FACULTIES OF THE UNIVERSITY OF PRETORIA

HUMANITIES
NATURAL AND AGRICULTURAL SCIENCES
LAW
THEOLOGY
ECONOMIC AND MANAGEMENT SCIENCES
VETERINARY SCIENCE
EDUCATION
HEALTH SCIENCES
ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

ISBN 978-1-77592-008-3
FACULTY OF NATURAL AND AGRICULTURAL SCIENCES

- Agriculture Economics, Extension and Rural Development
- Anatomy
- Animal and Wildlife Sciences
- Biochemistry
- Chemistry
- Consumer Science
- Food Science
- Genetics
- Geography, Geoinformatics and Meteorology
- Geology
- Insurance and Actuarial Science
- Mathematics and Applied Mathematics
- Microbiology and Plant Pathology
- Physics
- Physiology
- Plant Production and Soil Science
- Plant Science
- Statistics
- Zoology and Entomology
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LPA(Institut Pedagogique Kinshasa) ................................ Senior Lecturer
Van der Walt, J.H., MSc PhD(Pretoria) ............................. Senior Lecturer
Appadu, A.R., BSc(Hons) PhD(Mauritius) ......................... Lecturer
Chapwanya, M., MSc PhD(Limerick, Ireland) .................... Lecturer
Dinga, Y.V., BSc HED(Fort Hare) BSc(Hons)(Rhodes)  
MSc(Western Cape) ................................................. Lecturer
Garba, S.M., MSc PhD(Putra, Malaysia) ......................................... Lecturer
Jooste, A.S., BSc(Hons) MSc(Pretoria) ......................................... Lecturer
Kellerman, R., BSc(Hons)(RAU) MSc(Johannesburg)  
PhD(Witwatersrand) ................................................. Lecturer
Kufakunesu, R., BSc(Hons) MSc DPhil(Zimbabwe) ..... Lecturer
Mostert, L., BSc(Hons) MSc(Potchefstroom) .......................... Lecturer
Moubandjo, D.V., BSc(Hons)(USTM) PhD(Stellenbosch) .... Lecturer
Van der Hoff, Q., BA(Hons)(Pretoria) MSc(Southern Mississippi) ..... Lecturer
Van Zyl, A.J., MSc Phd(Pretoria) ...................................... Lecturer
Verwey, A., BSc(Hons) MSc(Pretoria) ............................ Lecturer
Vetrik, T., MSc(Constantine the Philosopher Univ, Slovakia)  
PhD(Slovak Univ of Technology) ...................................... Lecturer
Basson, M., BSc(Hons), MSc(Pretoria) .............................. Junior Lecturer
Ostaszewicz, A.J., BSc(Hons)(Pretoria) ............................... Junior Lecturer
Van Wyk, D.W., BSc(Hons)(Pretoria) .............................. Junior Lecturer
Wiggins, H.Z., BSc(Hons) MSc(Cape Town) ................. Junior Lecturer
Yani, B.M., BSc(Hons)(Pretoria) ................................. Junior Lecturer

Department of Microbiology and Plant Pathology
Venter, S.N., MSc PhD(Pretoria) ........................................ Associate Professor  
(Head)
Ashton, P.J., BSc(Hons) MSc PhD(Rhodes) ................................. Extraordinary Professor
Brözel, V.S., MSc Phd(Pretoria) ........................................ Extraordinary Professor
Grabow, W.O.K., BSc(Hons) MSc DSc(Pretoria) .................. Extraordinary Professor
Paweska, J.T., BVSc DVSc Dr hab ........................................ Extraordinary Professor
Rupprecht, C.E., BA(Rutgers Univ) MSc(Wisconsin)  
VMD(Pennsylvania) PhD(Wisconsin) ................................ Extraordinary Professor
Pietersen, G., MSc(Pretoria) PhD(Witwatersrand) ................. Extraordinary Professor
Coutinho, T.A., BSc(Hons) MSc Phd(Natal) ............................ Professor
Nel, L.H., MSc(Free State) Phd(Pretoria) ............................ Professor
Korsten, L., BSc(Hons)(Stellenbosch) MSc Phd(Pretoria) ...... Professor
Roux, J., MSc Phd(Free State) ........................................ Professor
Theron, J., BSc(Hons) MSc Phd(Pretoria) ............................ Professor
Aveling, T.A.S., MSc Phd(Natal) ...................................... Associate Professor
Labuschagne, N., MSc(Agric) DSc(Agric)(Pretoria) PrSciNat .... Associate Professor
Steenkamp, E.T., BSc(Hons) MSc (Free State) Phd(Pretoria) .... Associate Professor
Markotter, W., BSc(Hons) MSc Phd(Pretoria) ....................... Senior Lecturer
Moleleki, L.N., BSc(Hons) MSc(KwaZulu-Natal)  
PhD(Univ of Dundee, UK) ........................................ Senior Lecturer
Thantsha, M., BSc(Hons)(Univ of the North) MSc Phd(Pretoria) ...... Senior Lecturer
Van der Waals, J.E., MSc(Agric) Phd(Pretoria) ................... Senior Lecturer

Department of Physics
Theron, C.C., BSc(Hons)(Port Elizabeth)  
MSc Phd(Stellenbosch) ........................................... Professor (Head)
Chakraborty, P., MSc Phd(Calcutta, India) ......................... Honorary Professor
Gries, W., BSc MSc(Pretoria) Phd(Stellenbosch) ............... Honorary Professor
Van der Merwe, J.H., MSc(Appl Maths)(Stellenbosch)  
MSc(Maths)(Pretoria) Phd(Bristol) ............................... Honorary Professor
Vilakazi, Z.Z., MSc Phd(Witwatersrand) .......................... Honorary Professor
Boeyens, J.C.A, MSc(Free State) DSc(Pretoria) FRSSA Extraordinary Professor
Friedland, E.K.H., MSc DSc(Pretoria) Extraordinary Professor
Alberts, H.W., BSc(Hons) MSc(Potchefstroom) DSc(Pretoria) Emeritus Professor
Bredell, L.J., MSc DSc(Pretoria) Emeritus Professor
Kunert, H.W., MSc(Poznan) PhD(Warszawa) Emeritus Professor
Malherbe, J.B., MSc DSc(Pretoria) Emeritus Professor
Van Staden, J.C., MSc(Pretoria) Dr Rer Nat(Heidelberg) Emeritus Professor
Van der Berg, N.G., BSc(Port Elizabeth) MSc(Unisa) Emeritus Senior
DSc(Pretoria) Lecturer
Auret, F.D., MSc(Physics) MSc(Appl Maths) DSc(Pretoria) Professor
Rakitianski, S., MSc(Tashkent) PhD(Joint Institute for Nuclear Research, Dubna, Russia) Professor
Selyshchev, P., PhD(Inst. For Nuclear Research, Taras Shevchenko Kyiv University) Professor
Chetty, N., BSc(Hons)(Natal) MS Phd(Illinois) Associate Professor
Duvenhage, R. deV., BSc(Hons) MSc PhD(Pretoria) Research, Dr Rer Nat(Heidelberg) Professor
Manyala, N.I., BSc(Hons) MSc(Witwatersrand) PhD(Louisiana State Univ) Associate Professor
Diale, M., BSc(Ed)(UNIBO) MSc(UDM) PhD(Pretoria) Senior Lecturer
Meyer, W.E., MSc PhD(Pretoria) Senior Lecturer
Moji, C., BSc(Hons)(University of the North) MSc PhD(Natal) Senior Lecturer
Nel, J.M., BSc(Hons)(Port Elizabeth) MSc(Cape Town) PhD(Pretoria) Senior Lecturer
Hlatshwayo, T.T MSc(Zululand) PhD(Pretoria) Lecturer
Janse van Rensburg, P.J., BSc(Hons)(Pretoria) Lecturer
Legodi, M.J., BSc(Medunsa) MSc(Pretoria) Lecturer
Machatine, A., MSc(Leipzig) Lecturer
Odendaal, R.Q., MSc(Pretoria) Lecturer
Prinsloo, L.C., MSc HED PhD(Pretoria) First Technical Assistant

Department of Physiology
Van Papendorp, D.H., MBChB(Pretoria) BSc(Hons)
MSc PhD(DStellenbosch) M.Akad.SA Professor (Head)
Joubert, A.M., MSc PhD(Pretoria) Professor
Pretorius E., BSc(Hons) MSc(DStellenbosch) PhD DTI(Pretoria) Professor
Aputu, R.S.K., MBChB(Ghana) PhD(Cantab) Associate Professor
Ker, J., MBChB MMed(Int) PhD(Pretoria) MRCP(Edinburgh) Fellow: European Society of Cardiology Associate Professor
Viljoen, M., MSc PhD(Pretoria) PhD(Witwatersrand)
Nat Dip(Microbiology) Emeritus Professor
Coetzee, M., BSc(DomSci)(Ed) MSc(Potchefstroom)
PhD(Pretoria) Emeritus Senior Lecturer
Du Toit, P.J., BSc MSc PhD(Pretoria) Senior Lecturer
Soma, P., MBChB(Medunsa) MSc(Pretoria) Senior Lecturer
Alumoottil, S., BSc MSc(India) Lecturer
Bipath, P., BSc MSc PhD(Pretoria) Lecturer
Hlloepe, Y., BSc MSc(Pretoria) Lecturer
Grobbelaar, C.W., MBChB(KwaZulu-Natal) MSc(Pretoria) Lecturer
Koorts, A.M., MSc PhD(Pretoria) Lecturer
Piorkowski, T., MBChB(Pretoria) Lecturer
Stander, B.A., B.Med.Sci(Free State) MSc(Pretoria) Lecturer
Van Rooy, M., BSc MSc (Pretoria) .................................................Lecturer
Theron, A.E., MBChB BSc(Hons) MSc(Pretoria) ............................Lecturer

**Department of Plant Production and Soil Science**

Annandale, J.G., MSc(Agric)(Pretoria) PhD(WSU) ......................Professor
(Acting Head)

Kruger, R.A., MSc DSc(Pretoria) .............................................Honorary Professor

Bristow, K.L., BSc(Hons)(Natal) MSc(Free State) PhD(WSU) ........Extraordinary Professor

Duke, S.O., MS(Univ Arkansas) PhD(Duke Univ) .......................Extraordinary Professor

Everson, C.S., BSc(Hons) MSc PhD (KwaZulu-Natal) ..................Extraordinary Professor

Haverkort, A.J., MSc(Wageningen) PhD(Reading) .......................Extraordinary Professor

Reinhardt, C.F., BSc(Hons)(Free State) BSc(Agric)(Hons) MSc(Agric) PhD(Pretoria) ..........................Extraordinary Professor

Singels, A., BSc(Agric)(Hons) MSc(Agric) PhD(Free State) ..........Extraordinary Professor

Stirzaker, R.J., MSc(Agric) PhD(Sydney) .................................Extraordinary Professor

**Van Heerden, P.D.R., MSc(Stellenbosch)**

PhD(Potchefstroom) .........................................................Extraordinary Professor

Chirwa, P. W. C., BSc(Hons)(Bangor) MSc(Gainesville, Florida)

PhD(Nottingham) ..............................................................Associate Professor

Du Toit, E.S., BSc(Hons) MSc(Agric) PhD(Pretoria) ..................Associate Professor

Steyn, J.M., BSc(Hons) MSc(Agric)(Free State) PhD(Pretoria) ......Associate Professor

Avenant, E., BSc(Hons) MSc(Agric)(Pretoria) ..........................Extraordinary Lecturer

Ghebremariam, T.T., MSc(Agric)(Pretoria) ..............................Extraordinary Lecturer

Surridge-Talbot, A.K.J., BSc(Hons) MSc PhD(Pretoria) ..............Extraordinary Lecturer

Van der Laan, M., BSc(Hons) MSc(Agric) PhD(Pretoria) ..........Extraordinary Lecturer

Vahrmeijer, J.T., BSc(Hons) MSc(Potchefstroom) ......................Extraordinary Lecturer

Madakadze, I.C., BSc(Agric)(Hons)(Zimbabwe)

MSc(Reading) PhD(McGill) ...................................................Senior Lecturer

Marais, D., BSc(Agric)(Hons) MSc(Agric) PhD(Pretoria) ..........Senior Lecturer

Taylor, N. J., PhD(KwaZulu-Natal) ........................................Senior Lecturer

Truter, W. F., MSc(Agric) PhD(Pretoria) .................................Senior Lecturer

Vorster, B.J., MSc PhD(Pretoria) ..........................................Senior Lecturer

De Jager, P.C., BSc(Hons)(Potchefstroom) MSc(Pretoria) ..........Lecturer

Tesfamariam, E.H., MSc(Agric) PhD(Pretoria) .........................Lecturer

**Department of Plant Science**

Meyer, J.J.M., PhD(Pretoria) ................................................Professor (Head)

Bredenkamp, G.J., DSc(Pretoria) THOD FLS PrSciNat MSAIE ES

MGSSA ...............................................................................Extraordinary Professor

Smith, G.F., PhD (J.P.H.Acocks Chair) ....................................Extraordinary Professor

Van Rooyen, M. W., PhD(Pretoria) HNED .................................Extraordinary Professor

Berger, D.K., PhD(Cape Town) ................................................Professor

Van Wyk, A.E., MSc(Potchefstroom) DSc(Pretoria) HED FLS ......Professor

Lall, N., PhD(Pretoria) ..........................................................Associate Professor

Kunert, K.S., PhD (Konstanz Germany) .................................Senior Research Fellow

Crampton, B.G., PhD(Pretoria) ..............................................Senior Lecturer

Kritzinger, Q., PhD(Pretoria) ................................................Senior Lecturer

Tshikalange, T.E., MSc PhD(Pretoria) .....................................Senior Lecturer

Bapela, M.J., MSc(Pretoria) ..................................................Lecturer

Kiviet, A.M., BSc(Hons)(Fort Hare) MSc(Michigan State Univ)

HED(Transkei) BEd DEd(Unisa) MEd(Columbia, USA) ............Lecturer
Postgraduate School of Agriculture and Rural Development
Machethe, C.L., BSc(Agric)(Hons)(Fort Hare)
MSc(Agric)(University of the North) M.S. PhD(Michigan) Professor/Director

SADC Centre for Land-related, Regional and Development Law and Policy
Olivier, N.J.J., BA(Law) LLB BA(Hons)(Pretoria)
Drs Juris LLD(Leiden) MA(Pretoria)
BA(Hons)(Potchefstroom) LLD(Pretoria) Professor/Director

SAFCOL Forest Science Chair
Chirwa, P. W. C., BSc(Hons)(Bangor) MSc(Gainesville, Florida) Director/
PhD(Nottingham) Associate Professor

