UNIVERSITY OF ZULULAND

FACULTY OF SCIENCE, AGRICULTURE AND ENGINEERING

2025

POSTGRADUATE 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 of the University of Zululand. It consists of Fourteen 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
Zoology
Science Access

POSTGRADUATE QUALIFICATIONS

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

The **Rules** and **Departmental Entries** contain outlines of each qualification offered by the Faculty.

Honours Qualifications. The Honours Degree BSc (Hons) or B. Consumer Science (Hons) follows an acceptable first degree. It is a specialised programme of one-year duration for full time students.

Masters Qualifications. Following the BSc Hons Degree one may pursue a Master of Science Degree (MSc). This can be done by following either a research programme of at least one-year duration or, in some instances, by course work and research. In the former, examination is by dissertation while in the latter it is by coursework and dissertation, with coursework contributing a maximum of 50% of the total required credits. The duration of this qualification is a minimum of one year.

Doctoral Qualifications. The Degree of Doctor of Philosophy (PhD) in Science follows a MSc Degree. It is of at least a two-year duration and based on a programme of original research. Examination is by thesis. The duration of this qualification is a minimum of two years.

All the qualifications are accredited by the Council on Higher Education (CHE) and registered with the South African Qualifications Authority (SAQA).

MEANINGS OF TERMS USED

Module	Unit of study. Each such unit is given a code. The code structure is as follows: Faculty indicator (S = Science and Agriculture).
First letter	Department or discipline indicator (BOT = Botany, CHM = Chemistry, etc.).
Next three letters	Year-level (5, 7 or 8) Numeric to distinguish between modules offered in the same year and semester
First number Second and third numbers	(01, 02, 03, etc.). The numeric "00" is used to signify a research dissertation or thesis.
Elective (module)	A module selected from a given list.
Prerequisite module	A module which must be passed before registration of the proposed module is allowed.
Co-requisite module	A module which must be passed prior to or in the same semester as the proposed module.
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.
Senate	The Senate of the University of Zululand.
University	The University of Zululand.

PROCEDURE FOR EXTERNAL MODERATION/EXAMINATION

DEPARTMENTAL REVIEWS

Each department in the Faculty 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 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 Executive Dean of the Faculty with recommendations of how possible weak areas can be corrected. The Executive Dean will implement appropriate action in conjunction after the review in consultation with departmental staff members.

HONOURS QUALIFICATIONS

Honours examination papers and scripts and research reports are sent to the external examiners approved by the board of the faculty.

MASTER'S DISSERTATIONS AND DOCTORAL THESES

The supervisor/promoter must apply well in advance of a student completing, through the head of department, for the external examiner/s to be appointed by the board of the faculty. Once the student has completed the dissertation/thesis and the supervisor/ promoter is satisfied that it can be presented for examination the supervisor gives a letter to the student giving permission for submitting the form indicating intention to submit. The candidate shall at least three months prior to the intended submission of the manuscript for examination, and no later than 30 September of the year preceding the intended graduation ceremony, submit via the supervisor to the HoD a form indicating intention to submit the manuscript for examination together with a description (abstract) in English of the manuscript's contents not exceeding 500 words. The HoD shall in turn submit the form and abstract to the Dean. Finally, the dissertation/theses will be submitted through the dean to the examination office It is then the responsibility of the examinations officer to send out the dissertation/ thesis to the external examiners as was approved by the board of the faculty. The examination's officer receives the examiner's reports back and then approaches the Dean in order to call an examinations committee meeting. Under no circumstances may the examiner's report be made known to anybody before it has served before the examinations committee.

RECOGNITION OF PRIOR LEARNING

CONFERMENT OF EQUIVALENT STATUS

A student who attained a qualification from another institution and wish to register for a higher degree at the University of Zululand must apply for equivalent status for the former degree through the Student Affairs Section. This must be done well in advance, as it needs the recommendation of the Faculty Board as well as approval from the Senate. The University General Calendar gives the dates of these meetings. If a student registers provisionally the registration will be cancelled if the application for conferment of status is not approved.

RECOGNITION OF COURSES PASSED AT OTHER INSTITUTIONS

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. 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.

STUDENT STUDY GUIDES / WORK SCHEDULES/ MODE OF DELIVERY

Every honours student will receive a student guide / work schedule for each module. This may be incorporated in a study guide or it may be distributed as a separate document.

This document will contain at least the following information:

1. Title and code of the module.
2. Brief description of the module.
3. The learning outcomes to be reached in the module.
4. Details of the lecturer / s who present the module.
5. All details of the study material for the module and where it is available.
6. 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.
7. 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.
8. 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.

FACULTY RULES FOR POSTGRADUATE DEGREES

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. 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 therefore replace Faculty Rules which in turn replace General Rules in instances where more stringent requirements are specified.

S1 HONOURS PROGRAMMES

S1.1 DISCIPLINES

The degree may be taken in the following disciplines:

BSc Applied Mathematics (honours)	4HON01
BSc Biochemistry (honours)	4HON02
BSc Biokinetics (honours)	4HON12
BSc Botany (honours)	4HON03
BSc Chemistry (honours)	4HON04
BSc Computer Science (honours)	4HON05
B. Consumer Sciences (honours)	4HON06
BSc Geography (honours)	4HON07
BSc Hydrology (honours)	4HON08
BSc Mathematics (honours)	4HON09
BSc Microbiology (honours)	4HON10
BSc Physics (honours)	4HON11
BSc Statistics (honours)	4HON14
BSc Zoology (honours)	4HON15

S1.2 ADMISSION TO THE DEGREE

(a) All honours programmes offered by the Faculty of Science, Agriculture and Engineering at the start of the academic year. No admittance to the programme will be allowed at any other time.

(b) To qualify for admission to a BSc honours degree programme a student shall possess a BSc undergraduate degree with a major in the subject she/he wishes to enrol for or have the approval of Senate for conferment of status equivalent to such a degree.

(c) To qualify for admission to the B.Consumer Sciences honours degree programme a student shall possess a B.Consumer Sciences or a B Home Economics undergraduate degree, or have the approval of Senate for conferment of status equivalent to such a degree

(d) To qualify for admission a to the BSc honours degree programme in Agriculture a student shall possess a four-year BSc degree which must be in a discipline of Agricultural Sciences appropriate to the selected curriculum, or have the approval of Senate for conferment of status equivalent to such a degree

(e) To qualify for admission to the BSc Biokinetics honours degree programme a student shall possess a BSc, BA or equivalent degree in Human Movement

Science, or have the approval of Senate for conferment of status equivalent to such a degree

(f) To be admitted to an Honours degree programme a student shall have passed the final-year modules of the major subject that leads to the honours degree with an average final mark of at least 60%.

(g) If the average mark for the final-year modules of the major subject that leads to the honours degree is less than 60% then admission shall be subject to the approval of the Faculty Board. Before the end of January, applicants must submit to the Head of Department concerned, a full written motivation that details relevant work experience since the award of the bachelors' degree as well as any other information in support of their admittance to the degree. This motivation must be endorsed by the Head of Department before it serves at the Faculty Board.

S1.3 DURATION OF THE DEGREE

(a) Full-time students may complete the degree in a minimum period of one year.

(b) Students may complete the degree over a maximum period of two years.

(c) The total duration of the degree shall not exceed one year beyond the minimum period.

S1.4 CURRICULUM

(a) Unless specified to the contrary in the Departmental rules, the honours degree will consist of four semester-length 20 credit theory modules and one compulsory year-length 40 credit research module.

(b) Compulsory modules and rules of combination for theory modules comprising honours degrees are outlined in departmental rules.

(c) It may be possible for a student to replace one module offered by the department hosting the degree with a module from another department. Students must refer to departmental rules and consult with their Head of Department if they wish to do this. Registration for a module from outside of their department is contingent on the student satisfying the prerequisites for the module and on the approval of both Heads of department.

(d) Students who do not have the necessary grounding in certain skills may be required to register for and pass specific undergraduate modules in addition to the prescribed curriculum.

(e) All theory modules are offered subject to the availability of staff and resources required to offer the modules. Students must consult with the Head of Department to determine which modules will be offered in any year.

S1.5 ASSESSMENT

(a) Each theory module comprises a continuous assessment component and a final examination.

(b) The final mark for a theory module is derived from the mark for the continuous assessment and the mark for the final examination. The continuous assessment mark may not comprise more than 50% of the final mark.

(c) A final mark of below 50% constitutes a fail.

(d) The General Rules that relate to the classification of a module (distinction, merit) apply.

(e) Each of the theory modules has a final examination of three-hours in length that is held immediately after the end of the semester in which it is taught.

(f) The research project module is assessed through the examination of a final mini-dissertation/report that must be submitted by the end of semester two. The assessment may also include components such as an oral presentation of the research and seminar presentations as outlined in departmental rules.

(g) No supplementary examinations are held for honours modules.

S1.6 CALCULATION OF THE FINAL MARK FOR THE DEGREE

(a) The marks for each of the four theory modules will carry a weight equivalent to their credit value. In total the theory modules will form two-thirds (⅔) of the final mark. The mark for the research project will form one-third (⅓) of the final mark.

(b) In order to obtain the degree, a student shall pass all of the theory modules and the research project, each with a final mark of at least 50%.

(c) The General Rules that relate to the classification of a degree (distinction, merit) apply.

(d) Modules that are failed may be repeated and passed within a period of one year after the module is first failed in order to retain credit for the passed modules. If the failed module(s) are not compulsory, then a substitute module(s) must be passed within a period of one year in order to retain credit for the passed modules. If after the period of one year, all components have not been passed then the honours programme must be repeated in its entirety.

(e) Substitute modules referred to in S25(d) must be honours level modules and the Head of Department must approve the substitution. If a substitute is selected from another department then the substitution must also be approved by the Head of the Department that offers the module.

S1.7 ATTAINMENT AND CONFERMENT OF DEGREE

(a) The qualification must be completed in no more than one year 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 as outlined in these rules and in Departmental rules, will be deemed to have completed the degree.

(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.

S2 MASTERS PROGRAMMES

S2.1 DISCIPLINES

The degree may be taken in the following disciplines:

M.Sc in Applied Mathematics	4MSC01
M.Sc in Biochemistry	4MSC02
M.Sc in Botany	4MSC03
M.Sc in Chemistry	4MSC04
M.Sc in Computer Science	4MSC05

M.Cons Sci	4MSC21
M.Sc in Geography	4MSC07
M.Sc in Hydrology	4MSC08
M.Sc in Microbiology	4MSC10
M.Sc in Physics	4MSC11
M.Sc in Human Movement Science	4MSC12
M.Sc in Zoology	4MSC15
M.Sc in Agriculture (Animal Science)	4MSC16
M.Sc in Agriculture (Agribusiness and Management)	4MSC17
M.Sc in Agriculture (Plant Science)	4MSC18
M.Nursing	4MCR20

S2.2 ADMISSION TO THE DEGREE

(a) To be admitted to the MSc or MN (Nursing) degree programme a student shall have passed the Nursing Honours or BN (Nursing) or equivalent NQF Level 8 programme with an average final mark of at least 60%. If the average mark for the Nursing Honours or BN (Nursing) degree is less than 60% then admission shall be subject to the approval of the Faculty Board. Applicants must submit to the Head of the relevant Department a full written motivation that details relevant work experience since the award of the Nursing Honours degree, as well as any other information in support of their admittance to the degree. This motivation must be endorsed by the Head of Department before it serves at the Faculty Board.

(b) While admission into any postgraduate programme is determined by the relevant rules and policies, admission into postgraduate study at the research Master's and Doctoral level is significantly influenced by the processes of pre-definition and work prior to formal application.

(c) All candidates must first discuss their intended topic informally with the HOD and prospective supervisor. If the HOD holds a preliminary view that the candidate meets the minimum academic requirements for admission and has the necessary academic maturity to enrol for the degree, that the proposed topic is suitable, and that supervision capacity and other resources exist in the Department, the HOD will request the candidate to submit a statement of intent.

A statement of intent is not a research proposal but rather a preliminary document that assists the HOD in determining whether a candidate and the proposed research topic are suitable and whether the candidate can proceed to the proposal writing stage. It provides a brief background and contextualization of the intended study as well as some evidence that the candidate has knowledge of research methodology at the appropriate level.

A statement of intent shall contain:

(a) A preliminary title
(b) The field of study
(c) The purpose of and rationale for the study
(d) An indication of the preliminary work that has been done to determine the suitability of the proposed topic for further in-depth research
(e) Broad time frames for the research

(f) Reasons why the candidate is suitable for conducting the type of research proposed
(g) Any other information that the candidate considers relevant in determining whether the intended research should proceed.

On receipt of the candidate's statement of intent, the HOD shall refer the statement to prospective supervisor(s) with a view to determining whether:

(a) Suitable supervision capacity exists in terms of expertise and experience
(b) Potential supervisors are willing and able to accommodate the supervision within their current workloads and in compliance with institutional policy
(c) The nature and extent of the proposed research render the topic suitable for research towards the proposed postgraduate degree
(d) The candidate has the necessary motivation and academic background and/or experience in the field of study to undertake the proposed research.

To assist in the decision, an HOD may, where appropriate, request a candidate to present the letter of intent to a departmental meeting or seminar.

The HOD shall approve the statement of intent only if the criteria mentioned above have been met. In appropriate circumstances, where the failure to meet the criteria is not material, the HOD may request that the statement of intent be reworked and resubmitted.

S2.3 DURATION OF THE DEGREE

(a) Full-time students may complete the degree in a minimum period of one year.

(b) Students may complete the degree over a maximum period of two years.

(c) The total duration of the degree shall not exceed two years beyond the minimum period.

S2.3 CURRICULUM

(a) Unless specified to the contrary in the Departmental rules, the Master degree will consist of a research dissertation.

(b) Students who do not have the necessary grounding in certain skills may be required to register for and pass specific modules in addition to the prescribed curriculum.

(c) The degree is offered subject to:
(i) the availability of staff with expertise relevant to the chosen research topic.
(ii) the availability of resources required to conduct the research.

S2.4 PROPOSAL SUBMISSION AND PROGRESS

(a) A research proposal must be compiled according to the following guidelines and this must be finalised within six months of registration for the first time:

Step 1. The student prepares a research proposal, as per the post-graduate proposal guidelines, with guidance from the supervisor.

Step 2. The proposal is presented to the relevant Department through a proposal seminar.

Step 3. After the recommended corrections, the proposal is sent for review through the faculty research committee representative. Based on the two reviewers' recommendations, corrections are made to the satisfaction of the supervisor.

Step 4. Once corrections are finalized, the supervisor or HoD make arrangements via the dean's office for the presentation of the proposal to a faculty panel, consisting of representatives from relevant departments and chaired by the dean/deputy dean or a nominated senior academic. An electronic copy of the proposal is sent out to the faculty in good time. The student presents the proposal orally in 15-20 minutes, after which the panel has the opportunity to ask questions and make suggestions. The panel must pay particular attention to the research methodology and the ability of the student to complete the research. The title is also discussed and finalised. The student leaves and the panel formally decide to approve / approve with changes / disapprove the proposal.

Step 6. Once corrections are made according to the faculty panel's recommendations, the proposal is then sent to the Faculty Research Ethics Committee for provisional ethical clearance. The documents submitted electronically to the ethics committee representative must include the proposal, a plagiarism report and where applicable, all research and survey instruments (informed consent form, questionnaires, interview schedule, permission letters to conduct the research, permit).

Step 7. The HoD formally applies for the approval of the dissertation title and the project proposal to the Faculty Board. The following information must be supplied:

1. A cover letter from the HoD providing the following:
    a) Student's name and student number.
    b) The title of the dissertation.
    c) The names of supervisors and co-supervisors. If these are not University of Zululand employees, then CV's must be attached.
    d) The names and designations of faculty panel members.
    e) A statement that the panel has found the proposal worthy for a MSc or PhD study.
    f) The date of the proposal presentation.
2. Registration of the proposal form (HDC01).
3. Appointment of Supervisor and Co-supervisor form (HDC03).
4. Faculty checklist with all relevant signatures.
5. The Faculty Research Ethics Committee's recommendation letter for provisional ethical clearance.
6. Memorandum of Understanding (MOU) (must be signed).
7. Research proposal (signed)

(b) In the event of the project proposal not being finalised within six months of registration, the student and the supervisor must meet with the Dean to discuss the reasons for the delay and to determine what action may be needed.

(c) The student will, after each semester, submit a progress report on the prescribed form to their Head of department. This report should outline the research conducted during in the preceding six months, highlight difficulties and problems encountered, and indicate whether the research is on schedule. The report will be submitted to the Dean.

(d) In the event of no progress report being submitted or if the progress report does not reflect satisfactory progress, the student and the supervisor must meet with the Dean to discuss the reasons for the delay and to determine what action may be needed.

S2.5 ASSESSMENT

(a) The dissertation will not be sent to the examiners unless the following are received at the office of the Dean or Deputy Dean Research:
- (i) A report written by the supervisor(s) that outlines relevant information concerning the research project that the examiners should be aware of.
- (ii) A letter confirming that the dissertation has been edited for the use of English
- (iii) A summary report from a recognised plagiarism detection service which confirms that the dissertation contains no plagiarised material

(b) The Masters dissertation will be examined by at least two external examiners from different Universities.

(c) The final mark for the Master degree will be recommended to the Faculty Board by an examinations committee. At least one of the supervisors must attend the examinations committee.

(d) The examinations committee may recommend one of the following outcomes:
- (i) The dissertation is accepted without changes.
- (ii) The dissertation is accepted subject to minor corrections being completed to the satisfaction of the supervisor(s).
- (iii) The dissertation is referred back to the student for more extensive revision and when this has occurred, the dissertation will be resubmitted for examination and the examinations committee will reconvene when the examiners reports have been received.
- (iv) The dissertation is failed.

(e) If rules S35 (d) (i), S35 (d) (ii) or S35 (d) (iv) apply, the final mark will be based on the recommendations of the examiners.

(f) If rule S35 (d) (iii) applies and the revised dissertation is passed, the dissertation will be awarded a final mark of 50%. If the revised dissertation is failed, then the final mark will be based on the recommendations of the examiners.

(g) A final mark of below 50% constitutes a fail.

(h) The General Rules that relate to the classification of the degree (distinction, merit) apply.

S2.6 ATTAINMENT AND CONFERMENT OF DEGREE

(a) The 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) The degree will not be awarded unless the following have been received by the examinations section:
- (i) Sufficient professionally bound copies of the dissertation such that two will be retained by the University and one will be provided to each examiner of the dissertation. In addition, the University of Zululand library requires an electronic version of the dissertation saved on a CD/DVD in a suitable format.
- (ii) A letter signed by the supervisor, endorsed by the HoD and the Dean that states that all corrections and/or revisions requested by the examiners have been attended to.

