To register for 3rd level modules a student shall have passed all 1st year modules. To register for 4th level modules a student shall have passed all 2nd level modules. In order to progress the subsequent level major a candidate shall complete the necessary requirements and obtain a pass mark in the preceding level. Where a support course or module is a pre-requisite a candidate shall be required to complete and pass the pre-requisite course or module in order to register the specific module.

EXPERIENTAL LEARNING (CLINICAL EXPERIENCE)

A total of four thousand (4000) hours experiential learning must be completed (SANC Regulation R425)

Practical work shall be undertaken at health related institutions approved by the SANC. Minimum hours for experiential learning shall be based on the directive set by the SANC. A learner shall keep a record of his/her clinical performance as prescribed for each level of study. This includes workbooks for General Nursing, Community Health Nursing, Midwifery, Psychiatry Nursing, Research project report, SANC Regulations file. Such records shall be signed by a professional nurse responsible for the clinical experience and will serve as legal evidence of experiential learning. Learner records for each level of the programme must be submitted complete, by 30 September each year for evaluation. Total attendance at SANC approved clinical facilities for prescribed clinical experience is compulsory.

B CUR (E et A)

This is a post registration degree programme for professional nurses, and is registrable with the South African Nursing Council. The degree is offered over a minimum of 3 years full-time or 4-5 years part-time study.

Admission requirements: Full matriculation exemption and current registration with the South African Nursing Council as a general nurse and midwife

Option 1: Nurse educator and nurse manager

Option 2: Community health nurse and nurse manager

Department of Physics

STAFF

Professor	SS Ntshangase, BScHons, MSc (UNIZULU), PhD (UCT), MSAIP, PGDHE(UKZN)
Associate Professor	T Jili, BScHons (UNIZULU), MSc (Atlanta, USA), PhD (WITS), MSAIP, Pr. Phys
Senior Lecturers	CL Ndlangamandla, BScHons, MSc, PhD (UNIZULU), MSAIP, Pr. Phys
Lecturers	PN Biyela, BScHons, MSc, PhD (UNIZULU), MSAIP, PGDip (HE) (UKZN)
	CT Thethwayo, BScHons, MSc (UNIZULU), MSAIP
	PZ Ngcobo, BSc, Hons, MSc(UNIZULU) PhD (UCT), MSAIP
Temporal Lecturer	GM Mengiste, BEd(Physics) JU, MSc (AAU), MSc (UCT), PhD (NWU)
Senior Laboratory Assistant	NP Chonco, BScHons, MSc (UNIZULU), MSAIP
	PS Mkwae, BScHons, MSc(UNIZULU)
	SP Noncolela, BSc(UKZN), Hons MSc (UWC)
	PP Majozi, BSc Hons(UNIZULU)
Laboratory Technician	NS Khanyile, Computer hardware and Software A+, N+ (Mega Training)
Secretary	NC Mothapo, Dip (Sec) (Working World)

Title	**Classical mechanics and properties of matter**		
Code	**4PHY111**	**Department**	**Physics**
Prerequisites	None	Co-requisites	None
Aim	The module is meant for entry level B.Sc. and contains fundamental concepts in Physics that prepares the student for later study in more advanced fields in the Physical Sciences. It contains basic concepts in mechanics, waves, optics and thermodynamics.		
Content	● Statistical concepts: Probability, distributions, histograms, standard deviation, propagation of errors. Units and measurement: Dimensions, SI-system of units, basic measurements in physics. ● Mechanics: Forces, moments, couples, Newton's laws, circular motion, momentum, oscillations, momentum and impulse. ● Heat and thermodynamics: Mechanisms of heat transfer, heat capacity, phase changes, gases. ● Waves: Sound waves, light and light sources, laws of refraction, diffraction and reflection. ● Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.		
Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic mechanics concepts, laws of Newton and their practical application. ▪ The understanding of circular motion, its mathematical representation and solving of problems associated with repetitive circular motion. ▪ An understanding of wave concepts, modes of propagation and associated phenomena inside a material medium. ▪ Problems.		

	▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results ▪ Learners must be able to write simple scientific reports commensurate with level 1 B.Sc.
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and Project work

Title	**Nuclear physics, electromagnetism, and modern physics**			
Code	**4PHY112**	**Department**		**Physics**
Prerequisites	None		Co-requisites	None
Aim	The module is meant for entry level B.Sc. and contains fundamental concepts in Physics that prepares the student for later study in more advanced fields in the Physical Sciences. It contains basic concepts in electricity, nuclear physics and modern physics.			
Content	● Electricity and Magnetism: Coulomb's law, conductors and insulators. The electric field. Gauss' law. Potential, electrical potential energy, line integral of electric field, Capacitance, dielectrics and properties of dielectrics, Electric circuits. Magnetic field and magnetism, motion of charges particles through magnetic fields, the cyclotron. Ampere's law. Induced electromotive force, The R-L circuit and the L-C circuit. ● Magnetic properties of matter, materials, permeability, molecular theory. Magnetization and susceptibility. Hysteresis. Magnetic field of the earth. Magnetic circuits. ● Atomic Physics and radioactivity: Quantum theory of radiation. Wien and Stefan's laws. Planck's radiation formula. Radioactivity, natural decay series. Detectors of radiation, Nuclear reactions, conservation laws, reaction process, proton-induced, neutron-induced and other reactions. Q-values, alpha-. beta- and gamma-decay. Nuclear binding energy. Fission and fusion. Reactors, nuclear fuel, breeders. ● Cosmic radiation and fundamental principles. ● Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.			
Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic in static electricity, natural phenomena such as lightening, and the principles of machines based on static electricity concepts such as Van De Graaf Generators. ▪ An understanding of electric current and its effects (such as heating) ▪ The generation of electricity (Faraday's law, Lenz's law, etc.) ▪ A learner should understand the basic concepts of radioactivity, constituents of the nucleus and the effect of radiation. ▪ Learners should be able to solve problems related to theory taught. ▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results ▪ Learners must be able to write simple scientific reports commensurate with level 1 B.Sc.			
Assessment	Continuous assessment 50%,			