Department of Statistics
Bekker, A., MSc(Johannesburg) PhD(Unisa) Associate Professor
(Acting Head)
Stoker, D.J., BSc MSc(Potchefstroom) MSc(Stellenbosch)
Dr(Math&Phys)(Amsterdam) Honorary Professor
Crowther, N.A.S., BSc(Hons)(Free State) MSc(Port Elizabeth)
DSc(Free State) Professor
Chakroborti, S., PhD(State University of New York) Professor (SARchi
chair holder)
Crafford, G., MSc PhD(Pretoria) Senior Lecturer
Debusho, L.K., MSc(Addis Ababa) PhD(KwaZulu-Natal) Senior Lecturer
Fletcher, L., MSc PhD(Unisa) Senior Lecturer
Kanfer, F.H.J., MSc PhD(Potchefstroom) Senior Lecturer
Louw, E.M., MSc PhD(Pretoria) Senior Lecturer
Millard, S.M., MCom(Pretoria) Senior Lecturer
Swanepoel, A., MSc(Port Elizabeth) Senior Lecturer
Adamski, K., BSc(Hons) MSc(Pretoria) Lecturer
Basson, E.M., BSc(Hons) MSc(Pretoria) Lecturer
Bodenstein, L.E., BCom(Hons) MCom(Pretoria) Lecturer
Coeetsee, J., BCom(Hons) MCom(Pretoria) Lecturer
Corbett, A.D., BCom BSc(Hons)(Pretoria) Lecturer
De Villiers, G.M., MSc(Pretoria) Lecturer
Ehlers, R., MSc PhD(Pretoria) Lecturer
Fabris-Rotelli, I.N., BSc(Hons) MSc(Pretoria) Lecturer
Graham, M.A., BSc(Hons) MSc(Pretoria) Lecturer
Reyneke, F., BSc(Hons) MSc(Pretoria) Lecturer
Strydom, H.F., MSc(Unisa) PhD(Pretoria) Lecturer
Van Staden, P.J., BCom(Hons) MCom(Pretoria) Lecturer

Wingfield M Mondi Chair
Roux, J., PhD(Free State) Professor

Department of Zoology and Entomology
Chimimba, C.T., BSc(Malawi) MSc(Western Australia)
PhD(Pretoria) FLS FZS(London) PrSciNat Professor (Head)
Best, P.B., MA PhD(Cantab) Extraordinary Professor
Cameron, E.Z., BSc MSc(Canterbury) PhD(Massey) Extraordinary Professor
Clutton-Brock, T.H., MA PhD ScD(Cantab) Extraordinary Professor
Crewe, R.M., BSc(Agric) MSc(Agric)(Natal) PhD(Georgia) 
FRES FRSSA MSAAS PrSciNat Extraordinary Professor
Dippenaar-Schoeman, A.S., BSc(Unisa) BSc(Hons) MSc 
PhD(RAU) Extraordinary Professor
Faulkes, C.G, PhD (University College London) Extraordinary Professor
Kfir, R., BSc(Agric) MSc(Agric) PhD(Hebrew University Jerusalem) Extraordinary Professor
Mansell, M.W., Bsc(Hons) Phd(Rhodes) Extraordinary Professor
Moritz, R.F.A., Dip PhD(Frankfurt) Extraordinary Professor
Bennett, N.C., Bsc(Hons)(Bristol) MSc Phd(Cape Town) FZS Professor
Bester, M.N., Bsc(Hons) MSc(Stellenbosch) Dsc(Pretoria) 
PrSciNat Professor
Ferguson, J.W.H., BSc(Port Elizabeth) BSc(Hons) 
Msc(Pretoria) PhD(Witwatersrand) Professor
Millar, R.P., MSc(London) Phd(Liverpool) RFCPath FRSE 
FRSSA Professor (Director)
Nicolson, S.W., Bsc(Hons)(Auckland) Phd(Cantab) FRES Professor
Scholtz, C.H., Bsc(Hons) Msc Dsc(Pretoria) FRES Professor
Van Aarde, R.J., Msc Dsc(Pretoria) PrSciNat Professor
Bastos, A., Bsc(Hons) Msc Phd(Pretoria) Associate Professor
Kruger, K., Mphil(Wales) Phd(Pretoria) FRES Associate Professor
McKechnie, A.E., Msc Phd(Natal) Associate Professor
Pirk, C.W.W., Msc(Berlin TU) Phd(Rhodes) Associate Professor
Robertson, M.P., Bsc Bsc(Hons) Phd(Rhodes) Associate Professor
Garnas, J.R., BA(Colorado) Msc(Maine) Phd(Dartmouth) Senior Lecturer
De Bruyn, P.J.N., Bsc(Hons) Msc Phd(Pretoria) Lecturer
Du Toit, C.A., Bsc(Hons) Phd(Pretoria) Lecturer
Hurley, B., Bsc(Hons) Msc Phd(Pretoria) Lecturer
Golpalraj, J.B.P., Bsc Msc(Madurai Kamaraj Univ) Lecturer
Weldon, C.W., BenvSci(Hons)(Newcastle) Phd(Sydney) Lecturer

Bsc Four-year Programme
Kritzinger, Q., PhD(Pretoria) Senior Lecturer
Grimsley, R., BA(Hons) (Pretoria) MA(Pretoria) Lecturer
Immelman, S., BA(Hons) (Unisa) Lecturer
Leso, T., BA(Hons)(Unisa) Lecturer
Naidoo, J., BA(Hons)(Unisa) Lecturer
Thokwane, D., BA(Hons)(Limpopo) MA(Minnesota) Lecturer

Student Administration
Beresford, M.E., Mrs Head: Student Administration

Faculty Manager
Kotze, S.i, MA Phd(Pretoria)
GENERAL INFORMATION

Admission
Any person who wishes to register at the University for the first time, or after an interruption of studies, should apply or reapply for admission. Application for admission to all undergraduate programmes closes on 30 September.

Selection
A selection procedure takes place prior to admission to the following degree programmes in the Faculty of Natural and Agricultural Sciences:

Postgraduate programmes:
- BScHons in Biotechnology: Applications close on 8 November.
- BScHons in Chemistry: Applications close on 15 December.
- BScHons in Wildlife Management: Applications close on 30 October.
- MScAgric in Animal Science (all specialisations): Applications close on 30 October.

Statement of symbols
When registering at this University for the first time, a candidate has to submit a record of symbols obtained for each subject in the Grade 12 examination.

National Senior Certificate
All undergraduate candidates who enrol at the University of Pretoria for the first time, must show their original National Senior Certificate at the Student Administration of their faculty before the end of the first semester.

Language of tuition
In conducting its general business, the University uses two official languages, namely Afrikaans and English. In formal education, the language of tuition is either Afrikaans or English, or both languages, taking the demand as well as academic and economic viability into consideration. However, it remains the student’s responsibility to determine in which language a module and any further level of that module is presented. The information is published annually in the Timetable. The University reserves the right to change the language of tuition on short notice, depending on the size of the groups and the availability of lecturers. In respect of administrative and other services, a student may choose whether the University should communicate with him or her in Afrikaans or English.

Bursaries and loans
Particulars of bursaries and loans are available on request.
Visit the website: www.up.ac.za/fao

Accommodation
Applications for accommodation in university residences for a particular year should be submitted as from March 1 of the preceding year. Applications will be considered as long as vacancies exist, and prospective students are advised to apply well in advance. Please note that admission to the University does not automatically mean that lodging will also be available.
Welcoming day, registration and start of the academic year
Details of the welcoming day to which all parents are cordially invited, the subsequent programme for registration and start of the academic year during which all new first-year students must be present, are obtainable from the Director: Student Affairs.

Prescribed books
Lists of prescribed books are not available. The appropriate lecturers will supply information regarding prescribed books to students at the commencement of lectures.

Amendment of regulations and fees
The University retains the right to amend the regulations and to change module fees without prior notification.
Please note: The fees advertised and thus levied in respect of a module or study programme presentation represents a combination of the costs associated with the formal services rendered (for example lectures, practicals, access to laboratories, consumables used in laboratories, etc) as well as associated indirect overheads such as the provision of library and recreation facilities, security and cleaning services, electricity and water supply, etc. Therefore the fees in respect of a module or study programme presentation cannot simply be reconciled with the visible services that are rendered in respect of such module or study programme.

NB: The University of Pretoria started phasing in a new system of education and learning during 2000, which meets the requirements set out in the SAQA guidelines (South African Qualifications Authority) and in the NQF (National Qualification Framework). This entails the implementation of training programmes that will be outcomes-based and market-orientated. This system was implemented in the Faculty during 2001.

Presentation of a module or a programme
The Faculty reserves the right not to offer a particular module or programme if there is insufficient resources to do so, or if an insufficient number of qualified students present themselves.

Definition of terms

Familiarise yourself with the following terms. They are used generally in all faculties.

academic year: the duration of the academic year which is determined by the University Council
core module: a compulsory module for a specific study programme or package
module code: consists of an equal number of capitals and digits, which indicate the name of the module, the year of study, the period of study and the level of the module
credits: a number of credits are allocated to each module. These represent the quantity of work and the extent of the module
curriculum: a series of modules grouped together from different subjects over a specified period of time and in a certain sequence according to the regulations
elective module: a module that forms part of a study programme and which may be chosen by the students on condition that sufficient module credits on a specific level is obtained, as is required for the qualification for which the student is registered
examination mark: the mark a student obtains for an examination in a module, including practical and clinical examinations where applicable. If necessary, the examination mark is finalised after ancillary examinations have been completed
**extended study programme**: a study programme for a degree or diploma which is completed according to the regulations over a longer period than the minimum duration of the particular degree or diploma

**final mark**: the mark calculated on the basis of the semester/year mark and the examination mark a student obtained in a particular module according to a formula which is determined from time to time in the regulations for each module with the proviso that should no semester/year mark be required in a module, the examination mark serves as the final mark

**fundamental module**: a module that is regarded as the academic basis of the learning activities in a specific programme or package

**grade point average based on module credits (GPA)**: an average mark that is calculated by multiplying the final mark achieved in a module with the credit value of that module and then dividing the sum of these values by the total of the credit values of all the modules for which a student was enrolled. The result of these calculations is a weighted average based on module credits.

**GS**: a combined mark (semester/year mark plus examination mark) of at least 40% required for admission to a specific prescribed module

**level of a module or year level**: the academic level of a module which is indicated in the module code: this is an indication of the complexity of a module; the year level is indicated by the first digit of the module code (thus, PHY 131 is a module in Physics at level 1)

**learning hours**: This refers to the notional number of hours students should spend to master the learning content of a particular module or programme. The total number of learning hours for a module consists of the time needed for lectures, practicals, self-study and any other activity required by the training programme. Learning hours for modules are calculated on the basis of 40 working hours per week x 28 weeks = 1120 + 80 additional hours for evaluation = 1200. For undergraduate modules, the total number of learning hours per module are calculated using the formula number of credits (per module) x 10.

**module**: a defined part of a subject deemed to be an independent learning unit to which a module code is being allocated; a module is normally offered over seven weeks (quarter module).

**registration**: the process a candidate is required to complete to be admitted as a student of the University or for admission to a module

**regulation for admission**: a regulation drawn up by the Dean of a faculty regarding the admission of students to the faculty. It includes a provision regarding the selection process

**semester module**: a module that extends over one semester

**semester/year mark**: the mark a student obtains during the course of a semester or a year for tests, class-work, practical work or any other work in a particular module as approved by regulation

**subject**: a demarcated field of study of which one module or more may be chosen for a study programme

**syllabus**: the division of the study material for a specific module, according to the regulations

**year module**: a module that extends over one year (two semesters)
REGULATIONS AND CURRICULA

The rules for degrees, diplomas and certificates here published are subject to change and may be amended prior to the commencement of the academic year in 2013.

1. Admission to undergraduate study

1.1. General
(a) To register for a first bachelor’s degree at the University, a candidate must, in addition to the required National Senior Certificate with admission for degree purposes, comply with the specific admission requirements for particular modules and fields of study as prescribed in the admission regulations and the faculty regulations.

(b) Candidates are advised to write the Institutional Proficiency Test of the University of Pretoria.

(c) Applicants are notified in writing of provisional admission. Admission to the Faculty of Natural and Agricultural Sciences is based on the final grade 12 examination results. In the case of the BSc (Four-year programme) candidates may be considered for admission based on the final grade 12 examination results and the results of the compulsory Institutional Proficiency Test.

(d) The following persons may also be considered for admission:

(i) A candidate who is in possession of a certificate that is deemed by the University to be equivalent to the required National Senior Certificate with admission for degree purposes.

(ii) A candidate who is a graduate from another tertiary institution or has been granted the status of a graduate of such an institution.

(iii) A candidate who passes an entrance examination, as prescribed by the University from time to time.

Abovementioned candidates are requested to contact the Student Administration at the faculty for more information regarding admission requirements.

Note: A conditional exemption certificate does not grant admission to bachelor’s study. However, in certain circumstances some of the faculties do accept a conditional exemption on the basis of mature age. Candidates are advised to contact the specific faculty administration in this regard.

(e) The Senate may limit the number of students allowed to register for a module, in which case the Dean concerned may, at his own discretion, select from the students who qualify for admission those who may be admitted.

(f) Subject to faculty regulations and the stipulations of General Regulations G.1.3 and G.62, a candidate will only be admitted to postgraduate bachelor’s degree studies, if he or she is already in possession of a recognised bachelor’s degree.

(g) Admission requirements for the Faculty of Natural and Agricultural Sciences for candidates with a National Senior Certificate:
To be able to gain access to the Faculty and specific programmes prospective students require the appropriate combinations of recognised NSC subjects as well as certain levels of achievement in the said subjects. In this regard the determination of an admission point score (APS) is explained and a summary of the specific requirements, i.e the APS and the specific subjects required is provided.
Determination of an Admission Point Score (APS)
The calculation is simple and based on a candidate’s achievement in six 20-credit recognised subjects by using the NSC ratings, that is the “1 to 7 scale of achievement”. Thus, the highest APS that can be achieved is 42.

Life Orientation is excluded from the calculation determining the APS required for admission per faculty.

<table>
<thead>
<tr>
<th>Rating code</th>
<th>Rating</th>
<th>Marks %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not achieved</td>
<td>0-29%</td>
</tr>
<tr>
<td>2</td>
<td>Elementary achievement</td>
<td>30-39%</td>
</tr>
<tr>
<td>3</td>
<td>Moderate achievement</td>
<td>40-49%</td>
</tr>
<tr>
<td>4</td>
<td>Adequate achievement</td>
<td>50-59%</td>
</tr>
<tr>
<td>5</td>
<td>Substantial achievement</td>
<td>60-69%</td>
</tr>
<tr>
<td>6</td>
<td>Meritorious achievement</td>
<td>70-79%</td>
</tr>
<tr>
<td>7</td>
<td>Outstanding achievement</td>
<td>80-100%</td>
</tr>
</tbody>
</table>

Preliminary admission is based on the results obtained in the final Grade 11 examination. Final admission is based on Grade 12 results.