(c) Students who have satisfied all of the academic requirements of the degree as outlined in these rules and in Departmental rules, will be deemed to have completed the degree.

(d) 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.

S3 DOCTORAL PROGRAMMES

S3.1 DISCIPLINES

The degree may be taken in the following disciplines:

Ph.D in Biochemistry	4PHD02
Ph.D in Botany	4PHD03
Ph.D in Chemistry	4PHD04
Ph.D in Computer Science	4PHD05
Ph.D in Geography	4PHD07
Ph.D in Hydrology	4PHD08
Ph.D in Mathematics	4PHD09
Ph.D in Microbiology	4PHD10
Ph.D in Physics	4PHD11
Ph.D in Human Movement Science	4PHD12
Ph.D in Zoology	4PHD15
D.Agric (Animal Science)	4PHD16
D.Agric (Agribusiness and Management)	4PHD17
D.Agric (Plant Science)	4PHD18
D.Nurs	4DPH20

S3.2 ADMISSION TO THE DEGREE

(a) To qualify for admission to a Doctoral degree programme a student shall possess a Master's degree in the subject she/he wishes to enrol for or have the approval of Senate for conferment of status equivalent to such a degree.

(b) To be admitted to the Doctoral degree programme a student shall have passed the Master's degree with an average final mark of at least 60%. If the average mark for the Master`s degree is less than 60% then admission shall be subject to the approval of the Faculty Board. Applicants must submit to the Head of the relevant Department a full written motivation that details relevant work experience since the award of the Master`s degree as well as any other information in support of their admittance to the degree. This motivation must be endorsed by the Head of Department before it serves at the Faculty Board.

S3.3 DURATION OF THE DEGREE

(a) Full-time students may complete the degree in a minimum period of two years.

(b) Students may complete the degree over a maximum period of three years.

(c) The total duration of the degree shall not exceed two years beyond the minimum period.

S3.4 CURRICULUM

(a) The Doctoral degree will consist of a research thesis.

(b) Students who do not have the necessary grounding in certain skills may be required to register for and pass specific modules in addition to the prescribed curriculum.

(c) The degree is offered subject to:
- (i) the availability of staff with expertise relevant to the chosen research topic and
- (ii) the availability of resources required to conduct the research.

S3.5 PROPOSAL SUBMISSION AND PROGRESS

(a) A research proposal must be compiled according to the guidelines, following the same processes and procedures as stipulated for MSc proposals under S34(a). Proposals must be finalised within eight months of registration for the first time.

(b) In the event of the project proposal not being finalised within eight months of registration, the student and the promoter must meet with the Dean to discuss the reasons for the delay and to determine what action may be needed to take place

(c) The student will, after each semester, submit a progress report on the prescribed form to their HoD. This report should outline the research

conducted during in the preceding six months, highlight difficulties and problems encountered, and indicate whether the research is on schedule. The report will be submitted to the Dean.

(d) In the event of no progress report being submitted or if the progress report does not reflect satisfactory progress, the student and the promoter must meet with the Dean to discuss the reasons for the delay and to determine what action may be needed to take place

S3.6 ASSESSMENT

(a) The thesis will not be sent to the examiners unless the following are received at the office of the Executive dean:
- (i) A report written by the promoter(s) that outlines relevant information concerning the research project that the examiners should be aware of.
- (ii) A letter confirming that the thesis has been edited for the use of English
- (iii) A summary report from a recognised plagiarism detection service which confirms that the thesis contains no plagiarised material

(b) The Doctoral thesis will be examined by at least three external examiners. Two of the examiners are based at institutions outside of the borders of South Africa.

(c) The outcome of the Doctoral degree will be recommended to the Faculty Board by an examinations committee. At least one of the promoters must attend the examinations committee.

(d) The examinations committee may recommend one of the following outcomes:
- (i) The thesis is accepted without changes
- (ii) The thesis is accepted subject to minor corrections being completed to the satisfaction of the promoter(s)
- (iii) The thesis is referred back to the student for more extensive revision and when this has occurred, the thesis will be resubmitted for examination and the examinations committee will reconvene when the examiners reports have been received
- (iv) The thesis is failed

(b) A doctoral thesis will only be classified as a pass or as a fail. No final mark is awarded.

S3.7 ATTAINMENT AND CONFERMENT OF DEGREE

(a) The 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) The degree will not be awarded unless the following have been received by the examinations section:
- (i) Sufficient professionally bound copies of the thesis such that two will be retained by the University and one will be provided to each examiner of the thesis. In addition, the University of Zululand library

requires an electronic version of the thesis saved on a CD/DVD in a suitable format.

(ii) A letter signed by the promoter, endorsed by the head of department and the Executive Dean that states that all corrections and/or revisions requested by the examiners have been attended to.

(c) Students who have satisfied all of the academic requirements of the degree as outlined in these rules and in Departmental rules, will be deemed to have completed the degree.

(d) Examination results and confirmation for graduation will be approved by SENEX.

(e) 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.

FSAE ROADMAP FOR REGISTRATION OF MSC/PHD STUDY

PROPOSAL WRITING

Student writes proposal under guidance of supervisor, as per proposal guide.

DEPARTMENTAL REVIEW

Supervisor submits proposal for scientific review (email Deputy Dean Prof. I Moyo – MoyoI@unizulu.ac.za)

(Attach names and contact emails of two (2) reviewers in the relevant field of study: UZ or external)

Proposal is sent out to two (2) reviewers (allow two (2) weeks)

After the review, the student amends the proposal, to the satisfaction of supervisor

PRESENTATION

Supervisor arranges with HOD for student to present the proposal to the Department consisting of all academics and representatives of cognate disciplines/departments.

Students presents to the Department. Proposal is amended following recommendations of Department review panel.

ETHICS REVIEW

Supervisor submits proposal, with completed Ethics Application form and supporting documentation (Informed Consent forms, questionnaire, permission letter, etc.) to the Faculty Research Ethics Subcommittee Chairs (Prof E Madoroba: Biological Science; Dr GJ Breukelman: Social/Human Science); Prof V Pullabhotla: Chemistry/Physical Science) and copy the Chairperson Prof I Moyo MoyoI@unizulu.ac.za

COMMITTEE PROCESS

Faculty Board: Supervisor submits proposal, together with all supporting documentation (HOD cover letter, HDC02, HDC03, signed checklist, MOU, reviews and ethics application form) to the Faculty Manager for inclusion in the Faculty Board agenda

Higher Degrees committee

UZ Research Ethics Committee (once approved, the UZ ethics certificate is issued and the study may be initiated).

LIST OF HONOURS MODULES OFFERED BY THE FACULTY (ALL NQF 8)		
Biochemistry and Microbiology	4BCH501	Advanced Biotechnology
	4BCH502	Techniques in Molecular Biology
	4BCH503	Advanced General Biochemistry
	4BCH504	Clinical Biochemistry
	4BCH509	Research Project
	4MCB501	Advanced Biotechnology
	4MCB502	Techniques in Molecular Biology
	4MCB505	Environmental and Industrial Microbiology
	4MCB509	Research Project
Human Movement Science	4BSS501	Health Promotion
	4BSS502	Exercise Physiology
	4BSS503	Biomechanics and Human Motor Behaviour
	4BSS504	Professional Internship
	4BSS505	Management of Orthopaedic Injuries and Conditions
	4BSS506	Management of Chronic Diseases and Disabilities
	4BSS507	Adapted Physical Activity
	4BSS508	Testing and Measurement
	4BSS509	Research Methodology and Project
Botany	4BOT501	Ecology and Conservation
	4BOT502	Aquatic Botany
	4BOT503	Secondary Plant Metabolites
	4BOT504	Ecophysiology
	4BOT505	General Botany
	4BOT506	Economic Botany
	4BOT507	Ethnobotany
	4BOT509	Research Project
Chemistry	4CHM501	Analytical Chemistry
	4CHM502	Inorganic Chemistry
	4CHM503	Organic Chemistry
	4CHM504	Physical Chemistry
	4CHM509	Research Project
Computer Science	4CPS501	Advanced Software and Distributed-Computing Techniques

	4CPS502	Advanced Distributed Database Techniques and Applications
	4CPS503	Compilation Techniques and Security for WS and SOA
	4CPS504	Wireless Networks with special focus on ad hoc networks and their Simulations
	4CPS505	Advanced Database Techniques and Security for WS and SOA
	4CPS506	Software Defined Networking Theory and Application
	4CPS509	Research Project
Consumer Sciences	4CNS501	Non-formal Education and Extension
	4CNS502	Family studies and Household Resource Management
	4CNS503	Clothing
	4CNS504	Housing and Interior Design
	4CNS505	Community Nutrition
	4CNS506	Food
	4CNS507	Advanced Nutrition
	4CNS508	Research Methods
	4CNS509	Research Project and Oral
Geography	4GES501	History, Philosophy and Methodology of Geography
	4GES502	Applied Climatology
	4GES503	Environmental Management
	4GES504	Geomorphology
	1GES505	Urban Geography
	1GES506	Rural Geography
	4GES509	Research Project
Hydrology	4HYD501	Soil Hydrology
	4HYD502	Groundwater Studies
	4HYD503	Hydrological Modelling
	4HYD504	Water Resources Management
	4HYD505	Hydroinformatics
	4HYD506	Disaster Management
	4HYD509	Research Project
Mathematical Sciences	4MTH501	Measure Theory
	4MTH502	Algebra
	4MTH503	Differential Equations
	4MTH504	Numerical Analysis

	4MTH505	Topology
	4MTH506	Functional Analysis
	4MTH509	Research Project
	4AMT501	General Relativity
	4AMT502	Relatavistic Cosmology
	4AMT503	Differential Geometry
	4AMT504	Numerical Analysis
	4AMT505	Continuum Mechanics
	4AMT506	Optimisation
	4AMT509	Research Project
	4STT501	Queueing Theory
	4STT502	Time Series Analysis
	4STT503	Categorical Data Analysis
	4STT504	Linear Programming
	4STT505	Econometrics
	4STT506	Special Topic
	4STT509	Research Project
	4STT501	Categorical Data Analysis
	4STT502	Time Series Analysis
	4STT503	Multivariate Analysis
	4STT504	Correspondence Analysis and Biplots
	4STT505	Stochastic Processes
	4STT506	Probability Theory
	4STT509	Research Project
Physics	4PHY501	Mathematical Methods of Physics
	4PHY502	Advanced Quantum Mechanics
	4PHY503	Nuclear Physics, Radioactivity and Applications
	4PHY504	Solid State Physics and Applications
	4PHY505	Advanced Electrodynamics
	4PHY506	Advanced Statistical Mechanics
	4PHY507	Electronics and Applications
	4PHY509	Research Project
Zoology	4ZOL501	Population Dynamics and Aquatic Production
	4ZOL502	Advanced Freshwater Ecology
	4ZOL503	Advanced Estuarine Ecology
	4ZOL504	Ecophysiology
	4ZOL509	Project Design & Implementation

Department of Agriculture

STAFF

Professor	GE Zharare, BScHons (Crop Science) (University of Zimbabwe), MSc Crop (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) (Agricultural 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)
	F Thabethe BSc (Agriculture - Animal Science) (UNIZULU), MSc (Agriculture - Animal Science), PhD (Agriculture - Animal Science) (UKZN)
	P Jiba, BSc (Agriculture) (Agricultural Economics), BSc Agriculture (Agricultural Economics Hons), MSc (Agriculture) (Agriculture Economics), (UFH), PhD Agriculture (Agricultural Economics) (NWU)
	MM Selepe, BSc (Agriculture) (Animal Science), MSc (Agriculture) (Animal Science) (UNIZULU)
	Y Nontu, BSc (Agriculture) (Agricultural Economics) (Hons), MSc (Agriculture) (Agriculture Economics), (UFH)
	SJ Mnembe, BSc (Environmental Science), BSc Hons (Soil Science), MSc (Soil Science) (UKZN)
	LG Buthelezi, BSc (Agriculture) (Agronomy); MSc (Botany) (UNIZULU) ; PhD 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)
Laboratory Assistants	RS Hlophe, BScHons (Biochemistry) MSc (Agriculture) (UNIZULU)
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

MSc (Agriculture) [QUALIFICATION CODES: 4MSC16, 4MSC17, 4MSC18]

The General rules and the Faculty rules pertaining to Masters study apply

Curriculum
A candidate shall propose, conduct and report on a research project in the module relevant to one of the following options:

Animal Science [4MSC16]
4AAS700 Animal Science

Agribusiness and Management [4MSC17]
4AAE700 Agribusiness

Plant Science [4MSC18]
4AAG700 Plant Science

D.Agric (Agriculture) [QUALIFICATION CODES: 4PHD16, 4PHD17, 4PHD18]

The General rules and the Faculty rules pertaining to Doctoral study apply

Curriculum
A candidate shall propose, conduct and report on a research project in the module relevant to one of the following options:

Animal Science [4PHD16]
4AAS800 Animal Science
Plant Science [4PHD17]
4AAG800 Agribusiness

Agribusiness and Management [4PHD18]
4AAE800 Plant Science

Department of Biochemistry and Microbiology

STAFF

Professor	SP Songca, PhD (Organic Chemistry) (Queen Mary University of London) K Syed, PhD (Biochemistry) (Sri Krishnadevaraya University, India) E Madoroba, PhD (Microbiology) (UP)
Lecturers	J Shandu, BScHons, MSc (UNIZULU) MS Goqo-Mathenjwa, PhD Biochemistry (UZ) Dr N Hlengwa, PhD, (Biochemistry) (UNIZULU) HP Mbongwa, PhD, (Biochemistry) (NW) ZG Ntombela, PhD (Microbiology) (UNIZULU)
Senior Laboratory Assistants (UNIZULU)	TG Dube, BSc (Hydrology & Microbiology) SF Ndulini, MSc Microbiology (UZ)
Laboratory Assistants	RD Mthembu

BSc (Hons) (Biochemistry) [QUALIFICATION CODE 4HON02]

Admission Requirements
A BSc degree in Biochemistry.

Curriculum/Examination

Theory Modules

4BCH501	Advanced Biotechnology
4BCH502	Techniques in Molecular Biology
4BCH503	Advanced General Biochemistry
4BCH504	Clinical Biochemistry

4BCH501 and 4BCH502 are compulsory. A student may take any two of 4BC503, 4BC504, or any other one honours level module in a related discipline approved by the Head of Department of Biochemistry and Microbiology. Each of the theory modules is examined with a three-hour paper.

Research Module

4BCH509	Seminar and Research Project

This module is compulsory and students must undertake a research project and compile a seminar on a topic approved by the Department of Biochemistry and Microbiology. The student will be orally examined on his / her project report.

Remarks

This is a one-year qualification for full-time students with the emphasis on techniques and the application thereof in biochemical research. The seminar must be completed, typed and handed in before the end of the first semester in the case of full-time students. The project extends over one semester in the case of full-time students. A typed report on the project must be handed in and presented orally before the oral examination. Final Mark: Each of the theory modules presented contributes 1/6 of the final mark and the research project contributes 1/3 of the final mark.

MSc (Biochemistry) [QUALIFICATION CODE 4MSC02, MODULE CODE 4BCH700]

Admission requirements
An Honours Bachelor's degree in Biochemistry or equivalent qualification subject to the approval of the Department of Biochemistry and Microbiology and the Faculty Board of Science and Agriculture.
Final admission to the degree shall be subject to the approval by the Faculty Board of Science and Agriculture on the recommendation of the Department of Biochemistry and Microbiology.

Duration of Degree
A minimum registration period of at least 1 year full-time after obtaining the BSc Honours degree in Biochemistry.

Curriculum / Examination
The presentation of a dissertation on a research project chosen to satisfy the objectives of the Department of Biochemistry and Microbiology as well as the Faculty Board of Science and Agriculture.
The presentation of at least one seminar on an approved topic.
Additional courses or advanced lectures on current topics which may be prescribed by the Department Biochemistry and Microbiology in special circumstances.
The preparation of at least one article on the dissertation for publication in a recognised journal.

PhD (Biochemistry) [QUALIFICATION CODE 4PHD02, MODULE CODE 4BCH800]

Admission requirements
A Master's degree in Biochemistry or equivalent qualification subject to the approval of the Department of Biochemistry and Microbiology.

Duration of Degree
A minimum of at least 2 years after obtaining the MSc degree in Biochemistry.

Curriculum / Examination
When deemed necessary by the Department, formal lectures may be offered on topics of current interest in Biochemistry, or additional courses in this or any other in the Department Biochemistry and Microbiology may be prescribed and the candidate examined, accordingly.

The presentation of a thesis on a research project chosen to satisfy the objectives of the Department of Biochemistry and Microbiology as well as the Faculty Board of Science and Agriculture.
The presentation of at least two articles on the thesis for publication in a recognised journal.
The formulation of an original research project presented in the form of a seminar. The proposition may deal with any topic not investigated experimentally in the thesis, but which nevertheless relates to a registered research project in the Department of Biochemistry and Microbiology.

BSc (Hons) (Microbiology) [QUALIFICATION CODE 4HON10]
Admission requirements
A BSc degree in Microbiology.

Curriculum

Theory modules

4MCB501	Advanced Biotechnology
4MCB502	Techniques in Molecular Biology
4MCB504	Clinical Microbiology
4MCB505	Environmental and Industrial Microbiology
4BCH509	Seminar and Research Project

4MCB501 and 4MCB502, are compulsory. A student may take any two of 4MCB504, 4MCB505, or any other one honours level module in a related discipline approved by the Head of department. Each of the theory modules is examined with a three-hour paper.

Research module

4MCB509	Seminar and Research Project

This module is compulsory and students must undertake a research project and compile a seminar on a topic approved by the Department of Biochemistry and Microbiology. The student will be orally examined on his / her project report at SASM South African Society of Microbiology, KZN).

Remarks

This is a one-year qualification for full-time students with the emphasis on techniques and the application thereof in microbiological research. The seminar must be completed, typed and handed in before the end of the first semester in the case of full-time students. The project extends over one semester in the case of full-time students. A typed report on the project must be handed in and presented orally before the oral examination. Final Mark: Each of the theory modules presented contributes 1/6 of the final mark and the research project contributes 1/3of the final mark.

MSc (Microbiology) [QUALIFICATION CODE 4MSC10, MODULE CODE 4MCB700]

Admission requirements
An honours bachelor's degree in Microbiology or equivalent qualification.
Final admission to the degree shall be subject to the approval by the Faculty Board of Science and Agriculture on the recommendation of the Department of Biochemistry and Microbiology.

Duration of Degree
A minimum registration period of at least 1 year full-time after obtaining the BSc Honours Degree in Microbiology.