	Final 3 hour theory exam 50%
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

Title	**Classical mechanics and properties of matter for Biological sciences**		
Code	**4PHY121**	**Department**	**Physics**
Prerequisites	None	Co-requisites	None
Aim	This is a non-calculus module meant for Biologists, Medical scientists and those not following calculus based physics. The aim of the module is to encourage learners to have an appreciation of the physical world surrounding them, an understanding of principles governing the physical world as well as skills in handling and understanding the operation of general laboratory instruments most likely to be used in their future careers.		
Content	● Kinematics: Displacement, distance. Vectors and scalars. Motion in one and two dimensions – circular and projectile motion. ● Dynamics: Concepts, inertia, momentum, force, weight. Newton's three laws of motion. Friction. Rotational motion. ● Thermodynamics: temperature. First law. Heat capacity. Latent heat. Heat interchange. Radiation of heat by human body. ● Properties of solids and liquids: Thermal expansion. Elasticity. Viscosity. Diffusion, osmosis, surface tension. Bernoulli's law. ● Waves and sound: Velocity of waves in elastic media. Intensity and level of intensity. Doppler effect. Ultrasonic waves and applications. ● Photometry: Fundamental quantities. Radiation energy. Light flux, light intensity, candela, illumination, Lambert's law. ● Geometrical Optics: Laws of reflection and refraction. Lenses, power of a lens. Optical systems, Lens defects. The eye and eye defects. Optical instruments: magnifying glass, microscope. ● Physical Optics: Interference, coherence. Diffraction, single and double slits. Gratings. Polarization: reflection and double reflection, polarimeter. Resolving power of optical instruments. Special microscopes: (polarization, ultra – violet, interference, phase-contrast). ● Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.		
Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic mechanics concepts, laws of Newton and their practical application. ▪ The understanding of circular motion, its mathematical representation and solving of problems associated with repetitive circular motion. ▪ An understanding of wave concepts, modes of propagation and associated phenomena inside a material medium. ▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results ▪ Learners must be able to write simple scientific reports commensurate with level 1 for the biological sciences		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's		

<table>
<tr><td>Title</td><td colspan="3">Nuclear physics, electromagnetism and modern physics for Biological sciences</td></tr>
<tr><td>Code</td><td>4PHY122</td><td>Department</td><td>Physics</td></tr>
<tr><td>Prerequisites</td><td>None</td><td>Co-requisites</td><td>None</td></tr>
<tr><td>Aim</td><td colspan="3">The aim of this module is to give learners the necessary grounding in physics for the further studies in biological and earth sciences</td></tr>
<tr><td>Content</td><td colspan="3">● Electrostatics: Coulomb’s law. Electrocardiogram. Dielectric media, electric polarization, induction field in a dielectric medium.
● Electrodynamics: Electric current and resistance. Ohm’s law. Temperature dependence of resistance. Circuits. Potentiometer.. Electricity. Electrical energy Joule’s law. Electrical power. Ionic conduction. Chemical effect of electric current. Conduction by gasses. Applications.
● Electromagnetism: Magnetic induction and flux. Force on moving charges in a magnetic field. Measurement of blood velocity using electromagnetic flow meters. Electrical instruments and measurements. Laws of Faraday and Lenz.
● Alternating current: Generation. A C circuit with resistance, capacitance and inductance. Transformer. Phases.
● Atomic physics: Rutherford-Bohr atom. Absorption and emission of energy by the atom. Stationary orbits and energy levels. Spectral lines of the hydrogen atom. Black-body radiation. Photo-electric effect and applications. Photomultipliers and stimulation emission of radiation. Lasers.
● X-Rays: Production of X-rays, continuous and characteristic spectra. Absorption. Medical applications. Diagnosis and therapy. Fluoroscope and image intensifier. Wave-particle duality e.g. light and matter. De Broglie waves. Compton effect. Electron microscope. Radioactivity: Natural radioactivity. Radioactive decay, activity, disintegration constant, half-life. Nuclear reactions. Production of radioactive isotopes. Medical applications.
● Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics heat and properties of matter.</td></tr>
<tr><td>Outcomes</td><td colspan="3">▪ An understanding of statistical concepts for data analysis and presentation.
▪ An understanding of basic in static electricity, natural phenomena such as lightening, and the principles of machines based on static electricity concepts such as Van De Graaf Generators.
▪ An understanding of electric current and its effects (such as heating)
▪ The generation of electricity (Faraday’s law, Lenz’s law, etc.)
▪ A learner should understand the basic concepts of radioactivity, constituents of the nucleus and the effect of radiation.
▪ Learners should be able to solve problems related to theory taught.
▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results
▪ Learners must be able to write simple scientific reports commensurate with level 1 for biological sciences.</td></tr>
<tr><td>Assessment</td><td colspan="3">Continuous assessment 50%,
Final 3 hour theory exam 50%</td></tr>
</table>

DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork	

Title	**Elementary physics for Consumer Sciences**		
Code	**4PHY131**	**Department**	**Physics**
Prerequisites	None	Co-requisites	None
Aim	The aim of this module is to give learners the necessary grounding in physics for the further study in consumers sciences		
Content	● Mechanics: Units and measurements. Vectors, Pressure, kinematics, levers and center of gravity, work energy and power and machines. ● Heat and molecular structure ● Heat energy, expansion, properties of gases and molecular structure, transfer of heat energy, change of state ● Wave motion, light and sound: ● Waves, reflections and shadows, refraction, thin lenses and curved mirrors, optical instruments, electromagnetic spectrum, sound. ● Electricity ● Magnetism, electric circuits, magnetic effects of an electric current, Energy and power, Electromagnetic induction ● Radioactivity ● Radiation counters, ionizing radiation, nature of α-, β- and γ-radiation and the mechanism of emissions, Radioactive sources, radioactive decay, safety precautions and uses. ● Practical: Laboratory sessions on precision calculations in experimental results, forces, mechanics, optics, heat and properties of matter and electricity.		
Outcomes	▪ An understanding of statistical concepts for data analysis and presentation. ▪ An understanding of basic mechanics concepts, laws of Newton and their practical application. ▪ The understanding of circular motion, its mathematical representation and solving of problems associated with repetitive circular motion. ▪ An understanding of wave concepts, modes of propagation and associated phenomena inside a material medium. ▪ An understanding of basic concepts in electricity and magnetism ▪ A basic understanding of nuclear physics, radiation and its effects. ▪ Learners should be able to identify most of laboratory instruments used in the level 1 laboratory and use these properly to obtain meaningful results ▪ Learners must be able to write simple scientific reports commensurate with level 1 for the consumer sciences		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

Title	**Mechanics, special relativity and properties of matter.**		
Code	**4PHY211**	**Department**	**Physics**
Prerequisites	4PHY111	Co-requisites	None
Aim	This module is designed to introduce students to the concepts of and theories applicable to mechanics, special relativity and properties of matter.		

Content	● Mechanics ● Motion of a particle in polar co-ordinates. Conservative fields, central forces, centre of mass coordinates. Right body dynamics and moments of inertia. Inverse square force and associated potential problems. Kepler’s laws and planetary motion. The vibration string and the wave equation. Free, forced, coupled and damped oscillations. ● Special relativity ● Experimental background. The postulates of special relativity theory. The relativity of simultaneity. The Lorentz transformation equations. Relativistic additional of velocities. The Doppler effect. Relativistic momentum. The equivalence of mass and energy. Space-time diagrams. Acceleration. ● Properties of matter ● Atoms, molecules and states of matter. Interatomic potential theories, the Boltzmann distribution, Maxwell speed distribution, transport properties of gases, liquids and imperfect gases, thermal properties of solids. Defects in solids
Outcomes	▪ An understanding of concepts and theories of mechanics, special relativity and properties of matter. ▪ An understanding of principles and applications of mechanics. ▪ An appreciation of phenomena leading to the concept of relativity. ▪ Understanding of basic properties of matter.
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical’s and fieldwork

Title	**Modern physics, photonics and waves.**		
Code	**4PHY212**	**Department**	**Physics**
Prerequisites	S/4PHY111, S/4PHY112	Co-requisites	None
Aim	This module is designed to introduce students to the concepts of and theories applicable to modern physics, photonics and waves.		
Content	● Waves: One- dimensional waves. The differential wave equation. Harmonic waves. Plane waves. Spherical waves. The superposition of waves. Beats. Group velocity. Anharmonic periodic waves. Fourier analysis. ● Light: The propagation of light. Huygens’s principle. Fermat’s principle. The interaction of light with matter. Interference. Conditions for interference. Wavefront splitting interferometers. Young’s experiment. Fresnel’s biprism. Lloyd’s mirror. Multiple reflections in thin dielectric films. Newton’s rings. Geometrical optics. Paraxial theory. Prisms. Mirrors. Thin and thick lenses. Lens systems. Stops. Aberrations. Optical instruments. ● Modern physics ● Lasers and applications ● Theory and principles of lasers, laser applications.		
Outcomes	▪ An understanding of concepts and theories of waves, photonics and laser applications. ▪ An understanding of principles and applications of lasers		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical’s and fieldwork		