Please note: The final Grade 12 results will be the determining factor with regard to admission.

Alternative admission channels:
Candidates with an APS lower than required, could be considered for admission to the faculty if they meet the additional assessment criteria specified by the faculty from time to time. Preference will, however, be given to students who comply with the regular admission requirements of the faculty.

Specific requirements for the Faculty of Natural and Agricultural Sciences
1. A valid National Senior Certificate with admission for degree purposes.
2. It is recommended that all applicants write the UP Institutional Proficiency Test
3. The following minimum subject and level requirements:

<table>
<thead>
<tr>
<th>Degree</th>
<th>APS</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSc in Biological Sciences (All the</td>
<td>30</td>
<td>Comply with NSC minimum requirements;</td>
<td>5 (60%-69%) or 4 (50-59%) provided a 5 symbol is</td>
</tr>
<tr>
<td>degrees including Medical Sciences)</td>
<td></td>
<td>ADDITIONALLY one of these languages</td>
<td>obtained for Physical Science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>must be Afrikaans OR English at level</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 (50-59%) provided a 5 symbol is</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>obtained for Mathematics</td>
<td></td>
</tr>
</tbody>
</table>

There are only 72 places available in the first year of BSc (Medical Sciences). Students who apply for Medical Sciences as their first choice before 30 September will be admitted until the places have been filled. Students who indicate it as their second choice will be placed on a waiting list and will be considered in January of the first year of study, if places become available.

Students who do not comply with these entrance requirements and who wrote the Institutional Proficiency Test may be considered for the BSc (Four-year programme) by the Admissions Committee.
### Degree APS

<table>
<thead>
<tr>
<th>Degree</th>
<th>APS</th>
<th>Group A</th>
<th></th>
<th>Group B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BSc in Physical Sciences (Geography, Geology, Environment and Engineering Geology, Meteorology, Environmental Science, Chemistry, Physics, Geoinformatics)</strong></td>
<td>30</td>
<td>Two languages</td>
<td>Mathematics</td>
<td>Physical Science</td>
<td>Two other subjects</td>
</tr>
</tbody>
</table>
| Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 4 (50-59%). | 5 (60-69%) | 5 (60-69%) | Any two subjects 4 (50-59%)
| Students who do not comply with these entrance requirements and who wrote the Institutional Proficiency Test may be considered for the BSc (Four-year programme). | | | |

<table>
<thead>
<tr>
<th>Degree</th>
<th>APS</th>
<th>Group A</th>
<th></th>
<th>Group B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BConsumer Science</strong></td>
<td>26</td>
<td>Two languages</td>
<td>Mathematics</td>
<td>Three other subjects</td>
<td></td>
</tr>
</tbody>
</table>
| Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 4 (50-59%). | 4 (50-59%) | | Any three subjects 4 (50-59%)
| Students who do not comply with these entrance requirements and who wrote the Institutional Proficiency Test may be considered for the BSc: (Four-year programme) by the Admissions Committee. | | | |
| **BSc in Mathematical Sciences (Applied Mathematics, Mathematics, Mathematical Statistics)** | 30  | Two languages | Mathematics | Three other subjects |
| Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 4 (50-59%). | 6 (70-79%) | | Any three subjects 4 (50-59%)
| BSc in Mathematical Sciences (Actuarial and Financial Mathematics) | 34  | Two languages | Mathematics | Three other subjects |
| Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 5 (60-69%). | 7 (80-100%) | | Any 3 subjects 4 (50-59%)
| BSc (Actuarial and Financial Mathematics): Admissions from the BSc (Four-year programme) to the BSc (Actuarial and Financial Mathematics) study programme will be considered if students have passed all their first-year modules with an average mark of at least 60% and a minimum mark of 60% for WTW 143 and WTW 153. | | | |
### Natural and Agricultural Sciences 2013

<table>
<thead>
<tr>
<th>Degree</th>
<th>APS</th>
<th>Group A</th>
<th>Group B</th>
<th>2 other subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BScAgric</strong></td>
<td>30</td>
<td>Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 4 (50-59%).</td>
<td>5 (60%-69%) or 4 (50-59%) provided a 5 symbol is obtained for Physical Science</td>
<td>Any two subjects 4 (50-59%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mathematics</td>
<td>Physical Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSc (Four-year programme) (Biological and Agricultural Sciences) <strong>Institutional Proficiency Test compulsory</strong></td>
<td>22</td>
<td>Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 4 (50-59%).</td>
<td>4 (50-59%) or 3 (40-49%) provided a 4 symbol is obtained for Physical Science</td>
<td>Any two subjects 4 (50-59%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mathematics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSc (Four-year programme) (Physical Sciences) <strong>Institutional Proficiency Test compulsory</strong></td>
<td>22</td>
<td>Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 4 (50-59%).</td>
<td>4 (50-59%) or 3 (40-49%) provided a 4 symbol is obtained for Physical Science</td>
<td>Any two subjects 4 (50-59%)</td>
</tr>
</tbody>
</table>

Students who do not comply with these entrance requirements and who wrote the Institutional Proficiency Test may be considered for the BSc(Four-year programme) with a view to apply to transfer to BSc(Agric) programmes after successful completion of the first year of the first year of the BSc (Four-year programme).

<table>
<thead>
<tr>
<th>Degree</th>
<th>APS</th>
<th>Group A</th>
<th>Group B</th>
<th>3 other subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BSc</strong> (Four-year programme) (Mathematical Sciences) <strong>Institutional Proficiency Test compulsory</strong></td>
<td>22</td>
<td>Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 4 (50-59%).</td>
<td>4 (50-59%)</td>
<td>Any three subjects 4 (50-59%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree</th>
<th>APS</th>
<th>Group A</th>
<th>Group B</th>
<th>2 other subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BSc</strong> (Four-year programme) (Physical Sciences) <strong>Institutional Proficiency Test compulsory</strong></td>
<td>22</td>
<td>Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 4 (50-59%).</td>
<td>4 (50-59%)</td>
<td>Any two subjects 4 (50-59%)</td>
</tr>
</tbody>
</table>
1.2. Requirements for specific modules

A candidate who:

(a) passed the Grade 12 examination in Mathematics with at least 60% will be admitted to the modules GLY 155, 161 and 162 in Geology;

(b) passed the Grade 12 examination in Mathematics with at least 50%, will be admitted to WTW 134, WTW 115 and WTW 152 and 60% for WTW114, WTW126, WTW 158 and WTW 161 in Mathematics, and to WST 111 in Mathematical Statistics (For the degree programme in Actuarial and Financial Mathematics, 80% in Mathematics is required);

(c) passed the Grade 12 examination in Mathematics as well as in Physical Science with at least 50%, will be admitted to Molecular and Cell Biology and a module in the subjects Zoology and Entomology, Genetics, Microbiology or Plant Science;

(d) passed the Grade 12 examination in Mathematics with at least 50%, or obtained at least 50% in STK 113 and 123 will be admitted to BME 120;

(e) passed the Grade 12 examination in Mathematics and Physical Science with at least 50%, will be admitted to the module CMY 117, 127 and 151 in Chemistry and PHY 131 and 114 and 124 in Physics;

(f) obtained at least 4 (50-59%) in Mathematics, and has passed WTW 133 and WTW 143, will be admitted to Informatics 153, 154, 163, 164;

(g) obtained at least 60% in Grade 12 Mathematics will be admitted for STK110. Candidates who do not qualify for STK 110, must enrol for STK 113 and STK 123.

(h) The modules Mathematical Statistics (WST) and Statistics (STK), except for STK 281, may not be taken simultaneously in a programme.

Please note:
- 'The Grade 12 examination’ refers to the final National Senior Certificate examination.
- A student who takes a module presented by another faculty must take note of the admission requirements of that module, subminimum required in examination papers, supplementary examinations, etc.

2. Registration for a particular year of study

At the beginning of an academic year, a student registers for all the modules he or she intends taking in that particular year (whether these be first-semester, second-semester or year modules). Changes to the chosen field of study may be made at the beginning of the second semester/third quarter with the Dean's approval. A student may also only register for modules that will fit in on the lecture, test and examination timetables. Should a student be prepared to attend one module after hours to avoid clashes on the timetables, the approval of the Dean is not required. (This will only be possible if the module in question is offered full-time and extramurally). A student is allowed to register for the next year of study only if at least the equivalent of four semester modules have been passed in a particular year of study.

3. Leave of absence

If it is impossible for a registered student at the University of Pretoria to continue with his/her studies/research in a specific year, but he/she intends to continue in the following year, the student must apply in writing to the dean of the relevant faculty for leave of absence. The application must include: full names, student number, address, reasons and period for leave of absence, for example the whole year, first semester (January to June) or second semester (July to December), name of supervisor (where applicable), and the student's intentions for the period after his/her leave of absence. However, in
accordance with the policy of the University of Pretoria, leave of absence is not granted for more than two years. Any outstanding fees should be paid in full upon the student's return from his/her leave of absence.

4. Extended programmes:
   BSc (Four-year programme) – Mathematical Sciences (02130007)
   BSc (Four-year programme) – Biological and Agricultural Sciences (02130008)
   BSc (Four-year programme) – Physical Sciences (02130010)
   (a) These programmes are followed by students who, as a result of exceptional circumstances, will benefit from an extended programme.
   (b) Students who wish to follow one of the BSc four-year programmes will be subjected to an Institutional Proficiency Test and will be considered for admission by the Admissions Committee.
   (c) Applications for admission to the BSc (Four-year programme) should be submitted before 30 September each year. Details are obtainable from the Student Administration at the Faculty of Natural and Agricultural Sciences.
   (d) The rules and regulations applicable to the normal study programmes apply mutatis mutandis to the BSc (Four-year programme), with exceptions as indicated in the regulations pertaining to the BSc (Four-year programme).
   (e) Students who are admitted to one of the BSc four-year programmes register for one specific programme.

5. Module credits for unregistered students
   There are students who attend lectures, write tests and examinations and in this manner earn “marks”, but have either not registered for modules or even as students at all. These marks will not be communicated to any student before he/she has provided proof of registration. A student cannot obtain any credits in a specific academic year for a module “passed” in this manner during a previous academic year and for which he/she was not registered. This arrangement applies even where the student is prepared to pay the tuition fees.

6. Examination admission and pass requirements
   (a) A final mark of at least 50% is required to pass the module.
   (b) Mainstream modules: A minimum semester mark of 30% is required to be admitted to the examination in a first year, first semester module on 100-level and a minimum semester/year mark of 40% is required for admission to the examination in all other modules.
   (c) Extended BSc Four Year Programme modules: All students in the first two semesters of the extended BSc Four Year Programme are allowed to write the examination in that module. In the third semester modules a minimum semester mark of 30% is required for admission to the examination.
   (d) Class attendance is compulsory for all students in all modules for the full duration of all programmes. A student may be refused admission to the examination or promotion to a subsequent year of study if he/she fails to comply with the attendance requirements.
   (e) In certain modules, e.g. those with practical components, a department may stipulate additional requirements for students to be admitted to the examination. These requirements must be published in the study guide of the module. A student may be refused admission to the examination in a module by the head of the relevant department should the student not comply with these requirements.
   (f) In exceptional cases, where it is deemed appropriate, the Dean of the Faculty may excuse a student from attending all or a part of the activities in a module.
Please note: The requirements for admission to the examination is published in the study guide and the relevant department is required to inform students of the specific requirements at the beginning of each module.

6.1. Subminima in examinations
A subminimum of 40% is required in the examination in each module. The year or semester mark of a module is obtained through continuous assessment of a student's performance during the module. A student must satisfactorily complete the practical component of the module (if applicable). The method by which the year/semester mark will be obtained, is published in the study guide of the module.

6.2. Examinations
The examinations for first-semester modules and the first- and second-quarter modules take place in May/June, while all other examinations (second-semester modules, third- and fourth-quarter modules and year modules) take place in October/November.

The final mark for the module is a combination of the year or semester mark and the examination mark, with the proviso that a module can only be passed if a subminimum of 40% is obtained in the examination and the practical component (if applicable) of the module has been satisfactorily completed. A final mark of at least 50% is required to pass a module. The year or semester mark must fall within a range of 40%-60% and the examination mark must fall within a range of 40%-60% of the final mark. Deviations from this rule can be approved by the Dean. The formula that is used to determine the final mark will be specified in the study guide of the module.

6.3. Ancillary examinations
After completion of an examination and before the examination results are published, the examiners may decide to summon a student for an ancillary examination on particular aspects of the work in that module with a view to determining:

- whether a candidate who does not comply with the requirements to pass a module could achieve a final pass mark; or
- whether a candidate, who does not comply with the requirements for a pass with distinction, will be able to improve his or her final mark.

It is, therefore, possible that, depending on the importance a lecturer attaches to continuous evaluation, no supplementary examinations may be awarded in a certain module. If ancillary examinations are awarded in a module, the guidelines indicating the basis for such consideration, have to be published in the study guide of the module.

6.4. Re-marking of examination papers (also consult Reg G.14)
After an examination, departments give feedback to students about the framework that was used by the examiners during the examination. The way in which feedback is given, is determined by the departmental heads. Students may apply for re-marking of an examination paper after perusal and within 14 calendar days after commencement of lectures in the next semester. The prescribed fee has to be paid. The paper will then be re-marked by an examiner appointed by the head of the department.

6.5. Supplementary examinations
(a) Supplementary examinations in first-semester modules take place after the May/June examinations, while those in second-semester and year modules take place after the October/November examinations.
(b) To pass a supplementary examination, a student must obtain a minimum of 50%.
(c) The highest final percentage a student can obtain in a supplementary examination is 50%.
(d) Special supplementary examinations are not arranged for students who are unable to write the examinations at the times and venues scheduled for supplementary examinations. (Also consult Reg.G.12).

7. Academic information management (AIM 101 or AIM 111 and AIM 121)
It is a requirement for all new first-year students to register for the Academic information management modules.