Curriculum / Examination

The presentation of a dissertation on a research project chosen to satisfy the objectives of the Department of Biochemistry and Microbiology as well as the Board of the Faculty.
The presentation of at least one seminar on an approved topic.
Additional courses or advanced lectures on current topics which may be prescribed by the Department in special circumstances.
The preparation of at least one article on the dissertation for publication in a recognised journal.**PhD (Microbiology) [QUALIFICATION CODE 4PHD10, MODULE CODE 4MCB800]**

Admission requirements
A master's degree in Microbiology or equivalent qualification subject to the approval of Department of Biochemistry and Microbiology.

Duration of Degree
A minimum registration period of 2 years full-time is required after obtaining the MSc degree in Microbiology.

Curriculum / Examination
When deemed necessary by the Department, formal lectures may be offered on topics of current interest in Microbiology, or additional courses in this or any other Department may be prescribed and the candidate examined, accordingly.
The presentation of a thesis on a research project chosen to satisfy the objectives of the Department of Biochemistry and Microbiology as well as the Faculty Board of Science and Agriculture.
The presentation of at least two articles on the thesis for publication in a recognised journal.
The formulation of an original research project presented in the form of a seminar. The proposition may deal with any topic not investigated experimentally in the thesis, but which nevertheless relates to a registered research project of the Department of Biochemistry and Microbiology.

Title	Advanced Biotechnology		
Code	4MCB501/4BCH501	Department	Biochemistry
Prerequisites	None	Co-requisites	None
Aim	This module will cover wide practical applications of biotechnology with an aim of introducing students to applied biotechnological processes. To introduce and provide skills required in establishing and maintaining an industrial bioprocess. To introduce advance aspects of environmental biotechnology and microbial ecology. To expose students to the applications of microbial processes in addressing environmental issues such as environmental sustainability and management.		
Content	Screening and strain improvement technologies. Bioprocess and production technologies. Product recovery and down streaming process. Advances in biotechnology principles and biotechnological applications. Selected topics covering advances, analytical and practical applications in the field of environmental biotechnology. Latest topics in advances and developments in environmental microbiology and microbial ecology. The topics may change year to year and may include sources of pollution and pollution control strategies, microbial responses to stress, aerobic and anaerobic digestion, biofiltration, bioleaching, bioremediation, solid waste wastewater management and control, genetic based methods in microbial ecology, biodiversity, metagenomics, microbial biofilms, microbial interactions with their biotic and abiotic systems.		
Assessment	1X assignment (25%), 2X presentations (25%), 3 hour theory exam (50%)		
DP Requirement	None		

Title	Techniques in Molecular Biology		
Code	4BCH502/4MCB 502	Department	Biochemistry & Microbiology
Prerequisites	None	Co-requisites	None
Aim	This module will cover modern techniques applied in molecular biology. The principles of the techniques will be covered in relation to their practical application in research and industry.		
Content	Microscopy, radiochemistry, fluorescence, centrifugation, spectroscopy, recombinant DNA & cloning, recombinant protein expression and purification, PAGE (protein analysis), PCR, Blotting, techniques in proteomics, Bioinformatics		
Assessment	1X assignment (25%), 2X presentations (25%), 3 hour theory exam (50%)		
DP Requirement	None		

Title	**Advanced General Biochemistry**		
Code	4BCH503	Department	Biochemistry
Prerequisites	None	Co-requisites	None
Aim	This module covers the folded conformation of proteins and how the folding determines the various functions of proteins.		
Content	Conformation of protein: Structure and function relationship of proteins; structural proteins (collagen, keratin, silk, wool), transport proteins (hemoglobin, myoglobin, cytochromes), catalytic proteins (enzymes) Enzyme catalysis: mechanism of enzyme catalysis (General acid/base, covalent). Structure and mechanism of action of selected enzymes. Kinetics of bisubstrate and multisubstrate reactions, control of enzyme reactions, allosterism, isoenzymes, immobilized enzymes Free radicals and anti-oxidants Current topics in Biochemistry		
Assessment			
DP Requirement			

Title	Clinical Microbiology		
Code	4MCB504	Department	Biochemistry/Microbiology
Prerequisites	None	Co-requisites	None
Aim	This module will cover the study the study of pathogenic Microorganisms related to South Africa and epidemiology.		
Content	The study selected pathogenic bacteria, viruses, protozoon and fungi. Diseases, symptoms, treatment and prevention. Detailed study of epidemiology		
Assessment	3 Hour exam paper, 1 X assignment, 1 X presentation		
DP Requirement	None		

Title	**Clinical Biochemistry**		
Code	4BCH504	Department	Biochemistry
Prerequisites	None	Co-requisites	None
Aim	This module deals with the pathophysiology, patho-biochemistry and clinical testing of disease and its application to the diagnosis. It requires the performance of relevant biochemical tests, analysis of body fluids and interpretation of the test results.		
Content	Clinical testing. Disturbances of water, sodium and potassium balance. Acid-base balance. Renal and liver diseases. Disorders of carbohydrate and lipid metabolism. Disorders of iron, porphyrin and purine metabolism. Disorders of the endocrine glands (pituitary and hypothalamus, thyroid gland, adrenal cortex and medulla and the gonads). Locomotor and nervous system diseases, Metabolic aspects of malignant diseases. Inherited metabolic diseases. Therapeutic drug monitoring and chemical toxicology		

Assessment	1X assignment (25%), 2X presentations (25%), 3 hour theory exam (50%)
DP Requirement	None

Title	**Environmental and Industrial Microbiology**		
Code	4MCB505	Department	Biochemistry and Microbiology
Prerequisites	None	Co-requisites	None
Aim	This module discusses the uses of microorganisms in processes that are grouped under the heading of industrial microbiology and environmental microbiology. The use of genetically engineered microorganisms to increase the efficiency of the processes and to produce new or modified products is discussed, as is the integration of biological and chemical processes to achieve a desired objective. The module concludes with discussions of biodegradation, some recent biotechnological applications, and the impact of microbial biotechnology on ecology and human society.		
Content	• Sources of microorganisms for use in industrial microbiology and biotechnology • Genetic manipulation of microorganism to construct strains that better meet the needs of an industrial or biotechnological process • Preservation of microorganisms • Design or manipulation of environments in which desired processes will be carried out • Management of growth characteristics to produce the desired product • Major products or uses of industrial microbiology and biotechnology • The use of microorganisms in manufacturing biosensors, microarrays, and biopesticides • The manipulation of microorganisms in the environment to control biodegradation		
Assessment			
DP Requirement	Completion of all assignments and active participation in all activities of the module.		

Title	**Research Project**		
Code	4BCH509/ 4MCB509	Department	Biochemistry/Microbiology
Prerequisites	BSc Biochemistry or Microbiology	Co-requisites	None
Aim	Application of laboratory methods in designing and conducting independent research. Writing and presenting research project.		
Content	Identification of the area and the topic of the research		

	Literature review relevant to the topic. Refine problem rational Design of the research project and set up of experimental protocols Training and implementing laboratory skills relevant to protocols Preparation for fieldwork. Sampling, data collection, processing of samples Analysis of data. presentation, interpretation and analysis of the results Write up of the research project. Oral presentation of research findings
Assessment	Final research report (written and oral presentation)
DP Requirement	

Department of Botany

STAFF

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

BSc (Hons) (Botany) [QUALIFICATION CODE 4HON03]

Admission Requirements
A BSc degree in Botany, with a final average mark of 60% for the core modules in the 3rd year level of study.

Curriculum
The qualification will be presented in seminar form and a student shall select THREE theory modules in consultation with the Head of the Department. Research Methods (4CNS508) and Research Project (4BOT509) modules are compulsory. Candidates must submit a report of a practical project (4BOT509) done by them. The mark for the research project will form one-third (⅓) of the final mark. Apart from a final average mark of 50%, all the modules of the honours qualification must be passed for the degree to be awarded.

Theory

4BOT501	Ecology and Conservation
4BOT502	Aquatic Botany
4BOT503	Secondary Plant Metabolites (Prerequisite: 4BOT311, 4BOT321)
4BOT504	Ecophysiology
4BOT505	General Botany
4BOT506	Economic Botany
4BOT 507	Ethnobotany
4BOT 509	Research Project

Examination
Four, 3-hour papers on theory (4BT501-507) and 4BOT509 project.

MSc (Botany) [QUALIFICATION CODE 4MSC03, MODULE CODE 4BOT700]

Admission Requirements

An honours degree in Botany or equivalent qualification subject to the approval of the Faculty Board of Science and Agriculture on recommendation of the Department of Botany.

Curriculum
A dissertation on original research carried out under supervision in one or more of the following divisions of botany: anatomy, morphology, ethnobotany, ecology, physiology, taxonomy and microbiology.
A research proposal on the subject of the dissertation is written and presented to the Faculty.
An external examination of the dissertation is required.
The preparation of at least one article on the dissertation for publication in a recognised journal.

PhD (Botany) [QUALIFICATION CODE 4PHD03, MODULE CODE 4BOT800]

Admission Requirements
A Master's degree in Botany or equivalent qualification subject to the approval of the Faculty Board of Science and Agriculture on recommendation of the Department of Botany.

Curriculum
A research proposal on the subject of the dissertation is written and presented to the Faculty.
An external examination of the thesis is required.
The preparation of at least two articles on the thesis for publication in a recognised journal.

Title	**ECOLOGY AND CONSERVATION**		
Code	4BOT501	Department	BOTANY
Prerequisites	4BOT321, 4BOT322	Co-requisites	
Aim	To develop an understanding of the dynamics of and plant communities and plant succession in Maputaland area.		
Content	A study of the plant community and community dynamics; plant communities and plant succession in Zululand; vegetation analysis, with emphasis on the practical application of the different methods of surveying vegetation; a study of environmental factors and their influence on the community; plant geography with particular reference to the vegetation of Maputaland; restoration ecology.		
Assessment	Formative: Continuous assessment, 50% (Assignments) Summative: 3-hour final examination, 50% 50% sub-minimum in all assessments		

DP Requirement	50% Continuous assessment mark

Title	**AQUATIC BOTANY**		
Code	4BOT502	Department	BOTANY
Prerequisites	4BOT321, 4BOT322	Co-requisites	
Aim	To examine environmental influences on periphyton and macrophyte survival in fresh water ecosystems.		
Content	Stress, disturbance and competitive pressures in macrophyte community dynamics; the importance of wetlands in supporting and maintaining freshwater ecosystems; relative efficiency and ecological problems of aquatic plant management; long-term ecosystem monitoring.		
Assessment	Formative: Continuous assessment, 50% (Assignments) Summative: 3-hour final examination, 50% 50% sub-minimum in all assessments		
DP Requirement	50% Continuous assessment mark		

Title	**SECONDARY PLANT METABOLITES**		
Code	4BOT503	Department	BOTANY
Prerequisites	4BOT311, 4BOT321	Co-requisites	
Aim	To develop an understanding of the biosynthesis, occurrence, structure and functions of secondary plant products.		
Content	Occurrence, structure, biosynthesis, catabolism and functions of secondary plant products which act as phytoalexins (isoflavonoids, sesquiterpenes) and non-protein amino acids. The importance of carotenoids in photosynthesis, changes in photosynthesis during leaf development, the biochemistry of herbicide action, biosynthesis and metabolism of ABA, auxin and GA prior to and during leaf yellowing in annual plants.		
Assessment	Formative: Continuous assessment, 50% (Assignments) Summative: 3-hour final examination, 50% 50% sub-minimum in all assessments		
DP Requirement	50% Continuous assessment mark		

Title	**ECOPHYSIOLOGY**		
Code	4BOT504	Department	BOTANY
Prerequisites	4BOT311, 4BOT321	Co-requisites	
Aim	To develop an understanding of water, mineral absorption and various metabolic processes of plants.		

Content	Water economy of plants; photosynthesis; respiration; carbohydrate metabolism; lipid and nitrogen metabolism; vitamins and hormones; photoperiodism; history of botany; principles of statistics as applied to biology.
Assessment	Formative: Continuous assessment, 50% (Assignments) Summative: 3-hour final examination, 50% 50% sub-minimum in all assessments
DP Requirement	50% Continuous assessment mark

Title	**GENERAL BOTANY**		
Code	4BOT505	Department	BOTANY
Prerequisites	4BOT311, 4BOT321 or 4BOT312, 4BOT322	Co-requisites	
Aim	This module is designed to add to the content of the students area of specialization as determined by the research project.		
Content	The content to be studied will be determined according to the selection of modules by the student and the intended direction of specialization. Special fields in Botany like Taxonomy, Genetics, Anatomy, Morphology etc. where expertise exist in the department, can also be covered in this module.		
Assessment	Formative: Continuous assessment, 50% (Assignments) Summative: 3-hour final examination, 50% 50% sub-minimum in all assessments		
DP Requirement	50% Continuous assessment mark		

Title	**ECONOMIC BOTANY**		
Code	4BOT506	Department	BOTANY
Prerequisites	4BOT311, 4BOT321 or 4BOT312, 4BOT322	Co-requisites	
Aim	This module is designed to develop an understanding of the value of the natural environment.		
Content	To estimate the quantities of botanical resources and the study of direct use-value of marketable resources and the significance of subsistence activities and non-marketed resources that add to the total value of the environment.		
Assessment	Formative: Continuous assessment, 50% (Assignments) Summative: 3-hour final examination, 50% 50% sub-minimum in all assessments		
DP Requirement	50% Continuous assessment mark		

Title	ETHNOBOTANY		
Code	4BOT507	Department	BOTANY
Prerequisites	4BOT311, 4BOT321 or 4BOT312, 4BOT322	Co-requisites	
Aim	This course is designed to develop an understanding of how people of a particular culture (Zulu's) make use of indigenous plants.		
Content	The module explores how indigenous plants that are harvested from the wild are used as food, shelter, medicine, clothing, hunting and in religious ceremonies. Plants that are grown in the homesteads (home gardens) are studied with reference to identification, position on the premises, cultivation, uses and conservation status.		
Assessment	Formative: Continuous assessment, 50% (Assignments) Summative: 3-hour final examination, 50% 50% sub-minimum in all assessments		
DP Requirement	50% Continuous assessment mark		

Title	RESEARCH PROJECT		
Code	4BOT509	Department	BOTANY
Prerequisites	4BOT311, 4BOT321 or 4BOT312, 4BOT322	Co-requisites	
Aim	The module is aimed at preparing students with skills for independent scientific research. Under guidance from academic staff, students undertake pure or applied research of on a topic relating to the field of research in the Department of Botany.		
Content	The content will largely depend on the topic chosen, but students are expected to undertake an extensive literature survey; conduct fieldwork as part of data collection; analyse data and interpret results; and present a written report of the research that is well presented, logically structured and accurately referenced. Students will also make oral presentations of their work at various stages of the research project.		
Assessment	Final research report (written and oral presentation)		
DP Requirement			

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)
Senior Lecturers	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)

BSc (Hons) (Chemistry) [QUALIFICATION CODE 4HON04]

This is a one-year qualification for full-time students..

The qualification consists of four theory modules and a research module:
4CHM501 - Analytical Chemistry
4CHM502 - Inorganic Chemistry
4CHM503 - Organic Chemistry
4CHM504 - Physical Chemistry
4CHM509 - Research Project

A student may elect to substitute any one of the four theory modules with a relevant honours level module from another Department provided that the approval of both heads of Department is obtained. Students will be assigned to a research project within the on-going research work in the Department. This project will run continuously throughout the year and students may be required to give a seminar on their project. A student's results for the theory modules may be withheld by the Department until the research project and the project report have been satisfactorily completed and two bound copies of the report have been submitted.

MSc (Chemistry) [QUALIFICATION CODE 4MSC04, MODULE CODE 4CHM700]

See General Rules for Masters degrees. A dissertation on an approved topic, a seminar and an oral examination, are basic requirements

PhD (Chemistry) [4CH800] [QUALIFICATION CODE 4PHD04, MODULE CODE 4CHM800]

See General Rules for Doctoral degrees. A thesis on an approved topic, a seminar and an oral examination, are basic requirements.

Title	**Analytical Chemistry**		
Code	4CHM501	Department	CHEMISTRY
Prerequisites	None	Co-requisites	None
Aim	Analytical chemistry covers the measurement and monitoring of chemicals. This may be measuring the purity of products leaving the factory or it may involve monitoring minute concentrations of substances in the environment.		
Content	**Spectroscopic Methods:** Comparison of Atomic Absorption and Flame Emission techniques. Inductively coupled plasmas (ICP). X-ray diffraction. X-ray absorption. X-ray fluorescence. **Electron Microscopy:** Principles involved in electron microscopy. Transmission electron microscopy. Scanning electron microscopy. Instrumental components of electron microscopy. Techniques involved in sample preparation. Various techniques of the electron microscopy. **Chromatography:** The principles of chromatography. Types of chromatography used in modern labs. Partition coefficients, Plate theory - optimization of performance. Van-Deemter curves. Retention times. **Gas Chromatography:** Supports, detectors, examples of use. Types of columns. Liquid 3 Chromatography: HPLC Principles and applications. Chiral columns. Ion chromatography. Capillary Electrophoresis. Gel Permeation and Filtration		
Assessment	50% Continuous Assessment Mark comprising two or more interim assessments and 50% Summative Assessment comprising a 3 hour assessment at the end of the semester.		
DP Requirement	Completion of all assignments and interim assessments.		

Title	**Inorganic chemistry Honours**		
Code	4CHM 502	Department	Chemistry
Prerequisites		Co-requisites	None
Aim	This module will cover various aspects of inorganic chemistry at an advanced level and will build on the basic principles established in the undergraduate inorganic chemistry program. Learners will also be exposed to certain key topics in materials chemistry in particular nanoscience.		

Content	The chemistry of lanthanides and actinides. Organo-metallic chemistry and bioinorganic chemistry. Advanced coordination chemistry, inorganic reaction mechanisms, molecular symmetry and group theory. The materials aspect will include, theory of semiconductors, electronic structure of solids, thin films, and theory of nanoparticles.
Assessment	50% Continuous Assessment Mark comprising two or more interim assessments and 50% Summative Assessment comprising a 3 hour assessment at the end of the semester.
DP Requirement	Completion of all assignments and interim assessments.

Title	**Organic chemistry Honours**		
Code	4CHM 503	Department	Chemistry
Prerequisites		Co-requisites	None
Aim	This module will cover various aspects of organic chemistry at an advanced level and will build on the basic principles established in the undergraduate organic chemistry program.		
Content	The following topics will be covered: Chemistry of bifunctional carbonyl compounds, heterocyclic chemistry and organic synthesis. Advanced spectroscopy methods for structure analysis and their applications. Special topics in natural product and synthetic chemistry.		
Assessment	50% Continuous Assessment Mark comprising two or more interim assessments and 50% Summative Assessment comprising a 3 hour assessment at the end of the semester.		
DP Requirement	Completion of all assignments and interim assessments.		