Title	**Electromagnetism.**		
Code	**4PHY222**	**Department**	**Physics**
Prerequisites	S/4PHY111,S/4PHY112	Co-requisites	None
Aim	This module is designed to introduce students to the concepts of and theories applicable to electromagnetism and its applications		
Content	● electromagnetism ● Electrostatics, Gauss's law. Dipoles. Dielectric media. Phenomena related to electron levels: Introduction to metals, semi-conductors and insulators. Contact potential. Thermoelectric effects. ● Electromagnetism: Forces on moving charges in electric and magnetic fields. Magnetic scalar potential and vector potential. Ampere's law. Faraday's law. Self-induction and mutual induction. ● Alternating current: M L C R circuits and A-C bridges ● Magnetism: Dia, para-and ferromagnetic materials. The magnetic circuit. ● Applications of concepts and theories of electromagnetism ● Transmission lines, microwaves, waveguides, electromagnetic interference.		
Outcomes	▪ An understanding of concepts and theories of electromagnetism. ▪ Understanding and applications of Gauss law. ▪ An understanding of laws governing electrical conduction and circuits. ▪ Understanding principles of magnetism and magnetic circuits ▪ Understanding applications of electromagnetism.		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		
Title	**Quantum and Statistical Physics**		
Code	**4PHY311**	**Department**	**Physics**
Prerequisites	4PHY212	Co-requisites	None
Aim	This module is designed to introduce students to the concepts and theories applicable to quantum and statistical physics		
Content	● Statistical physics ● Statistical and Thermal Physics: The first law of thermodynamics, the second law of thermodynamics. Simple thermodynamic systems: the heat capacity of solids: the perfect classical gas; phase equilibria; the perfect quantal gas. ● Blackbody radiation: Fermi-Dirac & Bose-Einstein distributions. ● Systems with variable particle numbers. ● Quantum Physics ● The foundation of quantum mechanics. The Compton effect. Wave function and probability density. Parity. Schrodinger's equation. Wave functions of particles in changing potentials. Potential barrier penetration. Time dependant wave functions and transition probabilities. Particles in confinements. The hydrogen atom. Quantization of angular momentum. Wave functions of atomic states. Zeeman effect. Electron spin. Atoms with more electrons - addition of angular moment. Electronic structure of the elements.		
Outcomes	▪ An understanding of concepts of probability as applicable to microsystems.		

	▪ Comprehension of the 1st, 2nd and 3rd laws of thermodynamics and their application. ▪ Understanding the statistics of paramagnetics. ▪ An understanding of simple thermodynamic systems. ▪ Theories applicable to the heat capacity of solids. ▪ The statistics of gases classical and quantal. ▪ Understanding the statistics of systems with variable particle numbers. ▪ Understand the basic concepts and theory of quantum mechanics ▪ Be able to mention and discuss simple systems where quantum mechanics is applicable (and cannot be explained using classical physics)
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical’s and project involvement

Title	**Electronic circuits and devices**		
Code	**4PHY321**	**Department**	**Physics**
Prerequisites	4PH111, 4PHY112,	Co-requisites	None
Aim	This module is designed to introduce students to the concepts of and theories applicable to electronics and its applications		
Content	● electromagnetism ● LCR circuits: Forced oscillations. Transients. ● Alternating current theory: Power factor correction. Three-phase circuits. ● Electronics: Vacuum tubes. Semiconductors. Diodes. Rectifiers. Smoothing. Transistors. Common-emitter h-parameters. Biasing. Amplifiers. Cascading. Decoupling. Modulation and demodulation. Operational amplifier. Analogue computer. Voltage regulator. Digital devices. Logical circuits. Digital computer.		
Outcomes	▪ An understanding of concepts and theories of electronics ▪ Understanding and applications of semiconductors. ▪ An understanding of laws governing electrical conduction and circuits. ▪ Understanding principles of magnetism and magnetic circuits ▪ Understanding applications of electronics.		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical’s and fieldwork		

Title	**Nuclear Physics and Applications.**		
Code	**4PHY312**	**Department**	**Physics**
Prerequisites	4PHY111, 4PHY112 4PHY212	Co-requisites	None
Aim	This module is designed to introduce students to the concepts of and theories applicable to nuclear physics and its applications		
Content	● Nuclear physics ● Molecules: The hydrogen molecule ion. Electronic configuration of some diatomic molecules. Polyatomic molecules. Molecular rotations and vibration. Electronic transitions.		

	● Nuclear Structure: Nuclear properties, electric multiple moments. Nuclear forces. Scattering. Nuclear models. The sell-model. The semi-empirical mass formula. The collective model. ● Nuclear processes: Laws of radioactive series decay. Alpha decay and barrier transmission. ● Beta decay and neutrino hypothesis. Gamma decay. Mean lifetime of a state. Electromagnetic multiple radiation and lifetimes. ● Cosmic radiation. ● Elementary particles: Classes and properties. Quantum numbers and conservation laws. ● Applications of nuclear physics ● Radiation physics and its applications. Nuclear energy and its generation. ● Effect of radiation on biological materials..
Outcomes	▪ An understanding of concepts and theories of nuclear physics. ▪ Understanding different nuclear models and arguments used to develop them. ▪ An understanding of laws governing radioactive decay. ▪ Understanding principles of nuclear power generation ▪ Understanding nuclear radiation, use and shielding
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

Title	**Solid State Physics and Materials Science**		
Code	**4PHY322**	**Department**	**Physics**
Prerequisites	4PHY211 4PHY212	Co-requisites	
Aim	This module is designed to introduce students to the concepts of and theories applicable to solid state physics and materials science.		
Content	● Solid state physics ● Introduction to solid state physics, XRD, crystallography, energy bands in solids, semiconductors, metals, one dimensional system. ● Materials science ● Types of atomic bonds; crystalline structure , X-ray diffraction, crystal defects, phase diagrams and microstructural development, kinetics of phase transformation, metals and their mechanical properties, ceramics and glasses, polymers and composites, electrical properties of materials, semiconductors, magnetic materials, degradation and failure of materials, materials processing and selection.		
Outcomes	▪ An understanding of types of bonds and how these lead to different properties. ▪ How crystal structure is determined using XRD. ▪ How to read phase diagrams and use them to predict microstructure. ▪ An appreciation of different properties of matter. ▪ A comprehension of how materials degrade under different environments and how this can be prevented ▪ Ability to process and select materials based on their properties for use in a modern technology.		
Assessment	Continuous assessment 50%, Final 3 hour theory exam 50%		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