### DEGREES AND DIPLOMAS CONFERRED/AWARDED IN THE FACULTY

The following degrees and diplomas are presented in the Faculty (minimum period of study is given in brackets):

**Bachelor’s degrees:**
- Bachelor of Science – [BSc] (3 years)
- Bachelor of Agricultural Science – [BScAgric] (4 years)
- Bachelor of Consumer Science – [BConsumer Science] (4 years)

**Honours degrees: (1 year)**
- Bachelor of Science Honours – [BScHons]
- Bachelor of Agricultural Management Honours – [BInstAgrarHons]

**Master’s degrees: (minimum 1 year)**
- Master of Science – [MSc]
- Master of Agricultural Science – [MScAgric]
- Master of Agricultural Management – [MInstAgrar]
- Master of Consumer Science – [MConsumer Science] (minimum 2 year)

**Doctoral degrees:**
- Doctor of Philosophy – [PhD] (minimum 1 year)
- Doctor of Science – [DSc]

**Diploma:**
- Advanced University Diploma in Extension and Rural Development – (1 year)

### BACHELOR’S DEGREES

### GENERAL INFORMATION FOR DEGREES IN THE FACULTY

General Regulations G.1 to G.15 are applicable to a bachelor’s degree.

**Sc.1 Duration**
- **BSc**
The minimum duration of study is three years full-time study.

**BScAgric, BConsumer Science, BSc in Food Management**
The minimum duration of study is four years full-time study.
Sc.2 Study programmes
The curricula are compiled from the study programmes in Sc. 7 or an alternative study programme as approved by the Dean.

Sc.3 Compilation of the curriculum
BSc
A student must obtain at least 428 module credits to comply with the requirements for a BSc degree programme. At least 144 credits must be obtained at 300/400 level, or otherwise indicated by curriculum. The minimum module credits needed to comply with degree requirements is set out at the end of each study programme. A maximum of 160 credits will be recognised at 100-level. A student may, in consultation with the Dean, follow modules not indicated in BSc three-year study programmes to the equivalent of a maximum of 36 module credits. The credits allocated per quarter/semester/year to each elective module should be regarded as a guideline only and not as an instruction. It is, however, important that the total number of prescribed elective module credits are completed during the course of the study programme. The Dean may, on the recommendation of the head of department, approve deviations in this regard.
A student may not register for more than 100 module credits per semester, unless it is with the permission of the Dean.
Students who are already in possession of a bachelor’s degree, will not receive credit for modules of which the content overlap with modules of the degree that was already conferred and will not receive, in any circumstance, credit for more than half the credits passed previously for an uncompleted degree. No credits at the final-year or 300- and 400-level will be approved.

BSc in Medical Sciences
As from 2004 the BScMedSci degree is presented in this Faculty.

NB: Due to the limited facilities, only 72 students can be admitted. Only candidates who have applied for admission by 30 September and who indicated this programme as a first choice, are provisionally admitted pending Grade 12 final results.

Promotion requirements:
A student will be promoted to the following year of study if he or she passed 100 credits of the prescribed credits for a year of study, unless the Dean on the recommendation of the head of department decides otherwise. A student who does not comply with the requirements for promotion to the following year of study, retains the credit for the modules already passed and may be admitted by the Dean, on recommendation of the head of department, to modules of the following year of study to a maximum of 48 credits, provided that it will fit in with both the lecture and examination timetable.

BScAgric
The minimum total of credits needed to comply with degree requirements is set out at the end of each study programme.
Students must register for elective modules in consultation with the head of department who must ensure that the modules do not clash on the set timetable.
The Dean may, in exceptional cases and on recommendation of the head of department, approve deviations from the prescribed curriculum.
Promotion requirements:
A student will be promoted to the following year of study if he or she passed 100 credits of the prescribed credits for a year of study, unless the Dean on the recommendation of the head of department decides otherwise. A student who does not comply with the requirements for promotion to the following year of study, retains the credit for the modules already passed and may be admitted by the Dean, on recommendation of the head of department, to modules of the following year of study to a maximum of 48 credits, provided that it will fit in with both the lecture and examination timetable.

B Consumer Science
Promotion requirements:
All the degrees in Consumer Science
A student who did not pass all the prescribed modules of a particular year of study, has to register for the outstanding modules first. With the approval of the head of the department, modules of the following year of study may be taken in advance only if no timetable clashes occur; all the requirements and prerequisites have been met and not more than a specified number of credits per semester are taken. The credits of the semester of which modules are repeated, are taken as a guideline for the calculation of the number of modules permitted.
(a) A student registers for the second year when at least 80% of the first-year module credits have been passed.
(b) A student registers for the third year when at least 85% of the module credits of the previous years have been passed.
(c) A student registers for the fourth year when at least 95% of the module credits of the previous years have been passed.

BSc (Four-year programme)
Three extended programmes are available:
BSc (Four-year programme) – Mathematical Sciences (02130007),
BSc (Four-year programme) – Biological and Agricultural Sciences (02130008) and BSc (Four-year programme) – Physical Sciences (02130010).
Students who do not comply with the normal three-year BSc entrance requirements for study in the Faculty of Natural and Agricultural Sciences, may nevertheless be admitted to the Faculty by being placed on the BSc (Four-year programme). Generally the BSc (Four-year programme) means that first study year in Mathematics, Physics, Biology and Chemistry is extended to take two years. After completing the BSc (Four-year programme) successfully, students join the second year of the normal BSc programme to complete their degrees. The possibility of switching over to other faculties such as Engineering, Built Environment and Information Technology, Veterinary Science and Health Sciences, after one or two years in the four-year programme, exists. This depends on selection rules and other conditions stipulated by the other faculties.

Applications for admission to the BSc (Four-year programme) must be submitted annually before 30 September. All students considered for the BSc (Four-year programme) must have written an Institutional Proficiency Test. Information in this regard is available at the Client Services Centre. In addition all rules and regulations applicable to the normal study programmes, apply mutatis mutandis to the BSc (Four-year programme), with exceptions stated in the regulations for the BSc (Four-year programme). For instance, students placed in the BSc (Four-year programme) must have a National Senior Certificate with admission for degree purposes.
An admissions committee considers applications for the BSc (Four-year programme) annually. Regarding subject choices, admitted students are individually placed on the BSc (Four-year programme) according to their prospective field of study. Students may NOT change this placement without the permission of the Chairperson of the admissions committee.

**Curriculum**

The following available modules as indicated below, are prescribed modules for a BSc (Four-year programme) and the equivalence to the first-year modules of the normal BSc programme:

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Module Name</th>
<th>Trm</th>
<th>Ipw</th>
<th>Ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIM111</td>
<td>Academic Information Management 111</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>COS133</td>
<td>Introduction to Programming 133</td>
<td>S1</td>
<td>2</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>LST133</td>
<td>Language, Life and Study Skills 133</td>
<td>S1</td>
<td>1</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>WST133</td>
<td>Mathematical Statistics 133</td>
<td>S1</td>
<td>2</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>WTW133</td>
<td>Precalculus 133</td>
<td>S1</td>
<td>5</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

Total credits for compulsory modules: 36

An elective can be chosen from the modules FRK133, CMY133, PHY133 or MLB133

Compulsory credits = (36) Elective credits = (8) Total credits = (44)
### Second year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>lpw</th>
<th>ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>COS153</td>
<td>Introduction to programming 3</td>
<td>S1</td>
<td>2</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>WST153</td>
<td>Mathematical statistics 153</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>WTW153</td>
<td>Calculus 153</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

With regard to the rest of the third-semester modules (second year, first semester) and the second-semester, prescribed modules must be selected from the normal BSc programme of your choice.

### First year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>lpw</th>
<th>ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIM111</td>
<td>Academic information management 111</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CMY133</td>
<td>Chemistry 133</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>LST133</td>
<td>Language, life and study skills 133</td>
<td>S1</td>
<td>1</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>MLB133</td>
<td>Molecular and cell biology 133</td>
<td>S1</td>
<td>2</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>PHY133</td>
<td>Physics 133</td>
<td>S1</td>
<td>2</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>WTW133</td>
<td>Precalculus 133</td>
<td>S1</td>
<td>5</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

Total credits for compulsory modules: 44

### First year, second semester:

<table>
<thead>
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### Second year, first semester:

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<td>Chemistry 154</td>
<td>S1</td>
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<td></td>
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<td>MLB153</td>
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<td>S1</td>
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<td></td>
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<tr>
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<tr>
<td></td>
<td>Prerequisite/s: PHY144</td>
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<td>Finite mathematics 154</td>
<td>S1</td>
<td>4</td>
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<td>8</td>
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<td></td>
<td>Prerequisite/s: WTW144</td>
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Total credits for compulsory modules = 32

Compulsory credits = (88) Elective credits = (0)

With regard to the rest of the third semester modules (second year, first semester) and the second semester, prescribed modules must be selected from the normal BSc programme of your choice.

---

### First year, first semester:

<table>
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<td></td>
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<td>Prerequisite/s: As for BSc (Four-year programme)</td>
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<tr>
<td>PHY133</td>
<td>Physics 133</td>
<td>S1</td>
<td>2</td>
<td>2</td>
<td>8</td>
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<tr>
<td></td>
<td>Prerequisite/s: As for BSc (Four-year programme)</td>
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</table>
**WTW133: Precalculus 133**  
Prerequisite/s: As for BSc (Four-year programme)  
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<th>Ppw</th>
<th>Crdt</th>
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</thead>
<tbody>
<tr>
<td>S1</td>
<td></td>
<td></td>
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</tbody>
</table>

Total credits for compulsory modules: 36

An elective can be chosen from modules COS133, or MLB133, or WST133

Compulsory credits = (36) Elective credits = (8) Total credits = (44)

**First year, second semester:**

<table>
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<tr>
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<td>WTW143</td>
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<td>S2</td>
<td>4</td>
<td>1</td>
<td>8</td>
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</table>

Total credits for compulsory modules: 36

An elective module can be chosen from modules COS143, MLB143 or WST143 based on the elective chosen from the first semester

Compulsory credits = (36) Elective credits = (8) Total credits = (44)

Compulsory credits = (72) Elective credits = (16) Total credits = (88)

**Second year, first semester:**

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
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</table>

With regard to the rest of the third-semester modules(second year, first semester) and the second-semester, prescribed modules must be selected from the normal BSc programme of your choice.

Prescribed: CMY133 Chemistry 133, CMY143 Chemistry 143 and CMY154 Chemistry 154: Equivalent module – a BSc First-semester prescribed module: CMY117.

Physics modules
For students in biological study directions: PHY133 Physics 133, PHY144 Physics 144 and PHY154 Physics 154 Equivalent module: PHY131.
For students who want to study Physical Sciences and engineering: PHY133 Physics 133, PHY143 Physics 143, PHY153 Physics 153 Equivalent module: FSK 116 (or FSK 176)
For all other students: PHY133 Physics 133, PHY143 Physics 143, PHY153 Physics 153, PHY 163 General physics: Equivalent modules: PHY114 and PHY124.
Prescribed: WTW133 Precalculus 133, WTW143 Calculus 143 and WTW153 Calculus 153: Equivalent module – a BSc First-semester prescribed module: WTW114.
For students in biological study directions: WTW133 Precalculus 133, WTW144 Calculus 144 and WTW154 Finite mathematics 154: Equivalent module WTW134 Mathematics 134
Prescribed: MLB133 Molecular and cell biology 133, MLB143 Molecular and cell biology, MLB153 Molecular and cell biology 153: Equivalent module – a BSc First-semester prescribed module: MLB111 Molecular and cell biology 111.

NB! Students may register for an extended module (eg PHY133, PHY143, PHY153 and PHY163) only once.

Compulsory modules:
AIM111 and AIM121 Academic information management, 4 + 4 credits.
LST133 and LST 143 Academic literacy, 8+8 credits.

All new students must register for the academic literacy modules LST.

**Academic promotion requirements**

**General**
All students whose academic progress is not acceptable can be suspended from further studies.
- A student who is excluded from further studies in terms of the stipulations of the abovementioned regulations, will be notified in writing by the Dean or Admissions Committee at the end of the relevant semester.
- A student who has been excluded from further studies may apply in writing to the Admissions Committee of the Faculty of Natural and Agricultural Sciences for re-admission.
- Should the student be re-admitted by the Admissions Committee, strict conditions will be set which the student must comply with in order to proceed with his/her studies.
- Should the student not be re-admitted to further studies by the Admissions Committee, he/she will be informed in writing.
- Students who are not re-admitted by the Admissions Committee have the right to appeal to the Senior Appeals Committee.
- Any decision taken by the Senior Appeals Committee is final.

**Specific**

**BSc (Four-year programme):**
It is expected of students who register for the first year of the BSc (Four-year programme) to pass all the prescribed modules of the first year;
It is expected of students accepted into the BSc (Four-year programme) to finish a complete corresponding BSc first year within the two years of enrolment in the BSc (Four-year programme). Students who do not show progress during the first semester of the first year will be referred to the Admissions Committee of the Faculty.
By the end of year 1 semester 2, a student must have passed at least 4 of the 5 prescribed semester 2 modules. The final mark in the module failed must not be lower than 40% allowing the student to write a special exam in this subject early in the following
year. This exam must be passed in order to register for the second year of the programme.

**Sc.4 Special examinations in the Faculty of Natural and Agricultural Sciences**

A student who requires a maximum of two modules and not more than 36 credits outstanding to comply with all the requirements for the degree, may be admitted by the Dean, on the recommendation of the head of department, to special examinations in modules failed, provided that this will enable him or her to comply with all the degree requirements. A student who has obtained a final mark of less than 40% in any one of the relevant modules, or who has previously been admitted to a special examination, does not qualify for this concession.

**Sc.5 Degree with distinction**

**BSc**

A student obtains his or her degree with distinction if all prescribed modules at 300-level (or higher) are passed in one academic year with a weighted average of at least 75%, and obtain at least a subminimum of 65% in each of the relevant modules.

**BSc (Food Management)**

A student obtains his or her degree with distinction if a weighted average of at least 75% is obtained in the following modules:
- Recipe development and standardisation 413
- Consumer aspects of food 417
- Food research project 480
- Food service management 420
- Food science and technology 413

**BScAgric**

The BScAgric degree is conferred with distinction if a student obtains a weighted average of at least 75% in the modules of the major subjects in the third and the fourth year of study, with a weighted average of at least 65% in the other modules of the third and the fourth year of study.

**BConsumer Science**

A student obtains his or her degree with distinction if a weighted average of at least 75% is obtained in the following modules:

- **Clothing: Clothing Retail Management:**
  - A combination equivalent to six semester modules
  - Marketing research 314 and Strategic marketing 321
  - Clothing retail management 410 and Clothing merchandising 420
  - Clothing production 32, Product development 411
  - Project: Clothing textile project 402
  - New developments, sustainability and textile use 411
  - Textiles: marketing and consumer aspects 421

- **Food Management: Food Retail Management:**
  - A combination equivalent to six semester modules:
  - Marketing research 314 and Strategic marketing 321
  - Food service management 420
  - Consumer food research 310
  - Food safety and hygiene 354
  - Recipe development and standardisation 413
Sc.5.1 Recognition of excellence

Criteria for eligibility
To qualify for the awards the following criteria must be met:

(a) **Dean’s Merit List**
The student will be considered if she/he has passed all first-time registered modules as prescribed for a programme at each year level of study for that year (minimum 140 credits per year/88 credits for the first year of the BSc(Four-year Programme)) with a weighted average of 75%.