Title	**Physical Chemistry Honours**		
Code	4CHM504	Department	Chemistry
Prerequisites		Co-requisites	None
Aim	This module will cover various aspects of physical chemistry at an advanced level and will build on the basic principles established in the undergraduate physical chemistry program as well as exposing learners to a wider range of more advanced aspects of the subject.		
Content	Advanced studies of the phase equilibria of the condensed phases of two and three component systems with applications to real systems. A detailed analysis of the kinetics of a selection of complex reactions. A more advanced study of selected aspects of thermodynamics. Studies of the theoretical basis for a selection of molecular spectroscopic techniques. Advanced studies of the solid state including crystal defects and the theoretical basis of X-ray crystallography. Any relevant additional topics that		

	may be selected at the discretion of the lecturer responsible for the module.
Assessment	50% Continuous Assessment Mark comprising two or more interim assessments and 50% Summative Assessment comprising a 3 hour assessment at the end of the semester.
DP Requirement	Completion of all assignments and interim assessments.

Title	**ETHNOBOTANY**		
Code	4BOT506	Department	Botany
Prerequisites	4BOT311, 4BOT321 or 4BOT312, 4BOT322	Co-requisites	
Aim	This course is designed to develop an understanding of how people of a particular culture (Zulu's) make use of indigenous plants.		
Content	The module explores how indigenous plants that are harvested from the wild are used as food, shelter, medicine, clothing, hunting and in religious ceremonies. Plants that are grown in the homesteads (home gardens) are studied with reference to identification, position on the premises, cultivation, uses and conservation status.		
Assessment	Formative: Continuous assessment, 50% (Assignments) Summative: 3-hour final examination, 50% 50% sub-minimum in all assessments		
DP Requirement	50% Continuous assessment mark		

Title	**RESEARCH PROJECT**		
Code	4BOT509	Department	Botany
Prerequisites	4BOT311, 4BOT321 or 4BOT312, 4BOT322	Co-requisites	
Aim	The module is aimed at preparing students with skills for independent scientific research. Under guidance from academic staff, students undertake pure or applied research of on a topic relating to the field of research in the Department of Botany.		
Content	The content will largely depend on the topic chosen, but students are expected to undertake an extensive literature survey; conduct fieldwork as part of data collection; analyse data and interpret results; and present a written report of the research that is well presented, logically structured and accurately referenced. Students will also make oral presentations of their work at various stages of the research project.		
Assessment	Final research report (written and oral presentation)		
DP Requirement			

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
Associate Professor	P Mudali, PhD (Computer Science), MSc (Computer Science) BSc (Hons) (Computer Science) (UNIZULU), MIEEE, MSAICSIT
Lecturers	IN Ezeji, MSc (Computer Science) (UNIZULU), BScHons (Computer Science) (University of Calabar Nigeria), SU Mathaba, MSc, BScHons, BSc (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)

The Department hosts a Centre for Mobile e-Services for Development. The centre is co-sponsored by Telkom, Huawei and Dynatech information systems. The Centre's current focus is ad-hoc Mobile Cloud-powered Grid-Based Utility infrastructure for SMME-enabling technology GUISET.

BSc (Hons) (Computer Science) [QUALIFICATION CODE 4HON05]

Admission Requirements
A BSc degree in computer science or equivalent qualification.

Curriculum

Theory modules
Students must select four theory modules from the list below:

4CPS501 Advanced Software and Distributed Computing Techniques
4CPS502 Advanced Distributed Database Techniques and AP
4CPS503 Compilation Techniques and Security- WS and SOA
4CPS504 Wireless Networks with Special focus on ad hoc networks and their simulations

One honours module from another department can be selected, with the approval of both Heads of Department.

Assessment
One, 3-hour paper shall be written at the end of the semester in which the module is taken. The Department may decide to have two, 3-hour papers written in any specific module.

Research Project
4CPS509 is a compulsory research project.
In addition to completing a report on the research, students must present a seminar on the research conducted.
Research topics can be selected from the following research areas:
Cloud Computing, Mobile Computing, Wireless ad-hoc Networks, Software-defined Networks and Electronic Warfare.

System of External Evaluation

An external examiner approved for that purpose by the Senate shall examine the written examinations and the project report. An External Examiner shall be invited to evaluate a seminar presentation on each Honour's project.

MSc (Computer Science) [4CS700]

Admission Requirements
An Honours Degree in Computer Science, Information Systems, Software Engineering or equivalent qualification subject to the approval of the head of department and the Board of the Faculty.

Departmental Research Projects
Students are expected to participate in the ongoing research projects of the Department. We are currently conducting research in the intersection of the domains of:

- Software-Defined Wireless Ad-hoc Networks
- Cloudlets for Mobile Cloud Computing.

The GUISET reference architecture has been previously developed in the Department. It relies on mobile web/cloud service technologies and standards to enable context-aware deployment of services while protecting personalisation and privacy concerns of mobile user groups. We envisaged a GUISET broker that explores all service e-market places as potential sources of pay-per-click online services. Recently, we have been looking at ensuring that the GUISET engine takes advantage of the Mobile Cloud Computing environment, which envisages a combination of architectures. At one extreme end are Data Centre based solutions, at the other end are ad hoc mobile

cloud; in between will be the Cloudlet concept. We are looking to use the SDN/NFV technologies as the basis for exploring Small Data applications as well as secure and energy-efficient use cases of GUISET.

Examination
In consultation with the head of Department the degree may be awarded by dissertation ONLY.

PhD (Computer Science) [4CS800]

Prospective candidates should consult the Head of Department and familiarise themselves with the general rules. The thesis should be based on a piece of original research in the computing field worthy of publication in a reputable research journal. Please refer to Departmental Research Projects above.

Title	**Advanced Software and Distributed-Computing Techniques**		
Code	4CPS501	Department	Computer Science
Prerequisites	None	Co-requisites	None
Aim	This module focuses on Advanced Software Techniques such as in Grid Computing, Service-Oriented Architecture and Distributed Event-based systems.		
Content	Section A – Distributed event-based systems Basic Terminologies (Model of Interaction, Notification filtering mechanisms, Distributed Notification Service, Specs of event systems); Content-Based Models and Matching; Distributed Notification Routing; Engineering of Event based systems; System scoping; Existing notification services. Section B – SOA and Grid Computing Techniques Introduction to grid computing, System Infrastructure: Web services, Background information. history, remote procedure calls, Service -Oriented Architecture (SOA), service registry, WSDL, WSDD, Web service implementation, SOAP, containers, stubs, code; Globus 4.0 grid services, using web services for grid computing, stateful web services, Grid computing standards, Open Grid Services Architecture (OGSA), Web Services Resource Framework (WSRF), programming GT 4.0 grid services, GT 4.0 container. More advanced features of WSRF GT 4 services, multiple resources, notifications, lifetime, index services.		
Assessment	Two papers are to be written. Paper A for Section A and Paper B for Section B content. Small laboratory projects are required to gain required skills in both Sections A and B of the content.		
DP Requirement	Completion of all assignment and class/mini projects.		

Title	Advanced Distributed Database Techniques and Applications		
Code	4CPS502	Department	Computer Science
Prerequisites	None	Co-requisites	None
Aim	This module focuses on enterprise database systems and their applications.		
Content	**Section A – Distributed database systems** Distributed database design; Query processing; Transaction Management; Distributed concurrency control; Distributed DBMS reliability **Section B – Database Application Techniques and technologies** Multimedia Databases; Database Compression; Data mining Concepts; Data mining Process; Data mining Techniques; Advanced Data mining techniques and applications: Text mining, Web mining, collaborative filtering.		
Assessment	Two papers are to be written. Paper A for Section A and Paper B for Section B content. Small laboratory projects are required to gain required skills in both Sections A and B of the content.		
DP Requirement	Completion of all assignment and class/mini projects.		

Title	Compilation Techniques and Security for WS and SOA		
Code	4CPS503	Department	Computer Science
Prerequisites	None	Co-requisites	None
Aim	The aim of this module is to use language processing techniques as a computational apparatus for understanding syntactic and semantic models. Furthermore, securing distributed systems against threats, vulnerabilities and countermeasures forms the second part of the module.		
Content	**Section A – Compilation Techniques Overview** Overview of the compilation process. Lexical analysis and CFGs, Syntactic Analysis and Parser Construction; Contextual analysis and runtime organization; Code generation. **Section B – Security of WS and SOA** Web Services Technologies, principles, architectures and standards; WS Threats, vulnerabilities and countermeasures; standards for WS security; Digital identity management and trust negotiation; Access control		

	for WS; Secure publishing techniques; Access control for business processes; Emerging research trends.		
Assessment	Two papers are to be written. Paper A for Section A and Paper B for Section B content. Small laboratory projects are required to gain required skills in both Sections A and B of the content.		
DP Requirement	Completion of all assignment and class/mini projects.		

Title	**Wireless Networks with special focus on ad hoc networks and their Simulations**		
Code	4CPS504	Department	Computer Science
Prerequisites	None	Co-requisites	None
Aim	The aim of this module is to teach the principles and the specialisation thereof of Wireless networks such as ad hoc, sensor and other types. The simulation and modelling of networks is also taught to prepare the student for Research.		
Content	**Section A – Wireless Network Principles** Antennas and Propagation; Signal Encoding techniques; Spread Spectrum Satellite Communication; Cellular Wireless Networks; Mobile IP Bluetooth; Wireless LANs (IEEE 802.11); Ad Hoc Networks (IEEE 802.15) **Section B – Modelling and Simulation of Wireless Networked systems** Modelling and optimization of large-scale systems in a wide variety of decision-making domains. Application domains include transportation and logistics, and telecommunications system planning. Modelling techniques covered include linear, network, discrete, and, sensitivity.		
Assessment	Two papers are to be written. Paper A for Section A and Paper B for Section B content. Small laboratory projects/assignments are required to gain required skills in both Sections A and B of the content.		
DP Requirement	Completion of all assignment and class/mini projects.		

Title	**Software Defined Networking Theory and application**		
Code	4CPS506	Department	Computer Science
Prerequisites	None	Co-requisites	None
Aim	The aim of this module is to give the students a solid foundation in Software defined networking theory and prepare them to develop relevant algorithms.		
Content	**Section A** Overview; History and Evolution of SDN-Central Control, Programmable Networks; History and Evolution of SDN,		

	Network Virtualization; Control and Data Plane Separation-Overview, Opportunities, Challenges. Virtual Networking- What is network virtualization? Applications of network virtualization, Virtual networking in Mininet, Mininet Python API. Control Plane- Overview, Examples of SDN Controllers. Customizing the Control Plane- Switching, Firewalls. Data Planes: Software- Software Data Planes: Click, Scaling Software Data planes; Data Planes: Hardware-Making Hardware Programmable. **Section B** Programming SDNs: Northbound APIs- Motivation for Northbound APIs, Frenetic, Pyretic. Advanced SDN Programming- Composing SDNs, Resonance: Event-Driven Control, Use Cases-1- Data Centres, Internet Exchange Points; Use Cases-2- Backbone Networks, Home Networks, UZ test-bed.
Assessment	Two papers are to be written. Paper A for Section A and Paper B for Section B content. Small laboratory projects/assignments are required to gain required skills in both Sections A and B of the content.
DP Requirement	Completion of all assignment and class/mini projects.

Title	**Honours Research Project**		
Code	4CPS509	Department	Computer Science
Prerequisites	None	Co-requisites	None
Aim	The aim of this module is to expose students to how to conduct research. Each students learns the research method and applies one more of the methods to a real Honours level investigation.		
Content	**Section A – Research Methods Lectures** Instruction on What is Research, how to conduct research; Study of individual research methods, Writing of Research proposal; How to put together a Research report or Honours thesis. **Section B – Preparation of Research Proposal and Execution of the Research.** Student selects a topics from available research topics advertised for Honours level research; Prepares a proposal and carries out the research according to approved proposal.		
Assessment	Presentation of research project to the Department and one external examiner		
DP Requirement	Completion of research project to the satisfaction of examiners.		

Department of Consumer Science

STAFF

Professor	U Kolanisi, B (Human Ecology) (UWC), M (Consumer Science), PhD (North West PUK)
Associate Professor	CJ du Preez, B (Home Economics) (Stell), HDE (UNISA), MSc, PhD (Wageningen Univ Netherlands)
Senior Lecturer	Vacant
Lecturers	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) Miss N Qumbisa (Consumer Science (Extension and Rural Development), Master in Food Security (UKZN) Mr R Manzini - Consumer Science (Nutrition), Honours (Consumer Science), Master in Biochemistry (UNIZULU)
Secretary	Vacant (Main Campus)
RB Campus	
Laboratory Technician	N Ngwane, NDip (Consumer Science: Food & Nutrition) BTech (Consumer Science: Food & Nutrition) (DUT)
Laboratory Technician	P Kupiso, Food & Nutrition) BTech (Consumer Science: Food & Nutrition), MS (Food Nutrition) (DUT)
Laboratory Technician	S Chiya, NDip (Food & Beverage Management), BTech (Consumer Science: Food & Nutrition) (DUT)

B (Hons) (Consumer Science) [QUALIFICATION CODE 4HON06]

Admission requirements

A 3-year bachelor's degree in Home Economics / Consumer Science.

Duration of degree
One-year full-time study.

Curriculum
The approved module from the Honours syllabus in Development Studies or Tourism may be substituted for one Honours module in Consumer Sciences on approval of the respective Heads of Departments.
A specialisation module may not be offered in any given year if a suitably qualified staff member is not available.
Prospective students must contact the head of department **before the end of January**.

Modules

Compulsory Modules [4CNS508 and 4CNS509]

4CNS508	Research methods
4CNS509	Research project and oral.

Specialisation Modules

Advanced study in three of the following topics:

4CNS501	Non-Formal Education and Extension
4CNS502	Family studies and Household Resource Management
4CNS503	Advanced Nutrition
4CNS504	Housing and Interior Design
4CNS505	Community Nutrition
4CNS506	Foods
4CNS507	Food Service Management Systems

Examination
Theory papers: 3-hour examinations.
Research project (including an oral examination).

Title	**Non-formal Education and Extension**		
Code	4CNS501	Department	Consumer Sciences
Prerequisites	None	Co-requisites	None
Aim	This module is aimed at introducing the student to an integrated approach for education, training and development, with specific applications in Consumer Sciences aimed at improving the quality of life of individuals, households and communities.		

Content	Adult education, non-formal education and extension for community development. Framework for extension practice in SA, with applications in Consumer Sciences Analysis of development issues and the role of extension/non-formal education. Comparative practices in other countries Communication, leadership, advocacy and facilitation Assess needs and problems in community Analysis of the organizational structure and goals of extension programmes. Project planning, implementation, management, monitoring and evaluation.
Assessment	50% Formative: assignments and presentations 50% Summative: final examination(s) and project
DP Requirement	Completion of all assignments 50% Continuous assessment mark

Title	**Family studies and Household Resource Management**		
Code	4CNS502	Department	Consumer Sciences
Prerequisites	None	Co-requisites	None
Aim	The module is aimed at introducing the student to theoretical frameworks in studying the family/household; the strengths and challenges families/ households encounter in contemporary society; family/household dynamics and multigenerational influences; the role of gender in changing family structures; family/household living arrangements and livelihood generation; family care giving.		
Content	Family/household configurations in modern society Conceptual approaches to understanding families/households and their internal dynamics - communication, decision making, conflict management, resource management, multigenerational changes on family relationships; role of women and the elderly in changing family structure Impact of HIV/AIDS on families/households and implications for living and care arrangements and livelihood generation Inter and intra household resource allocation		
Assessment	50% Formative assessment: assignments and presentations 50% Summative: examination(s) and project		
DP Requirement	Completion of all assignments 50% Continuous assessment mark		

Title	Advanced Nutrition		
Code	4CNS503	Department	Consumer Sciences
Prerequisite	B Consumer Science (Nutrition)	Co-requisite	None
Aim	To enable the student to function at nutrition policy formulation level by exposing him / her to the planning implementation, monitoring and evaluation of policies intended to maintain and /or improve the health and nutrition of people in health, disease and disasters and to act in an ethical manner.		
Content	• Public and community nutrition services available in RSA, including health promotion service. • Planning and monitor and evaluate and document appropriate intervention strategies to address nutrition and related health issues of groups in communities and/or public and facilitation of public participation in the selection, planning implementation and evaluation of appropriate intervention strategies. • Nutrition services in disaster situations and ethics in nutrition. • HPCSA code of ethics for health professionals • Policy issues in nutrition: planning, implementation, monitoring and evaluation of nutrition policies. • Current issues in nutrition and presentation of data		
Assessment	50% Formative: assignments and presentations 50% Summative: final examination(s) and project		
DP Requirement	Completion of all assignments 50 % continuous assessment mark		

Title	Housing and Interior Design		
Code	4CNS504	Department	Consumer Sciences
Prerequisites	None	Co-requisites	None
Aim	To provide relevant theoretical and practical knowledge on housing education. To explain why housing is viewed as an environment, service and a process. To develop critical thinking; analytical and problem-solving skills.		