Department of Science Access

STAFF

Lecturers

N Morojele-Mathibeli, MSc (Ed) (Southampton)
TE Buthelezi, MSc (UNIZULU)
S Naras, BScHons (UDW)
M Ramulindo, MSc (UNIZULU)
Q Schutte, MSc (UNIZULU)
N Qwabe, MSc (UKZN)
J Du Plessis, MA (NWU)
T Mpanza, MSc (UNIZULU)
MM Mthethwa, MSc (UCT)

Title	**Academic Literacy**		
Code	**4ACL110**	**Department**	**Science Access**
Prerequisites	None	Co-requisites	None
Aim	This module aims to develop the communicative skills necessary to function within the realm of academia. As the value of scientific research is seated in the effective communication thereof, developing language and communicative competency is of utmost importance for obtaining scientific qualifications and entering the academic community and/or future careers in science. Therefore, the focus is on student interactions with information (finding information, processing information, and producing information).		
Content	**Finding information** • Sources of information • Online searches • Library system searches • Basic research and reading strategies **Processing information** • Finding definitions for deciphering jargon • Comprehensive reading of academic texts • Effective note-making and annotation methods • Paraphrasing and quoting **Producing information** • Referencing and the ethical use of information • Integration of sources • Logical argument structure • Academic essay writing • Editing		
Outcomes	**By the end of the module, students need to able to** • Find information of academic quality • Conduct searches online or on library databases • Utilise different types of sources effectively • Systematically gain understanding of academic texts • Make effective notes for research purposes • Accurately paraphrase and/or quote other scholars' work • Integrate information from various different sources in own work • Use referencing system • Use information ethically • Construct a logical argument • Produce an academic essay • Effectively use editing techniques		

	• Incorporate feedback from others into developing drafts
Assessment	100% Continuous Assessment Mark
DP Requirement	100% Continuous Assessment Mark 80% Attendance

Title	**Foundation Biology**		
Code	**4FBL119**	**Department**	**Science Access**
Prerequisites	None	Co-requisites	None
Aim	This module aims to reinforce fundamental principles and concepts in Biology.		
Content	● **Introduction:** What is biology? Why is biology important? Levels of biological organization. ● **Building blocks of life:** Carbohydrates, lipids, proteins and enzymes. ● **Origin of life/Evolution:** Theories of Evolution, Darwin current concepts and evolution of behavior. ● **Cytology:** Cells as basic unit of life. The cell theory. Prokaryotes versus eukaryotes. Animal versus plant cell. Cell components and their functions. Types of transport across the cell membrane. Cells and tissues. ● **Genetics:** DNA and genes, the cell cycle, mitosis, meiosis, what is a gene? Heredity and Mendel's work. ● **Taxonomy:** Binomial Nomenclature, Linnaean Taxonomy. ● **Photosynthesis:** What is photosynthesis? Light dependent reactions. ● **Cellular respiration:** Types of cellular respiration, Aerobic and Anaerobic respiration. ● **Plant water relations:** Theory of water movement, xylem and phloem transport. ● **Homeostasis:** The importance of homeostasis, Regulatory mechanism (negative and positive feedback mechanism), thermoregulation, osmoregulation, sugar homeostasis and plant homeostasis. ● **Ecology:** What is ecology? Density and distribution of population, population parameters, environment and the ecological niche concept, ecological succession, climate and the biosphere. ● **Conservation biology / Environmental awareness:** Biodiversity and natural ecosystems.		
Outcomes	▪ Students will be able to demonstrate both a theoretical and a practical mastery of biology. ▪ Students will demonstrate an in-depth understanding of fundamental biological concepts including cell biology, genetics, evolution and ecology. ▪ To develop critical thinking and problem-solving skills. ▪ Students will be able to effectively communicate scientific ideas in both written and oral formats. ▪ Students will develop practical scientific skills; demonstrate in-depth understanding of the proper use and care of microscopes and other laboratory equipment.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam		
DP Requirement	40% Continuous Assessment Mark 90% Attendance at lectures and practical's		

Title	Foundation Chemistry		
Code	**4FCH119**	**Department**	**Science Access**
Prerequisites	None	Co-requisites	None
Aim	This module aims to reinforce fundamental principles and concepts in chemistry.		
Content	• **Basic Concepts:** Dalton's theory of the atom; elements, compounds and mixtures; sub-atomic particles; atomic number, mass number; isotopes; relative atomic mass; the periodic table. • **Naming of compounds:** Law of definite composition; writing formulae for ionic and molecular compounds; naming ionic and molecular compounds; formula and molecular mass; percentage composition. • **The mole concept:** empirical formula; balancing of chemical equations; mole calculations based on chemical equations; limiting reactants; percentage yield. • **Solutions:** concentration and dilution of solutions. • **Gases:** ideal gases; the ideal gas equation; stoichiometry involving gases; Dalton's Law of Partial Pressures. • **Redox Reactions:** oxidation numbers; oxidising and reducing agents; balancing of redox equations. • **Types of Chemical Reactions:** combination, decomposition, displacement and disproportionation reactions: classification and examples; electrolytes and non-electrolytes. • **Precipitation Reactions:** solubility rules; ionic equations; calculations of amount of precipitate formed. • **Acids and bases:** Bronsted acids and bases; strength of acids and bases; neutralisation reactions; volumetric analysis. • **Equilibrium:** Chemical equilibrium; Le Chatelier's Principle; Equilibrium Constant.		
Outcomes	▪ Understand some of the general principles of chemistry through independent and cooperative learning ▪ Make correct and careful experimental observations and measurements ▪ Report and interpret upon experimental data in written and oral form ▪ Know what a variety of pieces of chemical apparatus are used for and be able to use them safely and correctly when carrying out a laboratory experiment ▪ Perform numerical calculations in chemistry and present the reasoning behind their answer in a clear and accurate way ▪ Read, listen to and follow instructions carefully and correctly		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam		
DP Requirement	40% Continuous Assessment Mark 90% Attendance at lectures and practical's		