(b) **Other achievers**
The student will be considered if she/he has passed all first time registered modules as prescribed for a programme for that year (minimum 140 credits per year/88 credits for the first year of the BSc(Four-year Programme)) with a weighted average of 65%.

Sc.6 DEGREE PROGRAMMES

The curriculum is composed of one of the following study programmes. The Dean may, on the recommendation of the programme manager, approve deviations in this regard.

Sc.6.1 GENERAL INFORMATION

- Where elective modules are not specified, these may be chosen from any modules appearing in the list of modules.

**lpw/ppw:** lectures per week/ practicals per week (eg: 3+1 = 3 lectures and 1 practical per week)

**Quarter:** The quarter in which the specific module is presented.

- J1 = the whole year (year module: extends over two semesters)
- S1 = the first semester (Q1 + Q2)
- S2 = the second semester (Q3 + Q4)
- K1 = first quarter
- K2 = second quarter
- K3 = third quarter
- K4 = fourth quarter
Credits: Credit value of a module.

# : Module must be taken before or together with the module for which it is a prerequisite.

Prerequisite modules: clarification

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<th>Code in brackets: [AGR313]</th>
<th>Minimum requirements</th>
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<td>[ ]</td>
<td>Code followed by #: AGR313#</td>
<td>Obtained a minimum of 50%</td>
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<tr>
<td>GS</td>
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</table>

TDH: Approval from the head of department is required to register for the module.

Par 1.2: Refers to the admission requirements for specific modules that appear at the beginning of this publication.

<table>
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<tr>
<th>Field of study</th>
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<td>Financial management 112</td>
<td>S1</td>
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<td>0</td>
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<td>Mathematical statistics 111</td>
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<td>16</td>
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First year, second semester:

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<td>Calculus 128</td>
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<td><strong>71</strong></td>
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</tbody>
</table>

* Students may enrol for AIM 111 and AIM 121 instead of AIM 101 (the same content presented over 2 semesters)

**Compulsory credits = (150) Elective credits = (0)**

### Second year, first semester:

<table>
<thead>
<tr>
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<td>Informatics 214</td>
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<td>Linear algebra 211</td>
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### Second year, second semester:

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Elective module : IAS282. (Only for non-degree purposes)

**Compulsory credits = (146) Elective credits = (0)**
### Third year, first semester:

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<td>Analysis 310</td>
<td>S1</td>
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<td>S1</td>
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Total credits for compulsory modules: 54

### Third year, second semester:

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</table>

Total credits for compulsory modules: 36

Elective modules: IAS361, IAS382, WST312, WST322, WTW320, WTW382, WTW383, WTW386. All 72 elective credits must be on 3rd year level.

Compulsory credits = (90)
Elective credits = (72)
Total credits = (162)

A minimum of (458) credits is required to obtain the degree.

### Field of study

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### First year, first semester:

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Total credits for compulsory modules: 54
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</table>

**Total credits for compulsory modules** 54

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

**Compulsory credits = (108) Elective credits = (32) Total credits = (140)**

### Second year, first semester:

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**Total credits for compulsory modules** 36

### Second year, second semester:

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**Total credits for compulsory modules** 48

**Compulsory credits = (84) Elective credits = (60) Total credits = (144)**
Third year, first semester:

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<th>Code</th>
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Total credits for compulsory modules 54

Third year, second semester:

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Total credits for compulsory modules 36

Elective credits: A minimum of 54 elective credits at 100- to 300-level can be chosen from any WTW and WST modules. The remainder of the electives at 100- to 300-level can be chosen from any other modules in the list of modules of this faculty.

Compulsory credits = (90) Elective credits = (54) Total credits = (144)

A minimum of (428) credits is required to obtain the degree.

Field of study

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First year, first semester:

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<td>6</td>
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Total credits for compulsory modules 70
### First year, second semester:

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</table>

Total credits for compulsory modules: **70**

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Compulsory credits = (140) Elective credits = (0)

### Second year, first semester:

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Total credits for compulsory modules: **54**

38
## Second year, second semester:

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</table>

**Total credits for compulsory modules** 54

Electives can be chosen from Genetics, Microbiology, Human Physiology, Plant Science or Zoology.

Compulsory credits = (108) Elective credits = (48) Total credits = (156)

## Third year, first semester:

<table>
<thead>
<tr>
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<tr>
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<td>2</td>
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<td>Biochemistry of nucleic acids 354</td>
<td>S1</td>
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<tr>
<td>BCM355</td>
<td>Immunobiology 355</td>
<td>S1</td>
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**Total credits for compulsory modules** 36
Third year, second semester:

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<td>BCM363</td>
<td>Xeno biochemistry 363</td>
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<td>BCM364</td>
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<td>Immunobiochemistry 365</td>
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Total credits for compulsory modules: 36

Electives can be chosen from Chemistry, Genetics, Microbiology, Human Physiology, Plant Science or Zoology.

Compulsory credits = (72) Elective credits = (72) Total credits = (144)

A minimum of (440) credits is required to obtain the degree.

First year, first semester:

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<tr>
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<td>Language and study skills 110</td>
<td>S1</td>
<td>2</td>
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<td>Molecular and cell biology 111</td>
<td>S1</td>
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Total credits for compulsory modules: 70

First year, second semester:

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<td>Plant biology 161</td>
<td>S2</td>
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<td>0.5</td>
<td>8</td>
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<tr>
<td></td>
<td>Prerequisite/s: MLB111 GS</td>
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</table>
### General Chemistry 127
- **Code**: CMY117
- **Prerequisite**: CMY117 GS
- **Term**: S2
- **Lecture**: 4
- **Practical**: 1
- **Credits**: 16

### Introductory Genetics 161
- **Code**: GTS161
- **Prerequisite**: MLB111 GS
- **Term**: S2
- **Lecture**: 2
- **Practical**: 0.5
- **Credits**: 8

### Introduction to Microbiology 161
- **Code**: MBY161
- **Prerequisite**: MLB111 GS
- **Term**: S2
- **Lecture**: 2
- **Practical**: 0.5
- **Credits**: 8

### Animal Diversity 161
- **Code**: ZEN161
- **Prerequisite**: MLB111 GS or TDH
- **Term**: S2
- **Lecture**: 2
- **Practical**: 0.5
- **Credits**: 8

**Total credits for compulsory modules**: 70

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

**Generic first-year modules in Biological Sciences**: Students who are going to apply for the 20 to 30 MBChD, or the 2 to 3 BChD places that become available in the second term, may enrol for FIL155, MGW112 and MTL181 instead of WTW134 in the first semester, with the condition that, should they not be selected and want to continue with BSc, WTW134 be taken in the second semester.

**Compulsory credits = (140) Elective credits = (0)**

### Field of Study
- **Dept**: GTS
- **Code**: 03133052

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<th>First year, first semester:</th>
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<th>Ppw</th>
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<tr>
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<td>General chemistry 117</td>
<td>S1</td>
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<td>Language and study skills 110</td>
<td>S1</td>
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<td>Molecular and cell biology 111</td>
<td>S1</td>
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**Totals for compulsory modules**: 70

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<tr>
<th>First year, second semester:</th>
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<th>Name</th>
<th>Trm</th>
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<tbody>
<tr>
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<td>Biometry 120</td>
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*Prerequisite for BME120: At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123*
**Natural and Agricultural Sciences 2013**

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<td>S2</td>
<td>2</td>
<td>0.5</td>
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<tr>
<td>CMY127</td>
<td>General chemistry 127 Prerequisite/s: CMY117 GS</td>
<td>S2</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>GTS161</td>
<td>Introductory genetics 161 Prerequisite/s: MLB111 GS</td>
<td>S2</td>
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<td>0.5</td>
<td>8</td>
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<td>MBY161</td>
<td>Introduction to microbiology 161 Prerequisite/s: MLB111 GS</td>
<td>S2</td>
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<td>ZEN161</td>
<td>Animal diversity 161 Prerequisite/s: MLB111 GS or TDH</td>
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*Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)*

**Total credits for compulsory modules** = (140)

**Elective credits** = (0)

**Second year, first semester:**

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<td>Introduction to proteins and enzymes 253</td>
<td>S1</td>
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<td>Practical: Introduction to proteins and enzymes 254 Prerequisite/s: BCM253# and CMY117 GS and CMY127 GS and MLB111 GS</td>
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<td>Carbohydrate metabolism 255</td>
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<td>2</td>
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<tr>
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<td>South African flora and vegetation 251</td>
<td>S1</td>
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<td>Molecular genetics 251 Prerequisite/s: GTS161 GS</td>
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**Total credits for compulsory modules** = (60)

**Second year, second semester:**

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### BCM265: Biochemistry in perspective 265
Prerequisite/s: BCM266# en CMY117 GS and CMY127 GS and MLB111 GS

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### BCM266: Practical: Biochemistry in perspective 266
Prerequisite/s: BCM265# en CMY117 GS and CMY127 GS and MLB111 GS

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### BOT261: Plant physiology and biotechnology 261
Prerequisite/s: BOT161 and CMY117 and CMY127 or TDH

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### GTS261: Genetic variation and evolution 261
Prerequisite/s: GTS251 GS

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### MBY261: Mycology 261
Prerequisite/s: MBY161

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**Total credits for compulsory modules**: 60

Electives may be chosen from [ ZEN251 and ZEN261] or [PLG251 and PLG262 or MBY262] or [GKD250 and GKD225] or DAF200 or BME210 or other module/s subject to TDH.

**Compulsory credits = (120) Elective credits = (24) Total credits = (144)**

### Third year, first semester:

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**Total credits for compulsory modules**: 36

### Third year, second semester:

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**Total credits for compulsory modules**: 18

Contact the Department of Genetics for information regarding elective modules.

**Compulsory credits = (54) Elective credits = (90) Total credits = (144)**

A minimum of (428) credits is required to obtain the degree.
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<td>General chemistry 117</td>
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<td>LST110</td>
<td>Language and study skills 110</td>
<td>S1</td>
<td>2</td>
<td>0</td>
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<td>First course in physics 114</td>
<td>S1</td>
<td>4</td>
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<td>Prerequisite/s: Par 1.2</td>
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**Total credits for compulsory modules** 54

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<th>Crdt</th>
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<tbody>
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<td>Academic information management 101*</td>
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<td>2</td>
<td>0</td>
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<td>Prerequisite/s: Par 1.2</td>
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**Total credits for compulsory modules** 54

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Compulsory credits = (108) Elective credits = (32) Total credits = (140)

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**Total credits for compulsory modules** 24
### Second year, second semester:

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</table>

**Total credits for compulsory modules**

24

Electives can be chosen from modules in the following departments: Geography, Geoinformatics and Meteorology, Geology, Biochemistry, Zoology and Entomology, Physics, Plant Science, Computer Science, Mathematics and Applied Mathematics.

Compulsory credits = (48) Elective credits = (96) Total credits = (144)

### Third year, first semester:

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**Total credits for compulsory modules**

36

### Third year, second semester:

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**Total credits for compulsory modules**

36

Compulsory credits = (72) Elective credits = (72) Total credits = (144)

A minimum of (428) credits is required to obtain the degree.
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Total credits for compulsory modules: 70

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Total credits for compulsory modules: 70

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Compulsory credits = (140) Elective credits = (0)

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### Second year, first semester:

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<td>Invertebrate biology 251</td>
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**Total credits for compulsory modules** 72

Second year, second semester:

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**Total credits for compulsory modules** 64

**Compulsory credits = (136) Elective credits = (10) Total credits = (146)**

Third year, first semester:

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**Total credits for compulsory modules** 72
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Total credits for compulsory modules: 72

Compulsory credits = (144) Elective credits = (0)

A minimum of (430) credits is required to obtain the degree.

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### First year, first semester:

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Total credits for compulsory modules: 70

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### First year, second semester:

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### MBY161 Introduction to microbiology 161
Prerequisite/s: MLB111 GS

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### ZEN161 Animal diversity 161
Prerequisite/s: MLB111 GS or TDH

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<td>S2</td>
<td>2</td>
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**Total credits for compulsory modules** 70

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

---

### Compulsory credits = (140) Elective credits = (0)

#### Second year, first semester:

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<th>Ppw</th>
<th>Crdt</th>
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<td>South African flora and vegetation 251</td>
<td>S1</td>
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**Total credits for compulsory modules** 72

#### Second year, second semester:

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</table>
## Compulsory credits = (136) Elective credits = (12) Total credits = (148)

### Third year, first semester:

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**Total credits for compulsory modules**: 72

### Third year, second semester:

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<th>Crdt</th>
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<td>Evolution and phylogeny 362</td>
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</table>

**Total credits for compulsory modules**: 72

**Compulsory credits = (144) Elective credits = (0)**

A minimum of (432) credits is required to obtain the degree.

---

### First year, first semester:

Degree programmes in the Department of Geology: Students will be informed timeously of compulsory excursions that could take place during the vacations. The attendance of excursions for first-year students is compulsory, while excursions of longer duration are compulsory for senior students.

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<th>ppw</th>
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</table>

**Prerequisite/s: Par 1.2**
### First year, second semester:

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<th>Trm</th>
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<th>ppw</th>
<th>Crdt</th>
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</thead>
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<td>GLY162</td>
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<td>S2</td>
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</table>

Total credits for compulsory modules: 62

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Compulsory credits = (132) Elective credits = (8) Total credits = (140)

### Second year, first semester:

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<td>Strength of materials 210</td>
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Total credits for compulsory modules: 64
## Second year, second semester:

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<td>Metamorphic petrology 262</td>
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**Total credits for compulsory modules**

**Compulsory credits** = (112) **Elective credits** = (36) **Total credits** = 148

## Third year, first semester:

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<td>4</td>
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<td>18</td>
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**Total credits for compulsory modules**

**Third year, second semester:**

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**Total credits for compulsory modules**

**Electives for the first to third year can be chosen from the following departments:**

Compulsory credits = (116) Elective credits = (28) Total credits = (144)

A minimum of (432) credits is required to obtain the degree.