Content	Definition of housing concepts; Theoretical perspective of housing, Human needs in housing, Decision making processes in housing, Legal and financial aspects of housing, Housing towards a sustainable development approach, Understanding the issues of informal settlement and other housing challenges, low cost housing delivery and subsidies in South Africa, Underlying policy approaches and considerations. HIV and AIDS and housing. Research in housing.
Assessment	50% Formative: assignment and presentations 50% Summative: final examination(s) and project
DP Requirement	Completion of all assignments. 50% Continuous assessment mark

Title	**Community Nutrition**		
Code	4CNS505	Department	Consumer Sciences
Prerequisite	None	Co-requisite	None
Aim	To enable the student to apply specific nutrition skills to assess nutrition needs of communities, plan, implement, monitor and evaluate programmes aimed at helping communities alleviate their nutrition problems.		
Content	• The conceptual framework for analysis of factors which lead to growth, development and survival and malnutrition. • Nutrition assessment – assessing community resources, and the nutritional status of target populations. Nutrition surveillance in S.A. Household food security in rural SA. Micronutrient deficiencies in South Africa. (Vitamin A, iron iodine, and zinc status and interventions. Also incorporate the vitamin A consultative group and national food consumption surveys) • Programme planning for success. Designing community nutrition interventions. Developments in food fortification in SA • The integrated nutrition programmes in SA. • Infant nutrition and HIV&AIDS. • Community nutrition with an international perspective • Nutrition promotion (education). Primary health care. Nutrition Policy and ethics		
Assessment	50% Formative: assignment and presentations 50%Summative: final examination(s) and project		
DP Requirement	Completion of all assignments. 50% Continuous assessment mark		

Title	**Foods**

Code	4CNS506	Department	Consumer Sciences
Prerequisites	None	Co-requisites	None
Aim	The module is aimed at introducing the student to the theoretical aspects of food industrialization and food trade by reflecting on global trends and local attempts in South African context.		
Content	Aspects of food and nutrition policy namely; food supply (food and nutrition system in a country like South Africa; how international food trade affect food supply to populations in terms of food control, food safety; the role of food industrialization in increasing food supply – genetically modified foods, fortification, functional foods, modern preservation methods)		
Assessment	50% Formative: assignment and presentations 50% Summative: final examination(s) and project		
DP Requirement	Completion of all assignments. 50% Continuous assessment mark		

Title	**Food Service Management Systems**		
Code	4CNS507	Department	Consumer Sciences
Prerequisites	B Cons Sc (Hospitality & Tourism) degree	Co-requisites	None
Aim	This module aims at examining issues and challenges of the foodservice industry and outline strategies that contribute to a successful foodservice operation by focusing on a systems approach to foodservice management in the Hospitality Industry in order to improve revenue.		
Content	• Key elements for successful food service operations • Menu planning, purchasing, receiving, storage and production in food service • Cost control systems in food services • Service delivery and increased profits • Market variables such as client flow, dining times, table mix, meal duration, pricing • Improving market share • Current trends and challenges in food service operations		
Assessment	50% Formative: assignment and presentations 50% Summative: final examination(s) and project		
DP Requirement	Completion of all assignments. 50% Continuous assessment mark		

Module Title	**Research Methods**

Code	4CNS508	Department	Consumer Sciences
Pre-requisite	None	Co-requisite	None
Aim	To revise research methods done at the undergraduate level and to introduce students to advanced research concepts and methods of data collection and analysis. Application of theory in conducting a literature review and developing a research proposal.		
Content	• Fundamentals of research and research concepts. • Various methods of research. • Reviewing literature and referencing. • Quantitative and qualitative research approaches. • Sampling procedures and techniques. • Data collection methods and instruments. • Research ethics. • Identifying a research problem and designing a research project. • Proposal writing. • Analysis of qualitative data and introduction to appropriate software. • Analysis of quantitative data, fundamentals of statistics and appropriate software. • Descriptive and inferential statistics. • Interpretation of data and presentation of results. • Report writing.		
Assessment	50% Formative: assignment (literature review and draft proposal) and presentations 50% Summative: final examination and final research proposal and presentation		
DP Requirement	Completion of assignments, literature review and draft research proposal 50% Continuous assessment mark		

Module Title	**Research Project**		
Code	4CNS509	Department	Consumer Sciences
Pre-requisite		Co-requisite	4CNS508
Aim	Practical application of research methodology through designing and independent implementing of a research project and writing and presenting of a research report.		
Content	• Application of research methodology theory. • Design a research project. • Develop data collection instruments. • Review and refine problem statement, design, sampling and data collection methods. • Update literature review.		

	• Prepare for fieldwork and seek ethical clearance where required. • Independently implement a research project according to the protocol. • Collect, clean and where appropriate code data. • Analyse quantitative and/or qualitative data. • Interpret and present results. • Write a research report. • Present research findings (oral and/or poster).
Assessment	100% continuous assessment.
DP Requirement	Completion of all assessments 50% Continuous assessment mark

MCONS SCI (Consumer Sciences) [QUALIFICATION CODE: 4MSC21

[MODULE CODE 4MSC21 - Module Code: 4CNS700 - for 1st Year; Module Code: 4CNS702 - for 2nd Year; Module Code: 4CNS703 - for 3rd Year; Module Code: 4CNS704 - for 4th Year; Module Code: 4CNS705 - for 5th Year]

Admission requirements
To be admitted to M Cons Sci in Consumer Sciences a candidate shall have passed Bachelor of Science (Hons) degree in Consumer Sciences or an equivalent qualification.

Curriculum

A dissertation (4MSC21) on an approved topic. An oral examination on the contents of the dissertation may be required. Also see General Rules.

Examination
In consultation with the head of the department the degree may be awarded by dissertation only or by two written papers and a dissertation.

Department of Geography and Environmental Sciences Consumer Science

STAFF

Associate Professor	I Moyo, BAHons (Geography), GRAD CE (University of Zimbabwe), MA *cum laude* (UWC), MEd (Higher Education Studies) *cum laude* (UCT), MA, PhD (Geography) (UNISA), PGDip (Higer Education Studies) *cum laude* (UKZN)
Senior Lecturers	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) K Phinzi, BSS (Geography & Environmental Management), BScHons, MSc (Environmental Science) (UKZN), PhD (Earth Sciences) (University of Debrecen, Hungary)
Lecturer (NGAP) Prorgramme	J Mzimela, BSc, BSc (Hons), MSc (Environmental Science) (UKZN), PhD (Geography) (UNIZULU)
Laboratory Assistant	LC Shongwe, BA (Enviro. Plan. & Dev.), BAHons (UNIZULU)
Administrator	D Khumalo, NSC (Swinton Rd Col), BCom, BAHons (UNIZULU)

BSc (Hons) Geography [QUALIFICATION CODE 4HON07]

Admission Requirements

To be admitted to BSc (Hons) in Geography a candidate shall have passed Bachelor of Science degree in Geography and Environmental Studies or an equivalent qualification.

Curriculum for BSc (Hons) Geography

Five modules including the research project are to be completed.
4GES501 and the research project [4GES509] are compulsory.
A student must choose three modules after consultation with the Head of Department and will be determined by the student's undergraduate background and the availability of suitably trained staff members in a particular year.
A research project on an approved research topic to be chosen after consultation with a panel of staff members. Research is to start as soon as lectures commence.

A student must have acquired proficiency in qualitative methods and computer techniques prior to working on the research project report. A written or oral test can be required to satisfy the Head of Department in this respect.

Students who did not do GIS at undergraduate level should take undergraduate level GIS (4HYD222) concurrently with their Honours modules. A student must obtain at least 50% in GIS, otherwise they will have to repeat it before an Honours degree is confirmed complete.

4GES501	History, Philosophy and Methodology of Geography
4GES502	Applied Climatology
4GES503	Environmental Management
4GES504	Geomorphology
4GES509	Research Project (to be submitted by the end of November).

One module may be selected from the following with approval of both Heads of Department:

4HYD504	Water Resources Management
4BOT501	Terrestrial Plant Ecology
4ZOL501	Population Dynamics and Aquatic Production
4ZOL502	Advanced Freshwater Ecology
4ZOL503	Advanced Estuarine Ecology
4MCB505	Environmental and Industrial Microbiology

MSc (Geography) [QUALIFICATION CODE 4MSC07, MODULE CODE 4GES700]

Admission requirements
To be admitted to MSc in Geography a candidate shall have passed Bachelor of Science (Hons) degree in Geography and Environmental studies or an equivalent qualification.

Curriculum

A dissertation (4GES700) on an approved topic. An oral examination on the contents of the dissertation may be required. Also see General Rules.

PhD (Geography) Science [QUALIFICATION CODE 4PHD07, MODULE CODE 4GES800]

A thesis (4GES800) on an approved topic. An oral examination on the contents of the thesis may be required. Also see General Rules and consult with the Head of the Department.

Title	History, Philosophy and Methodology of Geography		
Code	4GES501	Department	Geography and Environmental Studies
Prerequisites	None	Co-requisites	None
Aim	The module is intended to provide students with background knowledge about the history and philosophical thought of geography. The history of geography will focus on the development of geography through the ages. The module will give an insight into the philosophy of the subject. The module will expose the students to the methodology of the discipline.		
Content	The module will cover the following topics: Ancient geography, as well as the German and French schools of Geography A history of the development of specific branches of the discipline. The contribution of prominent scholars to the field of geography The meaning and development of concepts such as dualism, determinism, environmental perception and regionalism. The four traditions of geography The use of models and theories in geography The quantitative and scientific paradigms in geography. The emergence of modern philosophy or paradigms in geography: positivism and phenomenology. The emergence of post-modernism in geography. The study of the following paradigms: Humanistic, Welfare, Behavioural, Radical and Feminist Geography. The value of geographic knowledge in the contemporary world. Development of Geography and geographic thought in South Africa.		
Assessment	Assignments, oral presentations and final examination		
DP Requirement	Completion of all assignments and 100% attendance.		

Title	Applied Climatology		
Code	4GES502	Department	Geography and Environmental Studies
Prerequisites	4GES341 or 4GES222	Co-requisites	None
Aim	This module serves as an introduction to the field of Applied Climatology. Climate penetrates into many facets of today's world, and will continue to do so in the future. We will investigate the many faces of Applied Climatology, both from physical and cultural		

	perspectives. Practical applications of Atmospheric Science and Climatology to weather-sensitive sectors are explored extensively throughout the module. The Applied Climatology Module is designed for the advanced student with a sound background of Atmospheric Science and/or related disciplines.
Content	Atmospheric and Oceanographic Data; The Climate System: controls on climate; The tropics and subtropics; Tropical Cyclones of the SW Indian Ocean; The subtropical ridge and attendant westerly waves; Subtropical deserts; Spatial and temporal patterns of climate variability; The mean climate of southern Africa; Ocean currents and ocean-atmosphere interactions; The El Nino Southern Oscillation; Climate monitoring and prediction; Climate Change; Remote sensing of the earth-ocean-atmosphere system; Weather, Climate and Society; Climate Impacts on food systems, water resources, human health and the environment.
Assessment	Practical exercises, Homework, Project, Mid-term tests and Final Exam
DP Requirement	30% Continuous Assessment Mark and 80% Attendance of theory and practical classes

Title	**Environmental Management**		
Code	4GES503	Department	Geography and Environmental Studies
Prerequisites	BSc Geography	Co-requisites	None
Aim	This module introduces the student to environmental management concepts, its problems, concepts, problems and policies. It provides the skills and knowledge to research and understand the issues related to environment and sustainable development. The module also introduces students to major environmental issues confronting a developing society.		
Content	• Environmental Ethics and Environmental Education in South Africa; Integrated Environmental Management; Environmental Economics and Evaluation; Environmental Law; Air pollution; Environmental auditing and ISO 14000; Water pollution, Waste management; Coastal Zone Management; Droughts and desertification; Sustainable development; Mineral resources; Radiation and Pesticides; Soils, Nature conservation in South Africa and environmental heritage of		

	international standing; Land-use planning; Mountains, Freshwater and marine ecosystems • Case studies on environmental management • Environmental Audits of UNIZULU waste management • South Durban Industrial Basin • Emission levels exceedances 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 EIA of Roads, Airports, Stadiums, Housing projects, Industries, Mining, etc.
Assessment	Assignments, practical exercises, oral presentations and final examination
DP Requirement	Completion of all assignments and 100% attendance

Title	Geomorphology		
Code	4GES504	Department	Geography and Environmental Studies
Prerequisites	None	Co-requisites	None
Aim	The geomorphology module is intended to provide the students with the analysis and interpretation of geomorphological concepts. The students are expected to understand the geomorphological theories and models. The forces and processes (both endogenic and exogenic) shaping the landforms are studied in terms of their spatial distribution and their respective intensities.		
Content	Aspects to be studied will include: • The operation of endogenic forces; The influence of geology and fragmentation of Gondwanaland on the geomorphology of Southern Africa through time. • The major geomorphic events in the Southern African Sub-continent following the fragmentation of Gondwanaland.; Quaternary geomorphology of Southern Africa. Weathering; Soil formation and its influence on geomorphology. • Soil classification and the soil distribution in Southern Africa.		

	• Early landscape models compared to the modern geomorphological approaches. • Fluvial geomorphology; Basin sediment systems (erosion) • Slope geomorphology. Mass movement • Coastal geomorphology pf Southern Africa; Karsts systems • Granite landscape; Wind erosion and deposits • Pans and lakes; Fieldwork in geomorphology
Assessment	Assignments, oral presentation, mid-term test, practical exercises and final examination.
DP Requirement	Completion of all assignments and 100% attendance

Title	**Urban Geography**		
Code	AGES505	Department	Geography and Environmental Studies
Prerequisites	None	Co-requisites	None
Aim	The module is intended to provide students with background knowledge about the key elements of urban geography, in particular those that relate themselves more to third world countries as against first and second world countries. It will examine philosophies and methodologies and principles relating to (a) current evolving methodologies (b) external and internal relationships among cities (c) problems associated with cities.		
Content	The module will cover the following topics: • The philosophy and methodology of urban geography. • Phenomenological and positivistic approach in urban geography. • The concept of open-space system in the planning of residential areas in South Africa. • Migration as an urban phenomena in South Africa • Housing in South Africa; Squatter Settlements in developing countries • Problems and prospects of micro-enterprises in the South African urban economy • Spatial inequalities in the South African residential landscape • Urban planning policy in South Africa; Urban land-use change in Empangeni • Informal housing around Empangeni.		

	• City Models- past, present and the future; • Sites of Inclusion and Exclusion: Gated residences in South Africa • Impacts of urban planning • Future Global Cities; City Trends and Globalization; • Urban Regeneration; • Role of transportation in the city: the case of Gautrain; • Legacy of the 2010 FIFA World Cup in the South African Cities;
Assessment	Assignments, practical exercises, oral presentations and final examination
DP Requirement	Completion of all assignments and 100% attendance

Title	**Rural Geography**		
Code	AGES506	Department	Geography and Environmental Studies
Prerequisites	None	Co-requisites	None
Aim	This module aims to encourage discussion of what *rural* means in a country that has undergone both political and economic transition. It aims to assess rural development approaches. Attention will be paid to what characterizes rural areas in the developing worlds and draw comparisons with the developed world.		
Content	• The module is designed to interrogate issues in rural geography as analyzed by researches, planners, and policy makers. • Introduction to Rural Geography, • Rural deprivation and socio-economic exclusion • Rural livelihoods, Economic activities and rural economies, • Rural development approaches and other alternative form of development, • Rural women and empowerment; Natural resources management, • Land politics, Rural governance; Globalization, Indigenous Knowledge System, Issues of theory, policy and practice (Africa, Asia and South America)		
Assessment	30% Continuous Assessment Mark 70% Formal end of module theory (3 hours)		
DP Requirement	Completion of all assignments and the written mid-term test 100% attendance.		

Title	Research Project		
Code	4GES509	Department	Geography and Environmental Studies
Prerequisites	None	Co-requisites	None
Aim	The module is aimed at preparing students with skills for independent scientific research. Under guidance from academic staff, students undertake pure or applied research of on a topic of their choice relating to the field of Geography. This module builds on research skills gained in 4GES322 during level 3.		
Content	The content will largely depend on the topic chosen, but students are expected to undertake an extensive literature survey; conduct some fieldwork as part of data collection; analyse data and interpret results; and present a written report of the research that is well presented, logically structured and accurately referenced. Students will also make oral presentations of their work at various stages of the research project.		
Assessment	Independent research project mini-dissertation, oral presentations		
DP Requirement	Completion of research project		

Department Human Movement Science

STAFF

Professors	Vacant
Senior Lecturers	GJ Breukelman, BA (Human Movement), BScHons (Biokinetics), MSc (Sport Science), PhD (Sport Science) (UNIZULU), NMDP (SBS) ML Mathunjwa, BSc (Sport Science), BScHons Adapted Physical Activity), MSc (Sport Science), PhD (Sport Science) (UNIZULU) NMDP (SBS) 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); Diploma Coaching Science (Leipzig University) L Millard, BA (Human Movement Science) BAHons (Human Movement Science: Sport Science), MA (Human Movement Science) (NMU). PhD (Human Movement Science) (UNIZULU)
Lecturers	PB Ndlovu, BScHons (Sport Science) (NUST), MSc (Sport Science) (SU); M Claassens, BA (Health science) N.W.U/Potchefstroom, BSc Hons (Biokinetics) UNIZULU, MSc (Biokinetics) UNIZULU. NM Shandu, BSc. (Human Movement Science), BSc. Hons. (Biokinetics), MSc. (Human Movement Science)
Secretary	BP Kunene, Higher in Shipping Practice and Freight handling (SA Maritime College), Computer Literacy (Avuxeni Computer Academy Higher Certificate in Business Administration (MANCOSA)
Laboratory Assistant	Mr Sneyimani BSc hons (Biokinetics) UNIZULU

BScHons) (Human Movement Science (QUALIFICATION CODES 4HON12
BSc Hons Human Movement Science (Biokinetics)

Students are required to do and pass all seven modules according to the fields of specialization as outlined below with a sub minimum of 50%. The total credit value of this year long qualification is 120 credits at NQF level 8.

The specialization options in any year will depend of the availability of staff as well as on student interest.
All students will be required to do internship hours as determined by the Health Profession Council of South Africa.

STUDENTS MAY SPECIALISE IN EITHER BIOKINETICS OR ADAPTED PHYSICAL ACTIVITY
SPECIALISATION IN BIOKINETICS (4HON 12)

Students specializing in Biokinetics must register for the following modules:

4BSS501	Health Promotion
4BSS502	Exercise Physiology
4BSS503	Biomechanics and Human Motor Behaviour
4BSS504	Professional Internship
4BSS505	Management of Orthopedic Injuries and Conditions
4BSS506	Management of Chronic Diseases and Disabilities
4BSS509	Research Methodology and Project

NOTE:
A limited number of students are selected for specialization in Biokinetics. These students register with the Professional Register for Biokinetics of the Health Professions Council of South Africa. Students specializing in Biokinetics are required to do simultaneous internship in the Department where they study as well as a further year at an accredited institution before they can register as a Biokineticist. Students are themselves responsible for find a position for the second year of internship.

MSc (Human Movement Science) [QUALIFICATION CODE 4MSC12, MODULE CODE 4BSS700]

Admission requirements
An Honours Bachelor's degree in Human Movement Science or related fields (Sport Science, Kinderkinetics/Biokinetics) with an average final mark of at least 60%.

Duration of Degree
A minimum of one year.

Examination
A dissertation on an approved topic.

PhD (Human Movement Science) [QUALIFICATION CODE 4PHD13, MODULE CODE 4BSS800]

Admission requirements
Admission shall be subject to the approval by the Faculty Board of Science and Agriculture on the recommendation of the Head of Department.

Duration of Degree
A minimum of two years.

Examination
A thesis on an approved topic.