Title	Foundation Mathematics		
Code	**4FMH119**	**Department**	**Science Access**
Prerequisites	None	Co-requisites	None
Aim	The aim of this module is to give learners the necessary grounding and reinforce fundamental principles and concepts in mathematics for further study of the subject.		
Content	• Basic Set Theory, Real Numbers and Basic Algebraic Concepts:		

	● The concept of a set and notation, union, intersection, complement, universal set and special sets. The real number system and the number line. Various groups/types of real numbers and their properties in terms of addition, multiplication and rising to a power (and their inverses). Mathematical induction as a property of natural numbers. Arithmetic and algebraic expressions, sum, difference, product, quotient, like and unlike terms, and factorization. Rational numbers (fractions, ratios, proportion, decimal fractions). Substitution and changing the subject of a formula. Concept of rationalization. Exponentials and logarithms. ● Advanced Algebra: ● Equations (linear and quadratic) and inequalities, Cartesian/cross product, relations and functions, curve sketching for linear, quadratic, cubic functions and the rectangular hyperbola. Exponential and logarithmic functions. The concept of absolute value and absolute value functions. Partial fractions. Sequences and series. Application of sequences and series in compound increase and decrease problems. ● Analytical Geometry: ● Fundamental concepts in geometry (point, line segment, straight line etc.). The rectangular system of axes (the Cartesian system of axes). The distance between two points, coordinates of a midpoint of a line segment and slope/gradient of a line. Equations of a straight line, circle, tangents to a circle and perpendicular lines. Determination of intersection of various curves on the Cartesian plane. The locus of a point. ● Trigonometry: ● Definitions of trigonometric ratios. The concept of a negative angle and trigonometric ratios of such angles. Definition of the radian measure. Trigonometric functions and their graphs. Periodicity of the sine, cosine and tangent ratios. The fundamental identity and other identities derived from it. Derivation of compound angle formulae. Ratios of special angles. Trigonometric identities. Trigonometric equations and their general solutions. ● Calculus: ● Concept of a limit at a point and the limit at infinity, rules of limits. The concept of continuity and its definition. Concept of a derivative of a function, its definition and the rules of differentiation. Application of the derivative to determine minima and maxima. Introduction to the concept of integration. Integration and the area under a curve.
Outcomes	▪ Eliminate the lack of understanding and/or misunderstanding of fundamental concepts in basic school mathematics. ▪ Strengthen the general mathematical foundation onto which advanced mathematical concepts can be built. ▪ Close the conceptual gaps between school and university mathematics; thereby helping students to pass through without too much effort. ▪ Kindle interest in mathematics both as a fun subject and a subject with applications in everyday life.
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam
DP Requirement	40% Continuous Assessment Mark 90% Attendance at lectures and tutorials

Title	**Foundation Physics**		
Code	**4FPH 119**	**Department**	**Science Access**
Prerequisites	None	**Co-requisites**	None
Aim	The foundation physics course is a one year long course designed to help students who did not perform very well during their matric but show the potential to succeed at the university. The course focuses more on the relationship between problem solving and conceptual understanding of physics concepts. The mathematical techniques used in the course include algebra, geometry, and trigonometry, but not calculus		
Content	**1st semester** 1.Mathematical Concepts ● Kinematics in One Dimension ● Kinematics in Two Dimension ● Forces and Newton's Laws of Motion ● Uniform Circular Motion ● Work and Energy ● Impulse and Momentum	**2nd semester** ● Simple Harmonic Motion ● Electric Forces and Electric fields ● Electric potential Energy and Capacitance ● Current and Resistance ● Direct Current Circuits ● Kirchhoff Laws	
Outcomes	▪ An ability to compute basic quantities in mechanics and electricity. ▪ An ability to formulate, analyze and solve a multi-level problem in mechanics and electricity. ▪ An ability to incorporate non-ideal elements, such as friction, into computations. ▪ An ability to apply principles of algebra and trigonometry to mechanics and electricity. ▪ An ability to write a laboratory report		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam		
DP Requirement	40% Continuous Assessment Mark 90% Attendance at lectures, practical's and tutorials		

Zoology

Associate Professors	HL Jerling, PhD (UPE)
	L Vivier, MSc (UP), PhD (UNIZULU)
Lecturers	HMM Mzimela, MSc (UNIZULU), SSTD
	SN Mpanza, MSc (UNIZULU)
	NF Masikane, BScHons (UNIZULU), MSc (NMU), PhD (UKZN)
Senior Laboratory Assistants	N Nariensamy-Venkatasalu, BScHons (UNIZULU)
	M Mothwa, BScHons (UL)
Senior Technician	R Seabi, BScHons, (UL)
Administrative Assistant	NFC Mbongwa, (Office Management & Technology) (DUT)
Laboratory Assistants	M Mhlongo
	M Zondo

Title	**Introduction to Zoology I**		
Code	**4ZOL111**	**Department**	**Zoology**
Prerequisites	None	Co-requisites	None
Aim	To provide students with a basic Introduction to General Zoology and Principles of Ecology.		
Content	● Students achieving the objectives of this module will have a fundamental theoretical and practical knowledge of the following aspects of Introduction to Zoology I: ● Origin of Life & Principles of Evolution ● General Taxonomy & Phylogeny ● Background to Procaryotes & Eukaryotes ● Cell structure, function and division ● Mendelian Genetics ● Interactions with the environment ● The growth of populations ● Communities & Ecosystems ● Pollution and Global Warming ● Land degradation & a sustainable world		
Outcomes	Students achieving the objectives of this module will have a fundamental theoretical and practical knowledge of the above aspects of Zoology.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at Practical’s.		