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First year, first semester:

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<th>ppw</th>
<th>Crdt</th>
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Total credits for compulsory modules 70

WTW 134 can be taken instead of WTW 114

First year, second semester:

<table>
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<tr>
<td>ZEN161</td>
<td>Animal diversity 161</td>
<td>S2</td>
<td>2</td>
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<td>Prerequisite/s: MLB111 GS or TDH</td>
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</tbody>
</table>

Total credits for compulsory modules 70

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)
Electives can be chosen from the following departments: Geography, Geoinformatics and Meteorology, Geology, Plant Production and Soil Science, Physics, Chemistry, Plant Science, Mathematics and Applied Mathematics, Zoology and Entomology, Anthropology and Archaeology and Computer Science.

**Compulsory credits = (140) Elective credits = (6) Total credits = (146)**

### Second year, first semester:

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<th>Name</th>
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<th>Ppw</th>
<th>Crdt</th>
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<tbody>
<tr>
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<td>South African flora and vegetation 251</td>
<td>S1</td>
<td>2</td>
<td>1</td>
<td>12</td>
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<tr>
<td></td>
<td>Prerequisite/s: BOT161 or TDH</td>
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**Total credits for compulsory modules**

60

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**Total credits for compulsory modules**

24

Electives can be chosen from the following departments: Geography, Geoinformatics and Meteorology, Physics, Geology, Plant Production and Soil Science, Chemistry, Plant Science, Mathematics and Applied Mathematics, Zoology and Entomology, Anthropology and Archaeology and Computer Science.

**Compulsory credits = (84) Elective credits = (60) Total credits = (144)**

### Third year, first semester:

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**Total credits for compulsory modules**

42

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### GGY361 Environmental geomorphology 361
Prerequisite/s: GGY252

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**Total credits for compulsory modules**

| Electives can be chosen from modules in the departments: Geography, Geoinformatics and Meteorology, Geology, Plant Production and Soil Science, Physics, Chemistry, Plant Science, Mathematics and Applied Mathematics, Zoology and Entomology, Anthropology and Archaeology and Computer Science |

Compulsory credits = (84) Elective credits = (60) Total credits = (144)

A minimum of (434) credits is required to obtain the degree.

### Field of study

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**Total credits for compulsory modules**

### First year, second semester:

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**Total credits for compulsory modules**

70

### Second year, second semester:

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**Total credits for compulsory modules**

70

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)
Pre-requisite/s: CMY117 and CMY127 and MBY161 and PHY131 and WTW134 or TDH

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Total credits for compulsory modules: 66

Compulsory credits = (136) Elective credits = (0)

### Third Year, First Semester:

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<td>Nutrition 311</td>
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Total credits for compulsory modules: 74

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Total credits for compulsory modules: 66

Compulsory credits = (140) Elective credits = (0)

### Fourth Year, First Semester:

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Natural and Agricultural Sciences 2013

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**Total credits for compulsory modules** 82

**Elective modules FST 413 (30) may be substituted with VDS 414 (28)**

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**Total credits for compulsory modules** 40

**Fourth year, second semester:**

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**Total credits for compulsory modules** 40

**Elective module VDS427 may substituted with VDS424**

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**Total credits for compulsory elective modules** 57/59

*OPI400 (Experiential training in industry): During the first to fourth years of study, students must complete a total of 480 hours experiential training in the industry to develop practical and occupational skills, participate in community engagement and provide service learning. This is equal to 3 weeks x 40 hours (120 hours) per year, according to requirements as determine by the head of department. These “credits” must be successfully completed together with a complete portfolio before the degree will be conferred. Please note: Various practical and industry interaction activities support the theoretical component of VDS414 & VDS424, VDS413 and FST413 and take place after hours to develop practical and industry skills.

Compulsory credits = (122) Elective credits = (47/56)

A minimum of (578/587) credits is required to obtain the degree.
### First year, first semester:

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<td>Molecular and cell biology 111</td>
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**Total credits for compulsory modules** 70

### First year, second semester:

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**Total credits for compulsory modules** 70

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Compulsory credits = (140) Elective credits = (0)

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**Total credits for compulsory modules**: 48

**Second year, second semester:**

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**Total credits for compulsory modules**: 72

**Compulsory credits = (122) Elective credits = (24) Total credits = (144)**

**Third year, first semester:**

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**Total credits for compulsory modules**: 63

**Third year, second semester:**

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**Total credits for compulsory modules**: 63

**Compulsory credits = (126) Elective credits = (18) Total credits = (144)**

A minimum of (428) credits is required to obtain the degree.

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**First year, first semester:**

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### First year, second semester:

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<td>Biometry 120</td>
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**Total credits for compulsory modules**: 70

* Students may enrol for AIM 111 and AIM 121 instead of AIM 101 (the same content presented over 2 semesters)

### Second year, first semester:

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**Compulsory credits = (140) Elective credits = (0)**
## Natural and Agricultural Sciences 2013

### MBY251: Bacteriology 251
- **Prerequisite/s:** MBY161 GS

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### ZEN251: Invertebrate biology 251
- **Prerequisite/s:** ZEN161 GS or TDH

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**Total credits for compulsory modules:** 72

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<tr>
<td>BCM266</td>
<td>Practical: Biochemistry in perspective 266</td>
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<td>BOT261</td>
<td>Plant physiology and biotechnology 261</td>
<td>S2</td>
<td>2</td>
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<td>GTS261</td>
<td>Genetic variation and evolution 261</td>
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<td>2</td>
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<td>African vertebrates 261</td>
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<td>Prerequisite/s: ZEN161 GS or TDH</td>
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</table>

**Total credits for compulsory modules:** 72

- Students interested in combining Genetics in a dual major with **Microbiology** may replace [BCM265 + BCM266] with PLG262
- Students interested in combining Genetics in a dual major with **Biochemistry** may replace [BOT251 + BOT261 + ZEN251 + ZEN261] with [CMY282 + CMY284 + CMY283 + CMY285]

**Compulsory credits = (144) Elective credits = (0)**

### Third year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>Crdt</th>
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<td></td>
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<td>GTS354</td>
<td>Genome evolution and phylogenetics 354</td>
<td>S1</td>
<td>2</td>
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<td>Prerequisite/s: GTS251 GS and GTS261 GS</td>
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**Total credits for compulsory modules:** 36
Third year, second semester:

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<th>Crdt</th>
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<td>Plant genetics and crop biotechnology 361</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>18</td>
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<tr>
<td>GTS367</td>
<td>Population and evolutionary genetics 367</td>
<td>S2</td>
<td>2</td>
<td>1</td>
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<td>Prerequisite/s: GTS251 and GTS261 or TDH</td>
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<td>GTS368</td>
<td>Genetics in human health 368</td>
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| Total credits for compulsory modules | 54 |

**Single major track:**

Electives may be chosen from any combination of: BCM351, BCM352, BCM354, BCM355, BCM364, BCM365, BCM366, BIF311, BOT356, BOT358, BOT365, MBY351, MBY355, MBY364, MBY365, PLG351, ZEN364, ZEN365.

**Dual major track**

- Genetics and **Biochemistry** combination:
  Students must replace BTC361 with Biochemistry modules and must take [BCM351 + BCM352 + BCM353 + BCM354] and [BCM362 + BCM363 + BCM364 + BCM365 + BMC366] to a total value of 72 credits.

- Genetics and **Microbiology** combination:
  Students must replace either GTS368 or BTC361 with Microbiology modules, and must take [MBY351 + MBY355] and [MBY364 + MBY365] to a total value of 72 credits.

- Genetics and **Plant Science** combination:
  Students must take [BOT356 + BOT358] and [BOT365] to a value of 54 credits. Students may also choose to replace GTS368 with BOT366.

- Genetics and **Zoology** combination
  Students must replace either BTC361 or GTS368 with Zoology modules, and must take [any 2 modules of ZEN351 or ZEN352 or ZEN353 or ZEN354] and [ZEN361 + ZEN363] to a total value of 72 credits.

- Genetics and **Entomology** combination
  Students must replace either BTC361 or GTS368 with Zoology modules, and must take [ZEN355 + ZEN351 or ZEN353 or ZEN354] and [ZEN361 + ZEN365] to a total value of 72 credits.

**Compulsory credits = (90) Elective credits = (54) Total credits = (144)**

A minimum of (428) credits is required to obtain the degree.
## Field of study

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<tr>
<th>Field of study</th>
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<th>Code</th>
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### First year, first semester:

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<td>Introduction to environmental sciences 101</td>
<td>K1</td>
<td>3</td>
<td>0</td>
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<td>GGY156</td>
<td>Aspects of human geography 156</td>
<td>K2</td>
<td>4</td>
<td>0</td>
<td>8</td>
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<tr>
<td>GMC110</td>
<td>Cartography 110</td>
<td>S1</td>
<td>3</td>
<td>1</td>
<td>12</td>
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<td>LST110</td>
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<td>S1</td>
<td>2</td>
<td>0</td>
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**Total credits for compulsory modules** 50

WTW 134 can be taken instead of WTW 114.

### First year, second semester:

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<td>Academic information management 101*</td>
<td>S2</td>
<td>2</td>
<td>0</td>
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<tr>
<td>GGY166</td>
<td>Southern African geomorphology 166</td>
<td>K3</td>
<td>4</td>
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<tr>
<td>WKD164</td>
<td>Climate and weather of Southern Africa 164</td>
<td>K4</td>
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**Total credits for compulsory modules** 22

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Electives can be chosen from modules in the following departments: Geography, Geoinformatics and Meteorology, Plant Production and Soil Science, Chemistry, Plant Science, Physics, Zoology and Entomology, Geology, Mathematics and Applied Mathematics, Computer Science, Anthropology and Archaeology, Economics, History, Psychology, Sociology, Political Sciences.

Compulsory credits = (72) Elective credits = (68) Total credits = (140)

### Second year, first semester:

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<td>GGY283</td>
<td>Introductory GIS 283</td>
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**Total credits for compulsory modules** 24

### Second year, second semester:

<table>
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### GIS220 - Geographic data analysis 220

<table>
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<th>ppw</th>
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<td></td>
<td></td>
<td></td>
<td>S2</td>
<td>3</td>
<td>12</td>
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</table>

**Total credits for compulsory modules: 36**

Electives can be chosen from modules in the following departments: Geography, Geoinformatics and Meteorology, Plant Production and Soil Science, Chemistry, Plant Science, Physics, Zoology and Entomology, Geology, Mathematics and Applied Mathematics, Computer Science, Anthropology and Archaeology, Economics, History, Psychology, Sociology, Political Sciences.

Compulsory credits = (60) Elective credits = (84) Total credits = (144)

#### Third year, first semester:

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<td>GGY356</td>
<td>Sustainable development 356</td>
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<td>Geographic information systems 310</td>
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**Total credits for compulsory modules: 60**

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<td>GGY366</td>
<td>Development frameworks 366</td>
<td>K3</td>
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<td>Spatial analysis 320</td>
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**Total credits for compulsory modules: 60**

Electives can be chosen from modules in the following departments: Geography, Geoinformatics and Meteorology, Plant Production and Soil Science, Chemistry, Plant Science, Physics, Zoology and Entomology, Geology, Mathematics and Applied Mathematics, Computer Science, Anthropology and Archaeology, Economics, History, Psychology, Sociology, Political Sciences.

Compulsory credits = (120) Elective credits = (24) Total credits = (144)

A minimum of (428) credits is required to obtain the degree.
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### First year, first semester:

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<td>GGY156</td>
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<td>GMC110</td>
<td>Cartography 110</td>
<td>S1</td>
<td>3</td>
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**Total credits for compulsory modules** 70

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<td>GGY166</td>
<td>Southern African geomorphology 166</td>
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<td>Geoinformatics 120</td>
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<td>Prerequisite/s: GMC110</td>
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<td>Informatics 163</td>
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**Total credits for compulsory modules** 60

* Students may enrol for AIM 111 and AIM 121 instead of AIM 101 (the same content presented over 2 semesters)

**Compulsory credits = (130) Elective credits = (0) Total credits = (130)**
### Second year, first semester:

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<td>2</td>
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<td>Remote sensing 220</td>
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<td>3</td>
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Total credits for compulsory modules: 71

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### Second year, second semester:

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Total credits for compulsory modules: 62

Compulsory credits = (133) Elective credits = (13) Total credits = (146)

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### Third year, first semester:

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<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>ppw</th>
<th>Crdt</th>
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<tbody>
<tr>
<td>GIS310</td>
<td>Geographic information systems 310</td>
<td>S1</td>
<td>3</td>
<td>1</td>
<td>24</td>
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<tr>
<td>GMC310</td>
<td>Geometrical and space geodesy 310</td>
<td>S1</td>
<td>3</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>OBS114</td>
<td>Business management 114</td>
<td>S1</td>
<td>3</td>
<td>0</td>
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Total credits for compulsory modules: 58

---

### Third year, second semester:

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<th>Crdt</th>
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<tbody>
<tr>
<td>GIS320</td>
<td>Spatial analysis 320</td>
<td>S2</td>
<td>3</td>
<td>1</td>
<td>24</td>
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<tr>
<td>GMA320</td>
<td>Remote sensing 320</td>
<td>S2</td>
<td>3</td>
<td>1</td>
<td>24</td>
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</tbody>
</table>
### GMT320 Geoinformatics project 320
Prerequisite/s: GIS310 and INF214 and INF261 or TDH.
Only for Geoinformatics students

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
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<th>Ipw</th>
<th>ppw</th>
<th>Crdt</th>
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</thead>
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<td>Business management 124</td>
<td>S2</td>
<td>3</td>
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</table>

**Total credits for compulsory modules**: 24

### OBS124 Business management 124
Prerequisite/s: Admission to the examination in OBS114

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<th>Crdt</th>
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<tbody>
<tr>
<td>S2</td>
<td>Geoinformatics project 320</td>
<td>3</td>
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</table>

**Only for Geoinformatics students**

A minimum of (438) credits is required to obtain the degree.

### Field of study

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Dept</th>
<th>Code</th>
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<tbody>
<tr>
<td>BSc in Geology</td>
<td>GLY</td>
<td>02133022</td>
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</table>

### First year, first semester:

Degree programmes in the Department of Geology: Students will be informed timeously of compulsory excursions that could take place during the vacations. The attendance of excursions for first-year students is compulsory, while excursions of longer duration are compulsory for senior students.