Title	Health Promotion		
Code	4BSS 501	Department	Biokinetics & Sport Science
Prerequisites	BSc, BA or equivalent degree in Human Movement Science / Sport Science	Co-requisites	
Aim	To equip the students with the theoretical and practical knowledge required to offer professional services regarding health promotion and preventive medicine.		
Content	Introduction to Health Promotion; Pre-participation testing of sedentary individuals; Health appraisal, risk management, and safety of exercise; Exercise testing; Clinical testing; Exercise prescription; Health promotion programmes to the public, businesses and industries; Health promotion in special populations		
Assessment	50% consisting of tests, practicals and assignments 50% consisting of the final examination (3 Hours)		
DP Requirement	40%		

Title	Exercise Physiology		
Code	4BSS 502	Department	Biokinetics & Sport Science
Prerequisites	BSc, BA or equivalent degree in Human Movement Science / Sport Science	Co-requisites	
Aim	To give the students a good understanding of the workings of the human body especially under working conditions.		
Content	• Nutrients • Optimal nutrition for exercise • Energy value of food • Energy transfer in the body • Energy transfer in exercise • Measurement of human energy expenditure • Expenditure during rest and exercise • Individual differences and measurement of energy capacities • Pulmonary structure and function • Gas exchange and transport • Dynamics of pulmonary ventilation • The cardiovascular system • Cardiovascular regulation and integration • Functional capacity of the cardiovascular system • Skeletal muscle: structure and function • Neural control of movement • The endocrine system		

Assessment	50% consisting of tests, practicals and assignments 50% consisting of the final examination (3 Hours)
DP Requirement	40%

Title	**Biomechanics and Human Motor Behaviour**		
Code	4BSS 503	Department	Biokinetics & Sport Science
Prerequisites	BSc, BA or equivalent degree in Human Movement Science / Sport Science	Co-requisites	
Aim	To equip the students with the knowledge and expertise to analyze internal and external movement of humans and objects as well as how to optimize movement and motor learning		
Content	Clinical biomechanics of the human body; Concept of levers and moments; Muscles and joint movements; Advanced functional anatomy; Biomechanics of movement; Biomechanical analysis; Postural Balance; Muscle imbalance; Neuromuscular function; Applied biomechanics; Motor control and learning; Recovery after neurological injury		
Assessment	50% consisting of tests, practicals and assignments 50% consisting of the final examination (3 Hours)		
DP Requirement	40%		

Title	**Professional Internship**		
Code	4BSS504	Department	Biokinetics & Sport Science
Prerequisites	BSc, BA or equivalent degree in Human Movement Science / Sport Science	Co-requisites	
Aim	To equip the student with the knowledge and skill to serve as a biokineticist or kinderkineticist.		
Assessment	20% Continuous assessment 80% External practical examination		
DP Requirement	Not applicable		

Title	**Management of Orthopaedic Injuries and conditions**		
Code	4BSS 505	Department	Biokinetics & Sport Science
Prerequisites	BSc, BA or equivalent degree in Human	Co-requisites	

	Movement Science / Sport Science		
Aim	The aim is to equip the students with the theoretical and practical knowledge required to deal with the biokinetic management of musculoskeletal injuries and conditions.		
Content	Introduction of musculoskeletal conditions; Biokinetic consultations; Functional anatomy of the spine; Spinal injuries; Objective tests for spinal injuries; Biokinetic management of back pain conditions; Biokinetic assessment of the back; Rehabilitation programmes for the back; Biokinetic management of scoliosis; Functional anatomy of the shoulder, arm wrist and hand; Injuries of the shoulder, arm wrist and hand; Objective tests for the shoulder, arm wrist and hand; Biokinetic management of shoulder pain; Anatomy of the hip and lower limbs; Injuries to the hips and lower limbs; Objective tests for hip and lower limb injuries; Biokinetic management of overuse and pain in the lower limbs; Biokinetic management of traumatic knee injuries; Biokinetic management of ACL injuries; Biokinetic management of lower leg, ankle and foot conditions		
Assessment	50% consisting of tests, practicals and assignments 50% consisting of the final examination (3 Hours)		
DP Requirement	40%		

Title	**Management of Chronic Diseases and Disabilities**		
Code	4BSS 506	Department	Biokinetics & Sport Science
Prerequisites	BSc, BA or equivalent degree in Human Movement Science / Sport Science	Co-requisites	
Aim	The aim is to equip the students with the theoretical and practical knowledge required to deal with the biokinetic management of chronic diseases and disabilities		
Content	ECG operation, assessment and interpretation Exercise prescription modifications for cardiac patient; Cardiac conditions; Vascular diseases; Arthritis; Diabetes mellitus; Dislipidemia; Obesity; Osteoporosis; Metabolic syndrome; Pulmonary diseases; Lung function tests Immunological and hematological disorders; Pregnancy; Neurological disorders Cognitive, Psychological and sensory disorders; Children; Elderly; Basic pharmacology; Pharmacological agents		
Assessment	50% consisting of tests, practicals and assignments 50% consisting of the final examination (3 Hours)		
DP Requirement	40%		

Title	Research Methodology and project		
Code	4BSS 509	Department	Biokinetics & Sport Science
Prerequisites	BSc, BA or equivalent degree in Human Movement Science / Sport Science	Co-requisites	
Aim	To assist students to understand the principles of research as well as gain expertise in how to conduct research.		
Content	Research methodology Statistical procedures Research project Research ethics Logical thinking		
Assessment	50% Theory consisting of tests and examination 50% Research project		
DP Requirement	Not applicable		

Department of Hydrology

STAFF

Professor	V Elumalai, MSc (Madras), PhD (Anna) Pr. Sci. Nat.
Lecturer	AJ Hall, BSc (Hons) (Hydrology) (UZ), MSc (Envi and Geog Sci) (UCT) RV Makahane, BSc (Hons) (Geology) (UFS), MSc, PhD (Geohydro) (UFS)
Senior Technician	Vacant
Laboratory Assistant	BX Makhathini, BAdmin (UNIZULU)

Hydrological Research Unit

Acting Director	V Elumalai, MSc (Madras), PhD (Anna) Pr. Sci. Nat.

BSc (Hons) (Hydrology) [QUALIFICATION CODE 4HON08]

Admission

The student must hold a B.Sc. Degree with Hydrology as a major or hold a B.Sc. Degree in a field within the Earth Sciences which must contain a significant hydrological component. The Head of Department will assess such a degree and assess if it is adequate for entry to the B.Sc. honours degree.

Curriculum

The degree programme consists of advanced lectures, seminars, assignments and practical work in four specialised fields and a research project.

If a student has not passed Geographic Information Systems (4HYD222) or an acceptable equivalent, then the student must register for this module concurrently with their honours registration. This module must be passed before the degree may be awarded.

Theory Modules (20 credits, NQF level 8)

The student must register for four theory modules, at least three of which must be offered by the Department of Hydrology. The fourth module may be selected from the list of hydrology modules or it may be selected from a related discipline in which the student has the necessary grounding. Students must consult with the Head of Department before selecting modules since all modules may not be offered in any given year.

4HYD501	Soil Hydrology	4HYD502	Groundwater Studies
4HYD503	Hydrological Modelling	4HYD504	Water Resources Management
4HYD505	Hydroinformatics	4HYD506	Disaster Management

Research Project (40 credits, NQF level 8)

The student must conduct a Hydrological Research Project (4HYD509), which will form the basis of a junior dissertation. The project must be defined in consultation with the Head of Department. Research is to start as soon as lectures commence and regular reports must be submitted to the supervisor. A formal proposal must be submitted, presented and accepted before the start of April.

MSc (Hydrology) [QUALIFICATION CODE 4MSC08, MODULE CODE 4HYD700]

The General rules and the Faculty rules pertaining to Masters study apply

PhD (Hydrology) [QUALIFICATION CODE 4PHD08, MODULE CODE 4HYD800]

The General rules and the Faculty rules pertaining to Doctoral study apply

Title	**Soil Hydrology**		
Code	4HYD501	Department	Hydrology
Prerequisites	4HYD211 AND 4HYD212 OR EQUIVALENTS	Co-requisites	None
Aim	To provide the student with sufficient knowledge on the role of soil water in hydrology as affected by the variation of soils and their physical properties, and how this influences the process of soil water modelling, irrigation and erosion.		
Content	Variation of soil physical characteristics within the soil profile. Soil formation and classification requirements in hydrology; The characteristics of clay minerals and clay and how they affect water storage and movement; The free energy state of water and soil water potential; The flow of water in saturated and unsaturated soils; Entry of water into the soil (infiltration) and its movement through the soil; Redistribution of water following infiltration; Direct and indirect measurement of soil water; Water balance and energy balance in the field Evaporation from bare surface soils, interaction of soil wetness, suction, and transpiration rate, including the hazard of salinization due to shallow water tables Soil water applications in hydrological modelling and irrigation Factors affecting soil erosion and application of the USLE erosion model and its derivates		
Assessment	50% Continuous Assessment comprising assignments and 50% Summative Assessments comprising a three hour examination at the end of the Module		

DP Requirement	Completion of assignments, presentations, fieldwork and interim assessments

Title	**Groundwater Studies**		
Code	4HYD502	Department	Hydrology
Prerequisites	4HYD321 OR EQUIVALENT	Co-requisites	None
Aim	This module covers the occurrence, development, and protection of ground water in order for South Africa to receive maximum benefit from its ground-water resource. The module furthermore gives the students the groundwater expertise to work with and advise, well drillers, and others engaged in the study and development of ground-water supplies. It consists out of 3 sections. Section 1 gives the theoretical basis for groundwater occurrence, regime and dynamics. Section 2 focuses on the basic elements of ground-water hydrology, arranged in order from the most basic aspects of the subject through to the methods used to determine the yield of aquifers to occurrences in different rock types as well as common problems encountered in the operation of ground-water supplies. Section 3 provides the practical experience in groundwater exploration and exploitation.		
Content	Occurrence of groundwater, regime and dynamics Groundwater quality; Groundwater networks and observation methods; Processing and presentation of data; Remote sensing techniques for groundwater prospecting. Geophysical techniques in groundwater investigations; Well drilling and design methods Determining hydrodynamic and contaminant transfer parameters of groundwater Nuclear techniques in groundwater investigations; Hydrogeological mapping Assessment of groundwater resources and groundwater regime forecasting Groundwater management; Changes in hydrogeological conditions on the environment and Groundwater quality protection Hydrogeology of carbonate rocks, hard rocks and volcanic rocks Surface Water: Groundwater Interaction in a SA Context Practical Input: Field Trips Groundwater Investigation Project		
Assessment	50% Continuous Assessment comprising assignments and 50% Summative Assessments comprising a three hour examination at the end of the Module		
DP Requirement	Completion of all Presentations, Field Trip Reports and Interim assessments		

Title	Hydrological Modelling		
Code	4HYD503	Department	Hydrology
Prerequisites	4HYD332 OR EQUIVALENT	Co-requisites	4HYD222
Aim	The aim of this module is to provide a comprehensive tool for simulating all aspects of integrated hydrology. This module will familiarize students with hydrological modelling concepts, model usage, and modelling limitations. They will further apply modelling to reconnaissance studies that precede field investigations, interpretative studies following the field program, and for predictive studies in estimating future field behaviour. An integrative approach between surface water hydrology and groundwater hydrology will be followed using Mike SHE and Mike 11 software packages.		
Content	Integrated Hydrology Overview of Models and Modelling (Conceptual, Physical, Statistical and numerical models) Conceptual and Numerical Modelling Modelling Applications (surface water models, groundwater models, integrated models) Introduction to Mike SHE as an integrated model Overview of SZ, UZ and Evapo-transpiration (ET) Mike SHE Saturated (SZ) And Unsaturated Zone (UZ) Exercises Overview of MIKE 11 And Surface Water MIKE 11 Exercises Principles of Calibration Case Studies and Future Directions Mike SHE Project		
Assessment	50% Continuous Assessment comprising assignments and 50% Summative Assessments comprising a three hour examination at the end of the Module		
DP Requirement	Completion of all Exercises and Interim assessments		

Title	Water Resources Management		
Code	4HYD504	Department	Hydrology
Prerequisites	4HYD342 OR EQUIVALENT	Co-requisites	None
Aim	This module will cover various aspects of water resources management that are important to South Africa at the present time. The various aspects will be covered in varying detail and will focus on problems and difficulties		

	that the country is experiencing in balancing water availability and water demand. The country is very much in a state of transition and considerable effort is needed to ensure that water is managed in an equitable and sustainable manner.
Content	History of water law and water policy in South Africa (up to 1994); Development of the new Water Act (white papers, policy documents); Water Act of 1998; Implications of the new Water Act (The Reserve, Resource Directed Measures, Source Directed Controls Water Allocation Reform); National water resources strategy (Restructuring of water management in South Africa); Water Conservation and Water Demand Management; Integrated water resources management; Dams and Development (social and economic constraints to water resources management)
Assessment	50% Continuous Assessment comprising assignments and 50% Summative Assessments comprising a three hour examination at the end of the Module
DP Requirement	Completion of all assignments

Title	**Hydroinformatics**		
Code	4HYD505	Department	Hydrology
Prerequisites	4HYD311& 4HYD321, 4HYD332 & 4HYD342 OR EQUIVALENTS	Co-requisites	4HYD222
Aim	The module aims to give a broad overview of the integration of current and future based computer methods and tools in hydrology and water resources management.		
Content	Introduction to basic concepts (data vs information) Data types (notional, rational, spatial, temporal, remote, raster, vector, etc.), Data management data modelling (databases, data warehouses, etc), The role of data in hydrology and water resources management. Methods and tools to convert data into information (models, modelling). Advances and limitations in computing systems driving information generation (High speed computers, large memory, large storage capacity, parallel computing, cloud computing). Advances in Information dissemination (mapping, graphing, 3D graphics, videos, etc.). The integration of computing methods such as Geographical information Systems and Mike SHE, Remote sensing, and computer mapping in hydrology.		

Assessment	50% Continuous Assessment comprising assignments and 50% Summative Assessments comprising a three hour examination at the end of the Module
DP Requirement	Completion of all assignments

Title	**Disaster Management**		
Code	4HYD506	Department	Hydrology
Prerequisites	NONE	Co-requisites	
Aim	This module is designed to introduce the subject of disaster management (DM) to Hydrological students who in future will form part of disaster management teams, government, NGOs, and donors. The module is designed to increase the student's awareness of the nature and management of disasters. This should lead to better performance in disaster preparedness and shape them to begin to see mitigation of disasters as a component of development, and disasters as opportunities to further development goals. The overall objectives of this training module aims to create interest in disaster management stimulate motivation relate the learning to their values and attitudes about disaster management		
Content	Theory: Introduction to DM; Concepts and terms in DM; Natural Disaster Assistance and Refugee Operations; Tools and Methods of DM; Technologies of DM Presentations: Drought and famine; Disaster Preparedness; Disaster Assessment; Disaster Mitigation; Vulnerability and Risk Assessment; Rehabilitation and Reconstruction; Building capacities for Risk Reduction; Disasters and Development; Exercises: Slope Processes; Earthquakes; Volcanoes and earthquakes		
Assessment	50% Continuous Assessment comprising assignments and 50% Summative Assessments comprising a three hour examination at the end of the Module		
DP Requirement	Completion of all Presentations, Field Trip Reports and Interim assessments		

Title	**Research Project**		
Code	4HYD509	Department	Hydrology
Prerequisites	4HYD311, 4HYD312, 4HYD312 & 4HYD322 OR EQUIVALENTS	Co-requisites	None
Aim	The module is aimed at preparing students with skills for independent scientific research. Under guidance from		

	academic staff, students undertake pure or applied research of on a topic of their choice relating to the field of Hydrology.
Content	The content will largely depend on the topic chosen, but students are expected to undertake an extensive literature survey; conduct fieldwork as part of data collection; analyse data and interpret results; and present a written report of the research that is well presented, logically structured and accurately referenced. Students will also make oral presentations of their work at various stages of the research project.
Assessment	Independent research project mini-dissertation (60%), final oral presentation, proposal and interim work and presentations (40%)
DP Requirement	Completion of research project

Department of Mathematical Sciences

STAFF

Professor	Vacant
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	MW Kubheka, MSc (UKZN)
	NM Mkhize, MSc (UKZN), PhD (UKZN)
	PL Zondi, BScHons (UNIZULU), MSc (AIMS), MSc (UNIZULU)
	S Sibiya, BScHons (UKZN), MSc (UKZN)
	S Ndebele, BScHons (UKZN), MSc (UKZN)
nGAP Lecturer	WJ Dlamini, MSc, BScHons, BSc (UKZN)
Secretary	OD Zibani, BA, Dip (Public Admin), PGCE (UNIZULU)

BSc (Hons) (Applied Mathematics) [QUALIFICATION CODE 4HON01]

Admission

In order to be admitted to the qualification, a student shall have obtained a BSc degree majoring in Applied Mathematics or its equivalent with an average of 60% for the third year modules in Applied Mathematics. The Faculty Board may admit a student on special recommendation of the Head of Department if a student does not meet these criteria. Papers offered in a particular year depend upon the availability of staff and the discretion of the Head.

Remarks

Third year mathematics modules are strongly recommended to students enrolling for this module.

The module can be completed over two years in such a way that half of the work is done in each year.

The head of the department may decide which modules are presented in any given year or semester.

Projects are chosen subject to approval by the head of the department.

Up to 2 approved modules may be taken from the Honours syllabi from physics, mathematics, computer science or statistics subject to approval by the heads of departments concerned.

Theory modules

Four theory modules selected from, inter alia, the following:

4AMT501	General Relativity
4AMT502	Relativistic Cosmology
4AMT503	Differential Geometry
4AMT504	Numerical Analysis

4AMT505 Continuum Mechanics
4AMT506 Optimisation

Research project
A research project, 4AMT509, is a compulsory part of the honours studies. The project must be defined in consultation with the Head of Department. Research is to start as soon as lectures commence and regular reports must be submitted to the supervisor. A formal proposal must be submitted, presented and accepted before the start of April.

MSc (Applied Mathematics) [QUALIFICATION CODE 4MSC01, MODULE CODE 4AMT700]

Admission requirements
An honours degree in Applied Mathematics or equivalent qualification subject to the approval of the head of department and the Board of the Faculty of Science.

Examination
In consultation with the head of the department the degree may be awarded by dissertation only or by two written papers and a dissertation. The written papers, if required, will be written either in June or in November, depending upon the student's background and at the discretion of the head of the department. For further information, consult the general rules.

BSc (Hons) (Mathematics) [QUALIFICATION CODE 4HON09]

Admission
In order to be admitted to the qualification, a student shall have obtained a BSc Mathematics degree or its equivalent with an average of 60% for the third year modules in Mathematics. The Faculty Board may admit a student on special recommendation of the Head of Department if a student does not meet this criteria.

Remarks
The qualification can be completed over two years in such a way that half of the work is done in each year.
The head of the department may decide which modules are presented in any given year or semester.
Projects are chosen subject to approval by the head of the department.
Up to 2 approved modules may be taken from the Honours syllabi from physics, applied mathematics, computer science or statistics subject to approval by the heads of departments concerned.

Theory modules

Four modules selected from, inter alia, the following:
4MTH501 Measure theory
4MTH502 Algebra
4MTH503 Differential equations
4MTH504 Numerical analysis
4MTH505 Topology

Research project
A research project, 4MTH509, is a compulsory part of the honours studies. The project must be defined in consultation with the Head of Department. Research is to start as soon as lectures commence and regular reports must be submitted to the supervisor. A formal proposal must be submitted, presented and accepted before the start of April.