Title	**Introduction to Zoology II**		
Code	**4ZOL112**	**Department**	**Zoology**
Prerequisites	Students must have attended and written the assessments for 4ZOL 111.	Co-requisites	None
Aim	To Continue from 4ZOL111 in presenting an overview of the study of Zoology in the sub disciplines of animal behavior, embryology and anatomy and physiology. To give students background in the above sub disciplines leading to more detailed study in subsequent years.		
Content	● Students achieving the objectives of this module will have a fundamental theoretical and practical knowledge of the following aspects of Introduction to Zoology II: ● Animal behavior ● Embryology ● Introduction to animal anatomy and physiology covering; Structure and function of animal and cell tissue types, Organs and organ systems, Body cover, Homeostasis and Support and movement.		
Outcomes	Students achieving the objectives of this module will have a fundamental theoretical and practical knowledge of the above aspects of Zoology.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at Practical's.		

Title	**Human Anatomy & Physiology I**		
Code	**4ZOL121**	**Department**	**Zoology**
Prerequisites	None	Co-requisites	None
Aim	To provide students with the underlying theory of the different Human Anatomy and Physiology components and processes associated with these topics. To discuss Clinical and Pathological concepts related to these topics. Students should understand and be able to apply the practical aspects of the different Human Anatomy and Physiology topics.		
Content	● Students achieving the objectives of this module will have a fundamental theoretical and practical knowledge of the following aspects of Human Anatomy and Physiology: ● Human anatomy in perspective ● Body tissues and covering ● Anatomy of the human skeleton ● Bone structure and development ● The human muscular system ● Blood composition and function ● The circulatory system ● The cardiovascular system ● Organisation, regulation and integration of the nervous system ● Special senses including; Chemical senses – taste and smell, the Eye and vision and the Ear – hearing and balance.		
Outcomes	Students achieving the objectives of this module will have a fundamental theoretical and practical knowledge of the above aspects of Human Anatomy & Physiology.		
Assessment	50% Continuous Assessment Mark , 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark		

	80% Attendance at Practical's.

Title	**Human Anatomy & Physiology II**		
Code	**4ZOL122**	**Department**	**Zoology**
Prerequisites	None	Co-requisites	None
Aim	To provide students with the underlying theory of the different Human Anatomy and Physiology components and processes associated with these topics. To discuss Clinical and Pathological concepts related to these topics. Students should understand and be able to apply the practical aspects of the different Human Anatomy and Physiology topics.		
Content	● Students achieving the objectives of this module will have a fundamental theoretical and practical knowledge of the following aspects of Human Anatomy and Physiology: ● Respiration ● Digestion and metabolism ● Muscles and movement ● Renal system, homeostasis and osmoregulation ● Lymphatic system ● Immunology and body defense ● Reproduction: the continuation of Life ● Endocrine system		
Outcomes	Students achieving the objectives of this module will have a fundamental theoretical and practical knowledge of the above aspects of Human Anatomy & Physiology.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam (3 hours)		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at Practical's.		

Title	**Animal Anatomy & Physiology**		
Code	**4ZOL211**	**Department**	**Zoology**
Prerequisites	4ZOL111 & 4ZOL112	Co-requisites	None
Aim	This course is designed to introduce students to concepts and theories applicable to components of animal anatomy and physiology.		
Content	Students achieving the objectives of this course will have a fundamental theoretical and practical knowledge of: ● Anatomy and physiology in perspective ● The skin, skeleton and muscular systems ● The digestive system and nutrition ● Internal fluids and the circulatory system ● Homeostasis and excretion ● Lymphatic system and immunity ● The respiratory system ● The nervous system and nerve impulse generation ● Sense organs ● The endocrine system ● Reproduction, development and embryology ● Practical aspects of animal anatomy and physiology ● Introduction to evolution ● Darwin's principles ● 16. Currents concepts and trends in evolution		
Outcomes	Students achieving the objectives of this course will have:		

	1. A comprehensive knowledge and understanding of the anatomical structures and physiological processes associated with the components of animal anatomy and physiology covered in the course. 2. A comprehensive knowledge and understanding of the practical aspects of the anatomical structures and physiological processes covered in the course. 3. A comprehensive knowledge and understanding of the historical and current concepts of evolution. 4. The ability to perform, analyse and interpret and report on practical work covered in the course.
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam
DP Requirement	40% Continuous Assessment Mark 80% Attendance in practical's and fieldwork