<table>
<thead>
<tr>
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<th>Name</th>
<th>Trm</th>
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<tbody>
<tr>
<td>CMY117</td>
<td>General chemistry 117</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
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<td>GLY155</td>
<td>Introduction to geology 155</td>
<td>S1</td>
<td>4</td>
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<td>16</td>
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<tr>
<td>LST110</td>
<td>Language and study skills 110</td>
<td>S1</td>
<td>2</td>
<td>0</td>
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<td>First course in physics 114</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
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<tr>
<td>WTW114</td>
<td>Calculus 114</td>
<td>S1</td>
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**Total credits for compulsory modules**: 70

### First year, second semester:

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<th>ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
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<td>AIM101</td>
<td>Academic information management 101*</td>
<td>S2</td>
<td>2</td>
<td>0</td>
<td>6</td>
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<tr>
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<td>General chemistry 127</td>
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<td>4</td>
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<tr>
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<td>Historical geology 161</td>
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<td>4</td>
<td>1</td>
<td>8</td>
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<tr>
<td>GLY162</td>
<td>Environmental and hazard geology 162</td>
<td>K3</td>
<td>4</td>
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<tr>
<td>WTW128</td>
<td>Calculus 128</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

**Total credits for compulsory modules**: 46

---

Total credits for compulsory modules = (140) Elective credits = (22) Total credits = (162)
* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Electives can be chosen from modules in the following departments: Geography, Geoinformatics and Meteorology, Plant Production and Soil Science, Chemistry, Mathematics and Applied Mathematics, Physics and Computer Science.

Compulsory credits = (116) Elective credits = (24) Total credits = (140)

**Second year, first semester:**

<table>
<thead>
<tr>
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<th>Name</th>
<th>Trm</th>
<th>Ipw</th>
<th>ppw</th>
<th>Crdt</th>
</tr>
</thead>
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<tr>
<td>GKD250</td>
<td>Introductory soil science 250 Prerequisite/s: CMY117 GS or TDH</td>
<td>S1</td>
<td>3</td>
<td>1</td>
<td>12</td>
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<tr>
<td>GLY254</td>
<td>Structural geology 254 Prerequisites: CMY117 and GLY155, and 1 of, GLY161, GLY162 and WTW114/WTW158 or PHY114</td>
<td>K2</td>
<td>4</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>GLY255</td>
<td>Fundamental and applied mineralogy 255 Prerequisite/s: CMY117 and GLY155 and 1 of GLY161, GLY162 and WTW114/WTW158 or PHY114</td>
<td>S1</td>
<td>4</td>
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</table>

Total credits for compulsory modules 48

**Second year, second semester:**

<table>
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<th>ppw</th>
<th>Crdt</th>
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<tbody>
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<td>Sedimentology 253 Prerequisites: CMY117 and GLY155 and 1 of GLY161, GLY162 and WTW114/WTW158 or PHY114</td>
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<td>4</td>
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<tr>
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<td>Igneous petrology 261 Prerequisite/s: GLY255</td>
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<tr>
<td>GLY262</td>
<td>Metamorphic petrology 262 Prerequisite/s: GLY255</td>
<td>K4</td>
<td>4</td>
<td>2</td>
<td>12</td>
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<tr>
<td>GLY265</td>
<td>Groundwater 265 Prerequisites: GLY155 and 1 of GLY161, GLY162 and WTW158/WTW114 or PHY114 and WTW128/WTW168</td>
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<td>12</td>
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</table>

Total credits for compulsory modules 48

Electives can be chosen from modules in the following departments: Geography, Geoinformatics and Meteorology, Plant Production and Soil Science, Chemistry, Mathematics and Applied Mathematics, Physics.

Compulsory credits = (96) Elective credits = (48) Total credits = (144)

**Third year, first semester:**

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<th>Code</th>
<th>Name</th>
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<th>ppw</th>
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<td>GLY363</td>
<td>Engineering geology 363 Prerequisites: GLY155 and GLY265 and 4 of the second-year modules: GLY253, GLY254, GLY255, GLY261, GLY262</td>
<td>K2</td>
<td>4</td>
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<td>18</td>
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</table>
GLY364  Rock mechanics 364  
Prerequisite/s: 5 of the second-year modules: GLY255, GLY253, GLY254, GLY261, GLY262, GLY265  

<table>
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<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>lpw</th>
<th>ppw</th>
<th>Crdt</th>
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<tr>
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<td>Rock mechanics 364</td>
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Total credits for compulsory modules  36

Third year, second semester:

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<td>Ore deposits 361</td>
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<td>Prerequisites: 5 of the second-year modules:</td>
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<tr>
<td>GLY362</td>
<td>Geostatistics and ore reserve calculations 362</td>
<td>K4</td>
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<tr>
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</table>

Total credits for compulsory modules  36

Electives can be chosen from modules in the following departments: Geography, Geoinformatics and Meteorology, Plant Production and Soil Science, Chemistry, Mathematics and Applied Mathematics and Physics.

Compulsory credits = (72) Elective credits = (72) Total credits = (144)

A minimum of (428) credits is required to obtain the degree.

Field of study                                    Dept   Code
BSc in Human Genetics                            GTS    03134031

First year, first semester:

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<th>ppw</th>
<th>Crdt</th>
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</thead>
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<td>4</td>
<td>1</td>
<td>16</td>
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<td>Prerequisite/s: Par 1.2</td>
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<tr>
<td>LST110</td>
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<td>S1</td>
<td>2</td>
<td>0</td>
<td>6</td>
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<td>MLB111</td>
<td>Molecular and cell biology 111</td>
<td>S1</td>
<td>4</td>
<td>1</td>
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<td>Prerequisite/s: Par 1.2</td>
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<td>General physics 131</td>
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<td>Prerequisite/s: Par 1.2</td>
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<tr>
<td>WTW134</td>
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Total credits for compulsory modules  70

First year, second semester:

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<tbody>
<tr>
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Natural and Agricultural Sciences 2013
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<tr>
<td>BOT161</td>
<td>Plant biology 161</td>
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<td>CMY127</td>
<td>General chemistry 127</td>
<td>S2</td>
<td>4</td>
<td>1</td>
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</tr>
<tr>
<td>GTS161</td>
<td>Introductory genetics 161</td>
<td>S2</td>
<td>2</td>
<td>0.5</td>
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<tr>
<td>MBY161</td>
<td>Introduction to microbiology 161</td>
<td>S2</td>
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<td>ZEN161</td>
<td>Animal diversity 161</td>
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</table>

Total credits for compulsory modules = 70

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Compulsory credits = (140) Elective credits = (0)

Second year, first semester:

<table>
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<tbody>
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<tr>
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<td>Carbohydrate metabolism 255</td>
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<td>Practical: Carbohydrate metabolism 256</td>
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<tr>
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<tr>
<td>FLG211</td>
<td>Introductory and neurophysiology 211</td>
<td>S1</td>
<td>2</td>
<td>1</td>
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<tr>
<td>FLG212</td>
<td>Circulatory physiology 212</td>
<td>S1</td>
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<tr>
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<td>Molecular genetics 251</td>
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<td>MBY251</td>
<td>Bacteriology 251</td>
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<td>Prerequisite/s: MBY161 GS</td>
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Total credits for compulsory modules = 72
### Second year, second semester:

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<tbody>
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<td>Biochemistry in perspective 265</td>
<td>S2</td>
<td>2</td>
<td>0</td>
<td>9</td>
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<td>Prerequisite/s: BCM266# en CMY117 GS and CMY127 GS and MLB111 GS</td>
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<tr>
<td>BCM266</td>
<td>Practical: Biochemistry in perspective 266</td>
<td>S2</td>
<td>0</td>
<td>0.5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: BCM265# en CMY117 GS and CMY127 GS and MLB111 GS</td>
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<tr>
<td>FLG221</td>
<td>Lung and renal physiology, acid-base balance and temperature 221</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>12</td>
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<tr>
<td></td>
<td>Prerequisite/s: FLG211 and FLG212</td>
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<tr>
<td>FLG222</td>
<td>Digestion, endocrinology and reproductive systems 222</td>
<td>S2</td>
<td>2</td>
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<td>Prerequisite/s: FLG211 and FLG212</td>
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<td>Genetic variation and evolution 261</td>
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<td>Prerequisite/s: GTS251 GS</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>MBY261</td>
<td>Mycology 261</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: MBY161</td>
<td></td>
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</tr>
</tbody>
</table>

**Total credits for compulsory modules**: **72**

Compulsory credits = (144) Elective credits = (0)

### Third year, first semester:

<table>
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<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>GTS351</td>
<td>Eukaryotic gene control and development 351</td>
<td>S1</td>
<td>2</td>
<td>1</td>
<td>18</td>
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<tr>
<td></td>
<td>Prerequisite/s: GTS251 GS and GTS261 GS</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>GTS354</td>
<td>Genome evolution and phylogenetics 354</td>
<td>S1</td>
<td>2</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: GTS251 GS and GTS261 GS</td>
<td></td>
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</tbody>
</table>

**Total credits for compulsory modules**: **36**

### Third year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>lpw</th>
<th>ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>GTS367</td>
<td>Population and evolutionary genetics 367</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: GTS251 and GTS261 or TDH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GTS368</td>
<td>Genetics in human health 368</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: GTS251 and GTS261 GS</td>
<td></td>
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</tbody>
</table>

**Total credits for compulsory modules**: **36**

**Single major track:**
Electives may be chosen from any combination of: BCM351, BCM352, BCM354,
BCM355, BCM364, BCM365, BCM366, BIF311, BOT365, BTC361, FAR381, FAR382, MBY351, MBY355, MBY364 and MBY365.

**Dual major track**
- Genetics and **Physiology** combination:
  Students must take \([\text{FLG330} + \text{FLG327} + \text{FLG331} + \text{FLG332}]\) to a total value of 72 credits.

<table>
<thead>
<tr>
<th>Field of study</th>
<th>Dept</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSc in Human Physiology</td>
<td>FLG</td>
<td>03134021</td>
</tr>
</tbody>
</table>

Compulsory credits = (72) Elective credits = (72) Total credits = (144)

A minimum of (428) credits is required to obtain the degree.

First year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>Ipw</th>
<th>ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMY117</td>
<td>General chemistry 117</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: Par 1.2</td>
<td></td>
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</tr>
<tr>
<td>LST110</td>
<td>Language and study skills 110</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>MLB111</td>
<td>Molecular and cell biology 111</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: Par 1.2</td>
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<td></td>
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</tr>
<tr>
<td>PHY131</td>
<td>General physics 131</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
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<td></td>
<td>Prerequisite/s: Par 1.2</td>
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<tr>
<td>WTW134</td>
<td>Mathematics 134</td>
<td>S1</td>
<td>4</td>
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<td></td>
<td>Prerequisite/s: Par 1.2</td>
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</tr>
</tbody>
</table>

Total credits for compulsory modules 70

- Students intending to apply for the 20 to 30 MBChB, or the 2 to 3 BChD places, that become available in the second term, may enrol for FIL155(6), MGW112(6) and MTL181(12) instead of WTW134 with the condition that, should they not be selected and want to continue with BSc, WTW134 **must** be taken in the second semester.
- Students should take note of the prerequisites for FLG 211 and FLG 212.
- Students who, after the first year do not comply with the prerequisites for these modules, will be required to apply to Student Administration, Faculty of Natural and Agricultural Sciences, to remain in the study programme.

First year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>Ipw</th>
<th>ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIM101</td>
<td>Academic information management 101*</td>
<td>S2</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>BME120</td>
<td>Biometry 120</td>
<td>S2</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Plant biology 161
- **Prerequisite/s:** MLB111 GS
- **Trm:** S2
- **lpw:** 2
- **ppw:** 0.5
- **Crdt:** 8

### General chemistry 127
- **Prerequisite/s:** CMY117 GS
- **Trm:** S2
- **lpw:** 4
- **ppw:** 1
- **Crdt:** 16

### Introductory genetics 161
- **Prerequisite/s:** MLB111 GS
- **Trm:** S2
- **lpw:** 2
- **ppw:** 0.5
- **Crdt:** 8

### Introduction to microbiology 161
- **Prerequisite/s:** MLB111 GS
- **Trm:** S2
- **lpw:** 2
- **ppw:** 0.5
- **Crdt:** 8

### Animal diversity 161
- **Prerequisite/s:** MLB111 GS or TDH
- **Trm:** S2
- **lpw:** 2
- **ppw:** 0.5
- **Crdt:** 8

### Total credits for compulsory modules
- **70**

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

- Students who did not take WTW134 in the first semester are reminded to enrol for it in the second semester.
- Students should take note of the prerequisites for FLG 211 and FLG 212. Students who after the first year do not comply with the prerequisites for these modules, will be required to apply to Student Administration, Faculty of Natural and Agricultural Sciences to remain in the study programme.

### Compulsory credits = (140) Elective credits = (0) Total credits = (140)

### Second year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>ppw</th>
<th>Crdt</th>
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<td>Introduction to proteins and enzymes 253</td>
<td>S1</td>
<td>2</td>
<td>0</td>
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<tr>
<td></td>
<td>Prerequisite/s: BCM254# and CMY117 GS and CMY127 GS and MLB111 GS</td>
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<tr>
<td>BCM254</td>
<td>Practical: Introduction to proteins and enzymes 254</td>
<td>S1</td>
<td>0</td>
<td>0.5</td>
<td>3</td>
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<tr>
<td></td>
<td>Prerequisite/s: BCM253# and CMY117 GS and CMY127 GS and MLB111 GS</td>
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<tr>
<td>BCM255</td>
<td>Carbohydrate metabolism 255</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: BCM256# and CMY117 GS and CMY127 GS and MLB111 GS</td>
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<tr>
<td>BCM256</td>
<td>Practical: Carbohydrate metabolism 256</td>
<td>S1</td>
<td>0</td>
<td>0.5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: BCM255# and CMY117 GS and CMY127 GS and MLB111 GS</td>
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<tr>
<td>FLG211</td>
<td>Introductory and neurophysiology 211</td>
<td>S1</td>
<td>2</td>
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<td></td>
<td>Prerequisite/s: CMY117 and CMY127 and MLB111 and PHY131</td>
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<tr>
<td>FLG212</td>
<td>Circulatory physiology 212</td>
<td>S1</td>
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<tr>
<td>GTS251</td>
<td>Molecular genetics 251</td>
<td>S1</td>
<td>2</td>
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<td></td>
<td>Prerequisite/s: GTS161 GS</td>
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### Total credits for compulsory modules
- **60**
## Second year, second semester:

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<tbody>
<tr>
<td>BCM263</td>
<td>Lipid and nitrogen metabolism 263</td>
<td>S2</td>
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<tr>
<td></td>
<td>Prerequisite/s: BCM264# and CMY117 GS and CMY127 GS and MLSB111 GS</td>
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<td></td>
</tr>
<tr>
<td>BCM264</td>
<td>Practical: Lipid and nitrogen metabolism 264</td>
<td>S2</td>
<td>0</td>
<td>0.5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: BCM263# and CMY117 GS and CMY127 GS and MLSB111 GS</td>
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<tr>
<td>BCM265</td>
<td>Biochemistry in perspective 265</td>
<td>S2</td>
<td>2</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: BCM266# and CMY117 GS and CMY127 GS and MLSB111 GS</td>
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<tr>
<td>BCM266</td>
<td>Practical: Biochemistry in perspective 266</td>
<td>S2</td>
<td>0</td>
<td>0.5</td>
<td>3</td>
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<tr>
<td></td>
<td>Prerequisite/s: BCM265# and CMY117 GS and CMY127 GS and MLSB111 GS</td>
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<td></td>
</tr>
<tr>
<td>FLG221</td>
<td>Lung and renal physiology, acid-base balance and temperature 221</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>12</td>
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<tr>
<td></td>
<td>Prerequisite/s: FLG211 and FLG212</td>
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<tr>
<td>FLG222</td>
<td>Digestion, endocrinology and reproductive systems 222</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>12</td>
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<tr>
<td></td>
<td>Prerequisite/s: FLG211 and FLG212</td>
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<tr>
<td>GTS261</td>
<td>Genetic variation and evolution 261</td>
<td>S2</td>
<td>2</td>
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<tr>
<td></td>
<td>Prerequisite/s: GTS251 GS</td>
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</tbody>
</table>

**Total credits for compulsory modules** 60

Electives can be chosen from Chemistry 283 and 284 (in consultation with the Head of the Department), Microbiology, Plant Science or Zoology.