BSc (Hons) (Statistics) [QUALIFICATION CODE 4HON14]

Admission
The students who have obtained a BSc degree majoring in Statistics or its equivalent with an average of 60% for the third year modules in Statistics will be admitted to this programme. The Faculty Board of Science and Agriculture may admit a student based on the special recommendations of the HOD if the student does not meet the above criteria. For admission via RPL learners will be required to demonstrate suitability either through work experience and/or other prior learning that has taken place. The institution makes provision for RPL intake, in line with the policies of the institution. The University RPL policy shall apply.

Remarks
The qualification can be completed over two years in such a way that half of the work is done in each year. The head of the department may decide which modules are presented in any given year or semester. Projects are chosen subject to approval by the head of the department. Up to 2 approved modules may be taken from the Honours syllabi from physics, applied mathematics, computer science or mathematics subject to approval by the heads of departments concerned.

Theory modules
Four modules selected from, inter alia, the following:

4STT501	Categorical Data Analysis
4STT502	Time Series Analysis
4STT503	Multivariate Analysis
4STT504	Correspondence Analysis and Biplots
4STT505	Stochastic Processes
4STT506	Probability Theory

Research project
A research project, 4STT509, is a compulsory part of the honours studies. The project must be defined in consultation with the Head of Department. Research is to start as soon as lectures commence and regular reports must be submitted to the supervisor. A formal proposal must be submitted, presented and accepted before

PhD (Mathematics) [4MTH800]
[QUALIFICATION CODE 4PHD09, MODULE CODE 4MTH800]

Prospective candidates should consult the Head of Department and familiarise themselves with the general rules. The thesis will be based on a piece of original

research in some branch of Mathematics, worthy of publication in a reputable research journal.

Applied Mathematics

Title	General Relativity		
Code	4AMT501	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	None
Aim	This module covers the basic ideas of general relativity.		
Content	Tensor calculus, Field equations in free space, Schwarzschild solution, Black holes, Gravitational waves, Equations for nonempty space, conservational laws & variational principles		
Assessment	50% CAM, 50% Final examination		
DP Requirement	80% attendance at lectures & tutorials, 40% CAM		

Title	Relativistic Cosmology		
Code	4AMT502	**Department**	Mathematical Sciences
Prerequisites	4AMT501	**Co-requisites**	None
Aim	Study of the basic principles of relativistic cosmology		
Content	Kinematics, conservation equations, field equations & models, observations, causal properties & horizons.		
Assessment	50% CAM, 50% Final examination		
DP Requirement	80% attendance at lectures & tutorials, 40% CAM		

Title	Differential Geometry		
Code	4AMT503	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	None
Aim	This module is designed to give the student a survey of geometry and its applications. It will introduce differential geometry and its applications and will expose the student to the representation of geometric concepts using MATHEMATICA		
Content	Introduction to classical geometry: Euclidean, Non Euclidean and projective geometry, Differential manifolds, Differential forms, Local and Global theory of curves and surfaces, Minimal surfaces, Tubes, Applications.		
Assessment	50% CAM, 50% Final examination		
DP Requirement	80% attendance at lectures & tutorials, 40% CAM		

Title	Numerical Methods		
Code	4AMT504	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	None

Aim	This module introduces advanced topics in numerical methods and numerical methods for solving partial differential equations.
Content	Fast Fourier transform. Spectral methods. Numerical solutions to partial differential equations. Parallel algorithms.
Assessment	50% CAM, 50% Final examination
DP Requirement	80% attendance at lectures & tutorials, 40% CAM

Title	**Continuum Mechanics**		
Code	4AMT505	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	None
Aim	Continuum mechanics encompasses the fields of Hydrodynamics, Acoustics. Aeronautics and Elasticity theory. The aim of this module is to introduce hydrodynamics and acoustics as an example of the methodology of Continuum mechanics.		
Content	Kinematics and deformation, Derivation of the Navier–Stokes equations, Ideal inviscid flows, Rotating fluids, Compressible fluids, Acoustic applications, Computational fluid dynamics, Application in aeronautics		
Assessment	50% CAM, 50% Final examination		
DP Requirement	80% attendance at lectures & tutorials, 40% CAM		

Title	**Optimization**		
Code	4AMT506	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	None
Aim	To provide the student with a knowledge and understanding of the theory and tools of optimization and their applications to optimal control.		
Content	Necessary and sufficient conditions for local minima. Equality constraints and Lagrange multipliers. Inequality constraints and the Kuhn-Tucker conditions. Application of saddle point theorems to the solutions of the dual problem. One-dimensional search techniques. Gradient methods for unconstrained optimization. Non-linear control systems, Optimal control, Pontryagin's Maximum Principle, Applications of the Maximum Principle		
Assessment	50% Continuous assessment mark 50% Exam mark		
DP Requirement	80% attendance, 40% Continuous assessment mark		

Title	**Research Project**		
Code	4AMT509	**Department**	Mathematical Sciences

Prerequisites	None	**Co-requisites**	4 Hons modules
Aim	Student to carry out a minor research project under supervision of a staff member		
Content	To be decided upon in consultation with the student and department		
Assessment	50% seminar, 50% written project		
DP Requirement	N/A		

Mathematics

Title	**Measure Theory**		
Code	4MTH501	**Department**	Mathematical Sciences
Prerequisites	4MTH321	**Co-requisites**	None
Aim	To provide students with a solid foundation in measure theory.		
Content	Differentiation and absolute continuity, Abstract measure and integration, Measure, Outer measure, Product measure, Measurable functions,		
Assessment	50% Continuous assessment mark 50% Exam mark		
DP Requirement			

Title	**Algebra**		
Code	4MTH502	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	None
Aim	The objective of this module is to provide students with as much depth and comprehension as possible in their study of abstract algebra and linear algebra.		
Content	Groups and representations, Vector Spaces and modules, Rings of polynomials, Factorizations of polynomials over a field, Euclidean rings, Field extensions and Galois Theory.		
Assessment			
DP Requirement	Satisfactory completion of all assignments		

Title	**Differential Equations**		
Code	4MTH503	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	None
Aim	This module introduces advanced topics in differential equations, especially partial differential equations.		
Content	Partial differential equations. Green's function. Fourier and Laplace transforms. Examples of nonlinear PDE's. Bifurcation theory.		

Assessment	50% CAM, 50% Final examination
DP Requirement	80% attendance at lectures & tutorials, 40% CAM

Title	**Numerical Methods**		
Code	4MTH504	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	None
Aim	This module introduces advanced topics in numerical methods and numerical methods for solving partial differential equations.		
Content	Fast Fourier transform. Spectral methods. Numerical solutions to partial differential equations. Parallel algorithms.		
Assessment	50% CAM, 50% Final examination		
DP Requirement	80% attendance at lectures & tutorials, 40% CAM		

Title	**Topology**		
Code	4MTH 505	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	None
Aim	Today in nearly all branches of analysis and it its far-reaching applications, topological methods are used and topological questions asked. Such a wide range of applications naturally requires that the conceptual structure be of such precision that the common core of the superficially different questions may be recognized. This module gives basic ideas needed for a future analyst.		
Content	Connectedness, Compactness, Product spaces Tychonoff Theorem, Separation axioms, Urysohn Lemma, Tietzs Extention Theorem, Metrizable spaces, Stone-Cech Compactification		
Assessment	50% from Continuous Assessment Mark & 50% from Final Exam Mark		
DP Requirement	80% of Attendance and 40% Continuous Assessment Mark		

Title	**Functional Analysis**		
Code	4MTH506	**Department**	Mathematical Sciences
Prerequisites	4MTH321	**Co-requisites**	None
Aim	This module aims to explore the consequences of equipping a vector space with a compatible metric, and show how this leads to a natural setting for many problems in analysis.		
Content	Vector spaces, Metric spaces, Normed linear spaces, Banach spaces, Subspaces, Linear operators and functionals, Hilbert spaces, The Hahn-Banach theorem, Spectral theory of linear operators, Topological vector		

	space and distributions, Basics of projections and orthonormal sets.
Assessment	50% Continuous assessment mark 50% Exam mark
DP Requirement	80% attendance, 40% Continuous assessment mark

Title	**Research Project**		
Code	4MTH509	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	4 Hons modules
Aim	Student to carry out a minor research project under supervision of a staff member		
Content	To be decided upon in consultation with the student and department		
Assessment	50% seminar, 50% written project		
DP Requirement	N/A		

Statistics

Title	**Categorical Data Analysis**		
Code	4STT501	**Department**	Mathematical Sciences
Prerequisites	Experimental Design, Linear Models	**Co-requisites**	None
Aim	This module is designed to teach students how to analyse categorical data.		
Content	**Two-way contingency tables:** Analysis of 2×2 tables and tables; **Three-way contingency tablets:** Analysis of tables; **Generalised Linear model:** Logistic Regression model, Negative Binomial Regression model; Multicategory Logit model; **Ordinal Response models:** Models involving data on the ordinal scale; **Log-linear models:** Analysis of data using the log-linear representation; **Practical computing applications:** Computing using statistical software and real live data for each of the above-mentioned techniques.		
Assessment	50% CAM, 50% Final examination		
DP Requirement	80% attendance at lectures & tutorials, 40% CAM		

Title	**Time Series Analysis**		
Code	4STT502	**Department**	Mathematical Sciences
Prerequisites	Random Processes, Time Series (undergraduate)	**Co-requisites**	None

Aim	The aim of this module is to introduce a variety of statistical models for time series, cover the main methods for analysis and give practical experience in fitting such models.
Content	**ARMA and Arima models:** Analysis of ARMA and Arima models using the Box-Jenkins approach; **Seasonal time series models:** Analysis of seasonal data using SARMA models, Exponential smoothing models, How to fit the exponential smoothing model and obtain forecast from such model, ARMA and ARIMA forecasting, How to obtain forecasts from the fitted model, Intervention analysis, How to analyse data that are affected by some external intervention, Transfer function models, Models involving analysis of two-time series, Introduction to ARCH and GARCH model, Models that model variation, Practical computing applications, Computing using statistical software and real live data for each of the above-mentioned techniques.
Assessment	50% CAM, 50% Final examination
DP Requirement	80% attendance at lectures & tutorials, 40% CAM

Title	**Multivariate Analysis**		
Code	4STT503	**Department**	Mathematical Sciences
Prerequisites	Linear Algebra, Linear Models	**Co-requisites**	None
Aim	The aim of the module is to introduce students to the main ideas and their justifying theories of multivariate statistical analysis.		
Content	**Multivariate normal distribution:** Form, properties and practical application; **Multivariate t-tests:** Hotelling's t-squared for multivariate data; **Profile analysis:** Analysis of multivariate repeated measures data; **Discriminant analysis:** How to identify two or more groups from data; **Multivariate analysis of Variance (MANOVA):** A procedure for comparing multivariate means of several groups; **Principal Component Analysis:** Transforming data involving correlated variables into a set of uncorrelated variables; **Factor Analysis:** Describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors; **Cluster Analysis:** To group a set of objects in such a way that objects in the same group are more similar to each other than to those in other groups; **Canonical Correlation Analysis:** A method to extract information from cross-covariance matrices; **Practical computing applications:** Computing using statistical software and real-life data for each of the abovementioned.		

Assessment	50% CAM, 50% Final examination
DP Requirement	80% attendance at lectures & tutorials, 40% CAM

Title	**Correspondence Analysis and Biplots**		
Code	4STT504	**Department**	Mathematical Sciences
Prerequisites	Experimental Design, Linear Models	**Co-requisites**	Multivariate Analysis
Aim	The aim of this module is to introduce the theory of Correspondence Analysis and Biplots and its practical applications in Statistics.		
Content	**Correspondence Analysis:** Geometry underlying Correspondence Analysis, Theory of Correspondence Analysis, Theory of Multiple Correspondence Analysis, Special topics (Stability, Re-weighting, Horseshoe Effect, Additional constraints, Missing data, Symmetric Matrices), Computing aspects of practical applications using R software; **Biplots:** Principal components theory and practice, Singular Value Decomposition (SVD), theory and geometric interpretation, Vector geometry of biplots, Regression, Generalized linear model biplots, Log ratio biplots, Discriminant Analysis biplots, Computer applications and Interpretation of biplots e.g. using the R package BiplotGui, Multidimensional scaling biplots.		
Assessment	50% CAM, 50% Final examination		
DP Requirement	80% attendance at lectures & tutorials, 40% CAM		

Title	**Stochastic Processes**		
Code	4STT505	**Department**	Mathematical Sciences
Prerequisites	Random Processes, Applied Mathematical Methods	**Co-requisites**	Multivariate Analysis
Aim	The aim of this module is to study the basic theory of stochastic processes in discrete and continuous time. We use mathematical techniques to explore the behaviour of these processes.		
Content	**Markov Chain:** Definition and basic properties, The long term probability distribution of a Markov chain, Modelling using Markov chains; **Time-homogeneous Markov jump process:** Poisson process and its basic properties, Kolmogorov differential equations; **Basic principles of stochastic modelling:** Classification of stochastic modelling, Postulating, estimating and validating a model,		

	Simulation of a stochastic model and its applications; **Brownian motion:** Definition and basic properties, Stochastic differential equations, The Ito integral and Ito formula, Diffusion and mean testing processes, The solution of the stochastic differential equation for the geometric Brownian motion, Ohrnstein-Uhlenbeck process.
Assessment	50% CAM, 50% Final examination
DP Requirement	80% attendance at lectures & tutorials, 40% CAM

Title	**Probability Theory**		
Code	4STT506	**Department**	Mathematical Sciences
Prerequisites	Real Analysis	**Co-requisites**	None
Aim	The aim of the module is to provide students with a solid grounding in probability theory and advanced probability models.		
Content	Probability Spaces, Independence, Laws of Large Numbers, Characteristics Functions, Central Limit Theorems, Introduction to Stochastic Calculus.		
Assessment	50% CAM, 50% Final examination		
DP Requirement	80% attendance at lectures & tutorials, 40% CAM		

Title	**Research Project**		
Code	4STT509	**Department**	Mathematical Sciences
Prerequisites	None	**Co-requisites**	4 Hons modules
Aim	The aim of this module is to develop a variety of research methods, skills and expertise in conducting a research project.		
Content	Students will be given an opportunity to select a research project in the area of mathematical statistics, applied statistics, time series analysis, statistical quality control, machine learning and data mining, probability theory, stochastic process and statistical inference.		
Assessment	50% seminar, 50% written project		
DP Requirement	N/A		

Department of Nursing Science

STAFF

Professor	Vacant
Associate Professor	ST Madlala, Dip (Gen, Com, Psy, Mid) (FSSON), Adv Dip (Ed & Ad) (UNISA), BTech Occ Health (TUT), Hon Health Studies (UNISA) MTech Nursing (DUT), PGDip Pub Health (UNISA), D Nursing (DUT)
Senior Lecturers	NSB Linda, B Cur (E et CHN) (UNISA), MN (UKZN), PhD (UWC), RN, RM, Intensive Nursing Science RN, RM
Lecturers	AS Joubert, B Cur (UP), M Cur (UP), RN, RM, Certificate (Nursing Education) (UNISA), PhD Nursing Science L Mgobhozi, BTech Nursing (DUT), M Nursing (UKZN), RN, RM, Dip (Nursing Education) (NWU), PHC (UKZN) Z Pillay, BCur (UNISA), MNSc (UNISA), RN RM, CHN, Psych, DNEd, DNA. BJ Molato, BNSc (NWU), MA Nur (NWU), BA Nur Ed (NWU), Adv Dip Health Serv MN (NWU) X Dlamini, BCur (NMU), PGDip NE (USB), Dip HSM (NWU), MCur Adv Mid & Neo (NMU)
nGap Lecturer	F Singh, MA Nursing (UNISA); BCom Business Management (UNISA); BA Nursing Health Service Management and Education (UNISA); Intensive Nursing Science RN; Dip (RN), (CHN), (Psych), Mid., Doctor of Nursing (UNIZULU)
Secretary	NT Makhoba, BA Hons, PGDip (Education), (UNIZULU)
Professional Support Coordinator	CH Ngcobo, NDipHRM (DUT), BTechHRM (DUT)
Clinical Skills Laboratory Manager	Vacant
Clinical Instructors	N Mkhwanazi, B Cur (UNIZULU), B Cur E et A (UNIZULU) SL Ngomane, B CUR (UNIZULU), BA Nursing (Health service management & Nursing Education) (UNISA), PGDip Public Health (UNISA) MA Mkhwanazi, Dip (RN), (CHN), (Psych), Mid; Dip Advanced Midwifery & Neonatal Nursing; BA Nursing (Health Service Management & Nurse Education)

Master Degree in Nursing Science (M Nurs) [QUALIFICATION CODE 4MCR20, MODULE CODE 4NUR700 - DISSERTATION]

The purpose of this degree is to develop learners towards an integrated conceptual nursing framework and enable them to acquire expert knowledge in nursing practice and skills as researchers in nursing science.

Doctoral degree in nursing science (D Phil)
[QUALIFICATION CODE 4DPH20, MODULE CODE 4NUR800]

The purpose of the doctoral degree is to enable learners to develop advanced skills as researchers in nursing science to advance nursing knowledge and enhance professional maturity and practice.

Department of Physics

STAFF

Professor	SS Ntshangase, BSc Hons, MSc (UNIZULU), PhD (UCT), MSAIP, PGDHE (UKZN)
Associate Professor	T Jili, BSc Hons (UNIZULU), MSc (Atlanta, USA), PhD (WITS), MSAIP, Pr. Phys
Senior Lecturers	CL Ndlangamandla, BSc Hons, MSc, PhD (UNIZULU) MSAIP, Pr.Phys
Lecturers	PN Biyela, BSc Hons, MSc, PhD (UNIZULU), MSAIP, PGDip (HE) (UKZN) CT Thethwayo, BSc Hons, MSc (UNIZULU), PS Mkwae, BScHons, MSc and PhD (UNIZULU) PZ Ngcobo, BSc, Hons, MSc (UNIZULU) PhD (UCT), MSAIP
Temporal Lecturer	GM Mengistie, BEd (JU), MSc (AAU),MSc (UCT), PhD (NWU)
Senior Laboratory Assistant	Chonco, BSc Hons, MSc (UNIZULU), MSAIP SP Noncolela, BSc(UKZN), Hons MSc (UWC) PP Majozi, BScHons, MSc (UNIZULU) TXA Ntombela BSc, BSc Hons (UNIZULU)
Laboratory Technician	NS Khanyile, Computer hardware and Software A+, N+ (Mega Training)
Secretary	NC Mothapo, Dip (Sec) (Working World)

BSc (Hons) (Physics) [QUALIFICATION CODE 4HON11]

Remarks
This is a one year course for full-time students.
Prospective students will normally have completed the requirements for a B.Sc. degree in Physics or a related discipline.

The student shall register for a minimum of five courses in consultation with the Head of Department. One 3-hour paper shall be written on four of the courses and the fifth course is a project course.