Title	**Animal Diversity**		
Code	**4ZOL212**	**Department**	**Zoology**
Prerequisites	4ZOL111 & 4ZOL112	Co-requisites	None
Aim	To present the phylogeny, taxonomy and diversity of invertebrates and vertebrates including theories and evidence pertaining to the origin of major taxonomic groups and the phylogenetic relationships among them.		
Content	Students achieving the objectives of this course will have a fundamental theoretical and practical knowledge of: ● The architectural pattern of an animal. ● Classification and phylogeny of animals. ● The Protozoa, Metazoa and radiate animals. ● The acoelomate and pseudocoelomate animals. ● The protostome coelomate animals including the Phylum Mollusca, Annelida and Arthropoda. ● The deuterostome coelomate animals including the Phylum Echinodermata, Hemichordata and Chordata, including the protochordates, fishes, amphibians, reptiles, birds and mammals. ● Human evolution.		
Outcomes	Students achieving the objectives of this module will: 1. He a broad knowledge of the phylogeny, taxonomy and diversity of animals. 2. Have a practical knowledge of the anatomy, classification and identification of the major animal groups. 3. Be able to continue with the study of any animal or group of animals at post graduate level.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam		
DP Requirement	40% Continuous Assessment Mark 80% Attendance of practical's and fieldwork		

Title	**Animal Ecology I**		
Code	**4ZOL311**	**Department**	**Zoology**
Prerequisites	4ZOL212	Co-requisites	None
Aim	To examine the major principles of animal ecology with specific reference to theoretical and applied aspects of terrestrial and freshwater ecosystems.		
Content	Students achieving the objectives of this course will have a fundamental theoretical and practical knowledge of: ● Levels of ecological organization, ecosystems & the physical environment. ● The biosphere, global climate patterns & world biomes.		

	● Environmental responses & ecological niche. ● Population ecology, reproductive strategies, equilibrium & regulation. ● Community ecology, structure, dominance, richness & succession. ● Availability & distribution of freshwater bodies in SA. ● Natural standing waters and lake succession. ● River hydrology, chemistry, the river continuum concept & functional feeding groups. ● Floodplains, catchments & inter-basin transfer schemes. ● Dams and the change from river to lake. ● 11. Freshwater conservation, management and the Water Act.
Outcomes	Students achieving the objectives of this module will: 1. Understand the underlying theory and practice of terrestrial and freshwater ecology. 2. Have a fundamental knowledge of the types and importance of different terrestrial and freshwater ecosystems in SA. 3. Be able to conduct ecological research including sampling, data collection, analysis, interpretation and presentation.
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam
DP Requirement	40% Continuous Assessment Mark 80% Attendance of practical's and fieldwork

Title	**Ecophysiology and Ecotoxicology**		
Code	**4ZOL 321**	**Department**	**Zoology**
Prerequisites	4ZOL211	Co-requisites	None
Aim	To examine the major physiological adaptations exhibited by animals to their environment and to develop knowledge and understanding of the principles associated with origins, assessment and significance fate and management of environmental pollutants.		
Content	Students achieving the objectives of this course will have a fundamental theoretical and practical knowledge of: ● Ionic and osmotic regulation. ● Osmoregulation in aquatic and terrestrial organisms. ● Heat, energy and metabolism. ● Temperature regulation in animals. ● Basic toxicological concepts and definitions. ● Behavior of toxicants in the environment. ● Uptake of pollutants by organism. ● Mode of transportation and dose-effect relationships. ● 9. Ecological Risk Assessment.		
Outcomes	Students achieving objectives of this course will have basic understanding of how pollutants affect organisms and their habitats and the modifying effects of environmental factors on pollutant toxicity.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam		
DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork		

Title	**Animal Ecology II**		
Code	**4ZOL312**	**Department**	**Zoology**
Prerequisites	4ZOL212	Co-requisites	
Aim	To examine the major principles of animal ecology with specific reference to theoretical and applied aspects of estuarine and marine ecosystems.		

Content	Students achieving the objectives of this module will have a fundamental theoretical and practical knowledge of: ● Classification and physical characteristics of estuaries. ● The estuarine flora & fauna. ● Adaptation to estuarine conditions. ● Case studies of selected South African estuaries. ● The importance and use of estuaries. ● Physical characteristics of the sea. ● Zonation of the sea, tides and ocean currents ● Rocky shore, sandy beach and open ocean ecology. ● The major South African fisheries. ● Fishery resource management. ● 11. An introduction to aquaculture.
Outcomes	Students achieving the objectives of this course will: 1. Understand the underlying theory and practice of estuarine and marine ecology. 2. Have a fundamental knowledge of the types and importance of different estuarine and marine ecosystems in SA. 3. Have a fundamental knowledge of the types and importance of different South Africa fisheries.
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam
DP Requirement	40% Continuous Assessment Mark 80% Attendance of practical's and fieldwork

Title	**Research Design & Application**		
Code	**4ZOL322**	**Department**	**Zoology**
Prerequisites	4ZOL211	Co-requisites	4ZOL311
Aim	This course is designed to introduce students to research planning and design		
Content	Students achieving the objectives of this course will have a fundamental theoretical and practical knowledge of: ● Research Project Design o Philosophy of science o Critical thinking in Science o Research Methodology o Importance of planning a research project o Designing and writing a research proposal o Scientific writing ● Research Project Planning and Application o Literature survey of research project o Writing a research proposal o Research seminar of research project o Implement research methodology o 5. Fieldwork and data collection		
Outcome	Learners achieving the objectives of this course will have: 1. A comprehensive knowledge and understanding of research planning and design. 2. A comprehensive knowledge and understanding of the practical aspects of performing, analyzing and interpreting a research project. 3. A comprehensive knowledge and understanding of scientific reporting. 4. The ability to plan and design a research project and do research seminars.		
Assessment	50% Continuous Assessment Mark 50% Formal end of module exam		

DP Requirement	40% Continuous Assessment Mark 80% Attendance at practical's and fieldwork

The University of Zululand Science Centre

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