The modules,

4PHY501	Mathematical and Numerical Methods of Physics
4PHY502	Advanced Quantum Mechanics
4PHY509	Project Physics

are compulsory for all students. The duration of all courses is six months except for the project course which takes one year. The Department offers two specialised streams, Solid State Physics and Nuclear Physics.

Students in the Solid-State stream must include:

4PHY504	Solid State Physics, Applications of Solid-State Physics

Students in the Nuclear Physics stream must include:

4PHY503 Nuclear Physics, Applications of Nuclear Physics and Radioactivity

A fifth course can be chosen from the following:
4PHY505 Electrodynamics
4PHY506 Statistical Mechanics
4PHY507 Electronics and Applications
Or an honours module selected from another Department in consultation with the Head.

MSc (Physics) [QUALIFICATION CODE 4MSC11, MODULE CODE 4PHY700]
This course consists of a dissertation on an approved topic, or of a dissertation plus coursework on theory on which examination papers will be written, as arranged with the supervisor appointed in consultation with the Head of Department. Seminars will be an integral part of the course. Prospective students will normally have completed the requirements for a BSc Honours degree in Physics or a related discipline. The course duration shall be a minimum of one year.

PhD (Physics) [QUALIFICATION CODE 4PHD11, MODULE CODE 4PHY800]
This course consists of a thesis on an approved topic as arranged with the supervisor appointed in consultation with the Head of Department. Seminars will be an integral part of the course. Prospective students will normally have completed the requirements for a MSc degree in Physics or a related discipline. The course duration shall be a minimum of two years.

Title	**Mathematical Methods of Physics**		
Code	4PHY501	Department	Physics
Prerequisites	BSc (Physics)	Co-requisites	4PHY502
Aim	The module is meant for BSc (Hons) and deals with advanced fundamental concepts of Mathematical Methods of Physics and it prepares the student for both theoretical and experimental physics at Masters and doctoral level. It prepares the student for research work in the field. It contains advanced concepts in Mathematical Methods in Physics and materials science.		
Content	• Coordinate Systems and Vector Analysis • Tensors • Mathematical Series • Group Theory, Determinants and Matrices • Complex Functions • Differential Equations • Special Functions of Physics • Fourier Series • Integral Transforms • Integral Equations • Project & Practicals		

Assessment	Continuous assessment mark (50%, consisting of 2x 2-hr tests, at least one project), 1x3-hr exam (50%).
DP Requirement	30% Continuous Assessment Mark, 80% Attendance at practicals & Project work

Title	**Advanced Quantum Mechanics**		
Code	4PHY502	Department	Physics
Prerequisites	4PHY311, 4PHY322	Co-requisites	4PH501 ,
Aim	The module is meant for BSc (Hons) and deals with advanced fundamental concepts of Quantum Mechanics that prepares the student for both theoretical and experimental physics at Masters and doctoral level. It prepares the student for research work in the field and other related disciplines (Solid State Physics, Nuclear Physics, and Theoretical Physics).		
Content	• Introduction to Quantum Mechanics • Quantum Observables and States • Quantum Dynamics • Some Examples in Quantum Dynamics • The Density Matrix: • Angular Momentum and Spin • Identical Particles • Symmetries and Conservation Laws • The Measurement Problem in Quantum Mechanics • Perturbations and Approximation Methods • Hydrogen and Helium Atoms • Hydrogen Molecular Ion • Quantum Optics		
Assessment	Continuous assessment mark (50%, consisting of 2x 2-hr tests, at least one project), 1x3-hr exam (50%).		
DP Requirement	30% Continuous Assessment Mark, 80% Attendance at practicals & Project work		

Title	**Nuclear Physics, Radioactivity and Applications**		
Code	4PHY503	Department	Physics
Prerequisites	4PHY312, 4PHY311	Co-requisites	4PH 501 4PHY 502
Aim	The module is meant for BSc (Hons) and deals with advanced fundamental concepts of Nuclear Physics, Radioactivity and their Applications. The module prepares the student for both theoretical and experimental physics at Masters and doctoral level. It prepares the student for research work in the field.		
Content	• Basic Nuclear Structure • Elements of Quantum Mechanics • Nuclear Properties		

	• The Force Between Nucleons • Nuclear Models • Nuclear Decay and Radioactivity • Detecting Nuclear Radiations • Alpha Decay • Beta Decay • Gamma Decay • Nuclear Reactions; Neutron Physics; Nuclear Fission • Nuclear Fusion; Accelerators; Nuclear Spin and Moments • Meson Physics • Particle Physics • Nuclear Astrophysics • Applications Of Nuclear Physics
Assessment	Continuous assessment mark (50%, consisting of 2x 2-hr tests, at least one project), 1x3-hr exam (50%).
DP Requirement	30% Continuous Assessment Mark 80% Attendance at practicals & Project work

Title	**Solid State Physics and Applications**		
Code	4PHY504	Department	Physics
Prerequisites	4PHY311, 4PHY322	Co-requisites	4PHY501 , 4PHY502
Aim	The module is meant for BSc(Hons) and deals with advanced fundamental concepts of Solid State Physics that prepares the student for both theoretical and experimental physics at Masters and doctoral level. It prepares the student for research work in the field. It contains advanced concepts in solid state physics and materials science.		
Content	• Crystal Structure • Wave Diffraction and the Reciprocal Lattice • Crystal Binding and Elastic Constants • Crystal Vibrations & Thermal Properties of Solids • Free Electron Gas Model • Energy Bands in Solids • Semiconductors • Fermi Surfaces and Metal • Superconductivity • Diamagnetism and Paramagnetism • Ferromagnetism and Antiferromagnetism • Plasmons, Polaritons, and Polarons • Optical Processes and Excitons • Dielectrics and Ferroelectrics • Surface and Interface Physics • Low Dimensional Structures • Point Defects and Dislocations		

	• Alloys
Assessment	Continuous assessment mark (50%, consisting of 2x 2-hr tests, at least one project), 1x3-hr exam (50%).
DP Requirement	30% Continuous Assessment Mark, 80% Attendance at practicals & Project work

Title	**Advanced Electrodynamics**		
Code	4PHY505	Department	Physics
Prerequisites	4PHY222	Co-requisites	4PHY 501, 4PHY502
Aim	The module is meant for BSc (Hons) and deals with advanced fundamental concepts of Electrodynamics. The module prepares the student for both theoretical and experimental physics at Masters and doctoral level. It prepares the student for research work in the field of electrodynamics and its related disciplines.		
Content	• Introduction to Electrodynamics • Introduction to Electrostatics • Boundary Value Problems in Electrostatics • Magnetostatics • Time-Varying Fields and Maxwell's Equations • Plane Waves • Wave Guides and Resonant Cavities • Simple Radiating Systems, Scattering and Diffraction • Magnetohydrodynamics and Plasma Physics • Special Theory of Relativity • Dynamics of Relativistic Particle and Electromagnetic Fields • Collissions between Charged Particles, Energy Loss and Scattering • Radiation by Moving Charges • Bremsstahlung, Method of Virtual Quanta, Radiative Beta Processes • Multiple Fields		
Assessment	Continuous assessment mark (50% , 2x 2hr tests, at least one project) , 1x3 h exam (50%).		
DP Requirement	30% Continuous Assessment Mark, 80% Attendance at practicals & Project work		

Title	**Advanced Statistical Mechanics**		
Code	4PHY506	Department	Physics
Prerequisites	4PHY311, 4PHY322	Co-requisites	4PHY 501 , 4PHY 502
Aim	The module is meant for BSc (Hons) and deals with advanced fundamental concepts of Statistical Mechanics Physics that prepares the student for both theoretical and experimental		

	physics at Masters and doctoral level. It prepares the student for research work in the field and other related disciplines (Solid State Physics, Nuclear Physics, and Theoretical Physics).
Content	• The Statistical Basis of Thermodynamics • The Ensemble Theory • The Canonical Ensemble • The Grand Canonical Ensemble • Formulation of Quantum Statistics • The Theory of Simple Gases • Ideal Bose Systems • Ideal Fermi Systems • Statistical Mechanics Of Interacting Systems:
Assessment	Continuous assessment mark (50%, consisting of 2x 2-hr tests, at least one project), 1x3-hr exam (50%).
DP Requirement	30% Continuous Assessment Mark, 80% Attendance at practicals & Project work

Title	**Electronics and Applications**		
Code	4PHY507	Department	Physics
Prerequisites	4 SPHY321	Co-requisites	60% average in physics at 3rd year level, 4PHY501, 4PHY502
Aim	The module is meant for BSc (Hons) and deals with advanced fundamentals in Electronics theory and application with a basis in physics. It prepares the student to carry out research in the of electronics and solid state physics focusing on detection data collection and measurement systems.		
Content	• **Instrumentation:** Sensing elements; Signal conditioning elements; Signal processing elements; data presentation elements. • **Computer interfacing:** Digital data communication; Parallel communication; Digital and analogue interface; Serial Interfaces; Serial devices - Universal Asynchronous Receiver Transmitter (UART) and Universal Serial Bus (USB). • **Microcontrollers:** Microcontroller components; communication interface; Software development; Hardware. • **Field Programmable Gate Arrays (FPGA):** Basic Combinatorial Logic; VHDL Processes; Sequential Designs Using Processes; Test Benches and Data Types; Arithmetic		

	Operators; Simulators and LFSR; Finite State Machines; and Timing Considerations in FPGAs.
Assessment	Continuous assessment mark (50%, consisting of 2x 2-hr tests, at least one project), 1x3-hr exam (50%).
DP Requirement	30% Continuous Assessment Mark, 80% Attendance at practicals & Project work

Title	**Project Physics**		
Code	4PHY509	Department	Physics
Prerequisites	4PHY311, 4PHY322,	Co-requisites	4PHY 501 , 4PHY 502 ,
Aim	The module is meant for BSc(Hons) and deals with material suitable for an experimental scientist. It prepares the student for experimental physics at Masters and doctoral level. The student is expected to skills in writing research proposals, conducting projects and experiments, be able to write understandable technical reports and to present results and proposals to an audience. Make a learner to be aware of and adhere to acceptable ethical behaviour.		
Content	**RESEARCH PROPOSAL WRITING:** Importance of writing research proposals, Different types of proposals (Thesis, proposals to solicit funds, etc.). Models of proposals, Essential sections of a proposal, **EXPERIMENTAL PHYSICS:** Data collection & techniques; At least four characterisation methods (RBS, ERDA, Channelling, SEM, Raman Spectroscopy, XPS, ARPES, AFM, UV-VIS) **PROJECTS:** At least one project in either Solid State Physics or Nuclear Physics. PRESENTATION: Presentation skills. **TECHNICAL REPORT WRITING:** How to write a technical report **TECHNIQUES ON PUBLICATION WRITING:** Various methods of writing a successful publication. **CARE OF INSTRUMENTATION AND SAFETY IN THE LABORATORY:** Documentation related to instruments and maintenance of research equipment. Common safety rules and procedures in the laboratory. **ETHICS:** Importance of adhering to accepted ethical rules.		
Assessment	Continuous assessment mark (10% presentation skills,10% writing skills, 90% Project).		
DP Requirement	30% Continuous Assessment Mark, 80% Attendance at practicals & Project work		

Department of Zoology

STAFF

Associate Professor	L Vivier, MSc (UP), PhD (UNIZULU)
Senior Lecturer	NF Masikane, MSc (NMU), PhD (UKZN)
Lecturers	HMM Mzimela, MSc (UNIZULU), SSTD SN Mpanza, MSc (UNIZULU)
Senior Laboratory Assistants	N Nariensamy-Venkatasalu, BSc (Hons) (UNIZULU) M Mothwa, BSc Hons (Limpopo)
Senior Technician	R Seabi, BSc Hons, (Limpopo)
Administrative Assistant	NFC Mbongwa, (Office Management & Technology) (DUT)
Laboratory Assistants	M Mhlongo M Zondo

BSc (Honours) Zoology [Qualification code 4HON15]

Admission requirements
A BSc degree with a major in Zoology, or an equivalent BSc degree as approved by the Board of the Faculty.

Curriculum
The student must register for four theory modules, at least three of which must be offered by the Department of Zoology. The fourth module may be selected from a related discipline in which the student has the necessary grounding. Students must consult with both Head of Departments before selecting modules from another department.

The theory component involves four theory modules, two per semester:
4ZOL501: Population dynamics and Production
4ZOL502: Advanced Freshwater Ecology
4ZOL503: Advanced Estuarine Ecology
4ZOL504: Ecophysiology

Research Project Module 4ZOL509:
This involves a Research Project that runs throughout the year. It incorporates the development of a project proposal and the presentation and defence of the proposal in written and oral format, and the completion of a mini thesis that is defended during a seminar presented by the candidate on completion of the research project.

Assessment

Assessment for each theory module involves assignments (semester mark) and a 3-hr examination (examination mark), written in June (4ZOL501 and 4ZOL502) and November (4ZOL503 and 4ZOL504).
Theory module marks will be calculated as follows: Semester mark: 50%, Examination mark: 50%
For the Research module (4ZL509), the following mark allocation applies: Project proposal (10%), Research Methodology assignments (10%), Project seminars x 2 (20%), Mini thesis (60%).
The final mark is calculated as follows: Theory modules: two thirds of the final mark; Research module: one third of final mark.

MSc (Zoology) [Qualification code 4MSC15, module code 4ZOL700]

Admission requirements:
An Honours Bachelor's degree in Zoology, OR
An Honours Bachelor's degree in another subject OR from another university as approved by Council on recommendation of Senate.
Admission shall be subject to approval by the Board of the Faculty on the recommendation of the Head of Zoology.

Curriculum / Examination
A dissertation on an approved topic.

PhD (Zoology) [Qualification code 4PHD15, module code 4ZOL800]

Admission requirements
An MSc in Zoology OR an equivalent qualification as recommended by the Head of Zoology and approved by the Board of the Faculty of Science.

Curriculum / Examination
A thesis on an approved topic.

Title	**Population Dynamics and Aquatic Production**		
Code	4ZOL501	Department	Zoology
Prerequisites	4ZOL 312 & 4ZOL322	Co-requisites	None
Aim	Production of natural aquatic populations range from the primary producers (plants and phytoplankton) through to the higher trophic levels such as fish stocks. The aim of this module is to expose the student to scientific production studies of the animal community of aquatic ecosystems. This module focuses on two components at opposite ends of the faunal trophic spectrum; the zooplankton as secondary producers at the lower trophic levels and fish stock assessment, representing higher trophic levels and with direct economical importance to humans. Any production study of a natural population is		

	based on population dynamics, which therefore also forms an integral part of this module.
Content	• Population dynamics: Definition of population dynamics. Population parameters, life tables and growth curves. • Secondary Production: Reasons for secondary production estimations, basic methods to calculate secondary production for different types of populations. P/B ratios. • Basics of fish stock assessment: Objectives of fish stock assessments. Data required and how they are estimated or obtained. Aspects such as, stock, cohorts, recruitment, natural and fishing mortality, catch per unit effort, maximum sustainable yield, monitoring of exploited stocks. • Practical component: Secondary production calculation for an estuarine zooplankton population
Assessment	50% Continuous Assessment Mark (Essays, Seminars, Laboratory or Fieldwork etc.) 50% Final Assessment (Final end of module exam).
DP Requirement	40% Continuous Assessment Mark

Title	**Advanced Freshwater Ecology**		
Code	4ZOL502	Department	Zoology
Prerequisites	4ZOL 312 & 4ZOL322	Co-requisites	None
Aim	To provide the student with an in-depth understanding of the theoretical and practical aspects of the nature and importance of South Africa's aquatic resources and its associated ecological functioning, recent advances in Aquatic Resource Management in South Africa as well as recent management protocols and management tools for Aquatic Resource Management in South Africa, To introduce appropriate and relevant practical monitoring, biomonitoring and assessment methods, sampling techniques, data interpretation and report writing associated with Freshwater Ecology and Resource Management.		
Content	The module content will include Advanced Freshwater Ecological principles in South Africa, Water resources in South Africa, the Ecological Reserve in South Africa, the National Water Resource Strategy, Strategies to balance water supply and demand in South Africa, Water management and Water Management Institutions in the new South Africa, Protection and classification of water resources and Aquatic Biomonitoring (The National Aquatic Ecosystem Biomonitoring Programme).		

Assessment	50% Continuous Assessment Mark (Essays, Seminars, Laboratory or Fieldwork etc.) 50% Final Assessment (Final end of module exam)
DP Requirement	40% Continuous Assessment Mark

Title	**Advanced Estuarine Ecology**		
Code	4ZOL503	Department	Zoology
Prerequisites	4ZOL 312 & 4ZOL322	Co-requisites	None
Aim	To provide the student with an in-depth understanding of the theoretical and practical aspects of the nature and importance of estuarine ecosystems with particular reference to South Africa.		
Content	• Review of components of the estuarine ecosystem in general and the South African situation in detail. • Abiotic influences in the estuarine ecosystem including; salinity, temperature, turbidity, oxygen, metals, currents and tidal flows. • Review of anthropogenic impacts on the estuarine environment, generally in a world context and specifically in the South African context. • Influence of abiotic components on the major biotic components of the estuarine ecosystem including zooplankton, benthos, macrocrustacea and fish. • Review of the abiotic influences on the biotic components in the estuarine ecosystem, generally in a world context, and specifically in a South African context.		
Assessment	50% Continuous Assessment Mark (Essays, Seminars, Laboratory or Fieldwork etc.) 50% Final Assessment (Final end of module exam).		
DP Requirement	40% Continuous Assessment Mark		

Title	**Ecophysiology**		
Code	4ZOL504	Department	Zoology
Prerequisites	4ZOL 321 & 4ZOL322	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 controlling the behaviour of cells and organs in response to environmental factors.		

Content	Environmental factors affecting physiological processes in animals. Respiratory physiology of aquatic invertebrates, fish, aquatic mammals and humans. How molecular substances in cells such as DNA and enzymes, and cell division are affected by external or environmental factors.
Assessment	50% Continuous Assessment Mark (Essays, Seminars, Laboratory or Fieldwork etc.) 50% Final Assessment (Final end of module exam).
DP Requirement	40% Continuous Assessment Mark

Title	**Project Design & Implementation**		
Code	4ZOL509	Department	Zoology
Prerequisites	4ZOL 312 & 4ZOL322	Co-requisites	
Aim	This module is designed to get the students to follow through the full research project cycle from inception to write up of research findings.		
Content	The module will involve: • Literature review of research topic • Writing a research proposal • Research seminar of research project • Implementation of research methodology • Fieldwork and data collection • 6. Data analysis and writing up of the report (mini thesis)		
Assessment	40% Continuous Assessment Mark (Project Proposal & Two Project Seminars) and 60% Final Assessment (Mini Thesis).		
DP Requirement	40% Continuous Assessment Mark.		