Compulsory credits = (120) Elective credits = (24) Total credits = (144)

## Third year, first semester:

<table>
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<th>Code</th>
<th>Name</th>
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<td>FLG327</td>
<td>Higher neurological functions 327</td>
<td>S1</td>
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<td></td>
<td></td>
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<tr>
<td>FLG330</td>
<td>Cellular and developmental physiology 330</td>
<td>S1</td>
<td>2</td>
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**Total credits for compulsory modules** 36
### Third year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>Ipw</th>
<th>ppw</th>
<th>Crdt</th>
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</thead>
<tbody>
<tr>
<td>FLG322</td>
<td><strong>Industrial physiology 322</strong>*</td>
<td>S2</td>
<td>1</td>
<td>1</td>
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</tr>
<tr>
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<td>Prerequisite/s: BCM253 GS and BCM254 GS and BCM255 GS and BCM256 GS and BCM263 GS and BCM264 GS and BCM265 GS and BCM266 GS and FLG221 and FLG222</td>
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</tr>
<tr>
<td></td>
<td><em>This modules is reserved for students that intend studying the honours in occupational health and safety.</em></td>
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</tr>
<tr>
<td>FLG331</td>
<td><strong>Exercise and nutrition science 331</strong></td>
<td>S2</td>
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<tr>
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<tr>
<td>FLG332</td>
<td><strong>Applied and pathophysiology 332</strong></td>
<td>S2</td>
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<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Total credits for compulsory modules: **36**

Electives may be chosen from Biochemistry, Chemistry (in consultation with Head of Department), Genetics, Microbiology, Plant science, Zoology or the combination of Pharmacology and Genetics/Biochemistry.

*NOTE: Only students interested in pursuing postgraduate studies in occupational health and safety must take FLG322 Industrial physiology. The balance of their elective credits must be chosen from the options below.*

Electives may be chosen from 300-level modules in Biochemistry or Genetics or a combination of Pharmacology and Genetics/Biochemistry. Electives may also be chosen from 300-level modules in Chemistry (in consultation with Head of Department), Microbiology, Plant Science or Zoology, if the necessary prerequisite modules were completed at 200-level.

Compulsory credits = (72) Elective credits = (72) Total credits = (144)

A minimum of (428) credits is required to obtain the degree.

### First year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>Ipw</th>
<th>ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMY117</td>
<td><strong>General chemistry 117</strong></td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: Par 1.2</td>
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</tbody>
</table>
### Natural and Agricultural Sciences 2013

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>Ipw</th>
<th>Ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>LST110</td>
<td>Language and study skills 110</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>MLB111</td>
<td>Molecular and cell biology 111</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>PHY131</td>
<td>General physics 131</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>SLK110</td>
<td>Psychology 110</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>WTW134</td>
<td>Mathematics 134</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
</tbody>
</table>

**Total credits for compulsory modules** 82

- Students intending to apply for the 20-30 MBChB, or the 2-3 BChD places, that become available in the second term, may enrol for FIL155(6), MGW112(6) and MTL181(12) instead of WTW134 under the condition that, should they not be selected and want to continue with BSc, WTW134 must be taken in the second semester.
- Students should take note of the prerequisites for FLG211 and FLG212. Students who, after the first year, do not comply with the prerequisites for these modules will be required to apply to Student Administration, Faculty of Natural and Agricultural Sciences, to remain in the study programme.

### First year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>Ipw</th>
<th>Ppw</th>
<th>Crdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIM101</td>
<td>Academic information management 101*</td>
<td>S2</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>BME120</td>
<td>Biometry 120</td>
<td>S2</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>CMY127</td>
<td>General chemistry 127</td>
<td>S2</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>GTS161</td>
<td>Introductory genetics 161</td>
<td>S2</td>
<td>2</td>
<td>0.5</td>
<td>8</td>
</tr>
<tr>
<td>SLK120</td>
<td>Psychology 120</td>
<td>S2</td>
<td>2</td>
<td>0</td>
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</tbody>
</table>

**Total credits for compulsory modules** 58

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

- Students should take note of the prerequisites for FLG211 and FLG212. Students who, after the first year do not comply with the prerequisites for these modules, will be required to apply to Student Administration, Faculty of Natural and Agricultural Sciences, to remain in the study programme.
- Students who intend to apply for the BSocSciHons (Psychology) programme must complete the following research modules: RES210 and RES320.

**Compulsory credits = (140) Elective credits = (0)**

### Second year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
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<td>BCM253</td>
<td>Introduction to proteins and enzymes 253</td>
<td>S1</td>
<td>2</td>
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</table>

**Students who intend to apply for the 20-30 MBChB, or the 2-3 BChD places, that become available in the second term, may enrol for FIL155(6), MGW112(6) and MTL181(12) instead of WTW134 under the condition that, should they not be selected and want to continue with BSc, WTW134 must be taken in the second semester.**

- Students should take note of the prerequisites for FLG211 and FLG212. Students who, after the first year, do not comply with the prerequisites for these modules will be required to apply to Student Administration, Faculty of Natural and Agricultural Sciences, to remain in the study programme.

**Compulsory credits = (140) Elective credits = (0)**

78
<table>
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<tr>
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Students that do not comply with the prerequisites for the modules FLG211 and FLG212, will be required to apply to Student Administration at the Faculty to remain in the study programme.

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<tr>
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<td>temperature 221</td>
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### Natural and Agricultural Sciences 2013

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</table>

**Total credits for compulsory modules** 80

- Students who intend to apply for BScHons (Genetics), will be required to register for additional undergraduate Genetics modules.
- Students intending to apply for the BSocSciHons in Psychology programme must complete the following research modules: RES210 and RES320.

**Compulsory credits = (160) Elective credits = (0)**

### Third year, first semester:

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**Total credits for compulsory modules** 84

### Third year, second semester:

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<td>FLG332</td>
<td>Applied and pathophysiology 332</td>
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</table>

**Total credits for compulsory modules** 84

80
Students intending to apply for the BSocSciHons (Psychology) programme must complete the following research modules: RES210 and RES 320.

Students intending to apply for BScHons (Genetics) must also complete the module GTS 367 in their third year.

Compulsory credits = (170) Elective credits = (0)

A minimum of (468) credits is required to obtain the degree.

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<tr>
<th>Field of study</th>
<th>Dept</th>
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First year, first semester:

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Total credits for compulsory modules 38

First year, second semester:

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</table>

Total credits for compulsory modules 38

* Students may enrol for AIM 111 and AIM 121 instead of AIM 101 (the same content presented over 2 semesters)

It is recommended that COS132 be taken as a first-year elective by all students in this programme. Additional electives should be chosen as follows:

Students in Mathematical Statistics who also want to be trained for the Mathematics industry normally choose from WTW123 (8), 115 (8), 152 (8), 162 (8) and COS110 (16)

Students in Mathematical Statistics who also want to be trained for the Insurance industry, Econometrics, normally choose: EKN113, 123 (30) or EKN110, 120 (20)
FBS110, 120 (20) or FBS112, 122 (20)
FRK111, 121 (22)
COS110 (16)

Students in Mathematical Statistics with other career requirements, choose modules from any other subject/faculty to meet their specific needs.

Compulsory credits = (76) Elective credits = (64) Total credits = (146)

### Second year, first semester:

<table>
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Total credits for compulsory modules 48

### Second year, second semester:

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Total credits for compulsory modules 48

Students in Mathematical Statistics who also want to be trained for the Mathematics industry normally choose from WTW286 (12), 285 (12).

Students in Mathematical Statistics who also want to be trained for the Insurance Industry normally choose IAS221 (12) (note the prerequisite specified by the Department of Insurance and Actuarial Science).

Students in Mathematical Statistics who also want to be trained for the Econometrics industry normally choose from: EKN214(16), 224 (16) and STK281 (10).

Students in Mathematical Statistics with other career requirements, choose modules from any other subject/faculty to meet their specific needs.

Compulsory credits = (96) Elective credits = (48) Total credits = (144)
Third year, first semester:

<table>
<thead>
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<tr>
<td>WST311</td>
<td>Multivariate analysis 311</td>
<td>S1</td>
<td>2</td>
<td>1</td>
<td>18</td>
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<tr>
<td></td>
<td>Prerequisite/s: WST211 and WST221 and WTW211 GS and WTW218 GS</td>
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</tr>
<tr>
<td>WST312</td>
<td>Stochastic processes 312</td>
<td>S1</td>
<td>2</td>
<td>1</td>
<td>18</td>
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<tr>
<td></td>
<td>Prerequisite/s: WST211 and WST221 and WTW211 GS and WTW218 GS</td>
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</table>

Total credits for compulsory modules 36

Third year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>Crdt</th>
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<tbody>
<tr>
<td>WST321</td>
<td>Time series analysis 321</td>
<td>S2</td>
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<td></td>
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<tr>
<td>WST322</td>
<td>Actuarial statistics 322</td>
<td>S2</td>
<td>2</td>
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<tr>
<td></td>
<td>Prerequisite/s: WST211 and WST221 and WTW211 GS and WTW218 GS</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

Total credits for compulsory modules 36

Students in Mathematical Statistics who also want to be trained for the Mathematics industry normally choose from: WTW310 (18), 320 (18), 354 (18), 364 (18), 381 (18), 382 (18), 383 (18), 385 (18), 386 (18), 387 (18), 389 (18).

Students in Mathematical Statistics who also want to be trained for the Insurance industry normally choose IAS382 (20).

Students in Mathematical Statistics who also want to be trained for the Econometrics industry normally choose from: EKN310, 320 and 314 (60).

Students in Mathematical Statistics with other career requirements, choose modules from any other subject/faculty to meet their specific needs.

Compulsory credits = (72) Elective credits = (72) Total credits = (144)

A minimum of (428) credits is required to obtain the degree.
<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>Crdt</th>
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</thead>
<tbody>
<tr>
<td>WTW114</td>
<td>Calculus 114 Prerequisite/s: Par 1.2</td>
<td>S1</td>
<td>4</td>
<td>0</td>
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<tr>
<td>WTW115</td>
<td>Discrete structures 115 Prerequisite/s: Par 1.2</td>
<td>S1</td>
<td>2</td>
<td>1</td>
<td>8</td>
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<tr>
<td>WTW152</td>
<td>Mathematical modelling 152 Prerequisite/s: Par 1.2</td>
<td>S1</td>
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</table>

**Total credits for compulsory modules**: 54

**First year, second semester:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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</thead>
<tbody>
<tr>
<td>AIM101</td>
<td>Academic information management 101*</td>
<td>S2</td>
<td>2</td>
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<tr>
<td>WST121</td>
<td>Mathematical statistics 121 Prerequisite/s: WST111 GS</td>
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<td>WTW123</td>
<td>Numerical analysis 123 Prerequisite/s: WTW114 GS</td>
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<td>2</td>
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<td>8</td>
</tr>
<tr>
<td>WTW126</td>
<td>Linear algebra 126 Prerequisite/s: Par 1.2</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>8</td>
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<tr>
<td>WTW128</td>
<td>Calculus 128 Prerequisite/s: WTW114 GS</td>
<td>S2</td>
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<tr>
<td>WTW162</td>
<td>Dynamical processes 162 Prerequisite/s: WTW114 GS</td>
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</table>

**Total credits for compulsory modules**: 54

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

**Compulsory credits = (108) Elective credits = (32) Total credits = (140)**

**Second year, first semester:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>Linear algebra 211 Prerequisite/s: WTW126</td>
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<td>2</td>
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<td>12</td>
</tr>
<tr>
<td>WTW218</td>
<td>Calculus 218 Prerequisite/s: WTW114 and WTW126 and WTW128</td>
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<td>2</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>WTW286</td>
<td>Differential equations 286 Prerequisite/s: WTW114 and WTW126 and WTW128</td>
<td>S1</td>
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</table>

**Total credits for compulsory modules**: 36

**Second year, second semester:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>Ipw</th>
<th>ppw</th>
<th>Crdt</th>
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</thead>
<tbody>
<tr>
<td>WTW220</td>
<td>Analysis 220 Prerequisite/s: WTW114 and WTW128</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>12</td>
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<tr>
<td>WTW221</td>
<td>Linear algebra 221 Prerequisite/s: WTW211</td>
<td>S2</td>
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<td>12</td>
</tr>
<tr>
<td>WTW248</td>
<td>Vector analysis 248 Prerequisite/s: WTW218</td>
<td>S2</td>
<td>2</td>
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</table>
### Discrete structures 285
- **Prerequisite/s:** WTW115

<table>
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<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>Crdt</th>
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</thead>
<tbody>
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<td>Discrete structures 285</td>
<td>S2</td>
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<td>12</td>
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</tbody>
</table>

**Total credits for compulsory modules**: 48

**Compulsory credits = (84) Elective credits = (60) Total credits = (144)**

### Third year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
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<th>ppw</th>
<th>Crdt</th>
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<tbody>
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<td>Analysis 310</td>
<td>S1</td>
<td>2</td>
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<td>18</td>
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<tr>
<td></td>
<td>Prerequisite/s: WTW220</td>
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<td></td>
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</tr>
<tr>
<td>WTW381</td>
<td>Algebra 381</td>
<td>S1</td>
<td>2</td>
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<td>18</td>
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<tr>
<td></td>
<td>Prerequisite/s: WTW114 and WTW211</td>
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</table>

**Total credits for compulsory modules**: 36

### Third year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
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<th>lpw</th>
<th>ppw</th>
<th>Crdt</th>
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<tbody>
<tr>
<td>WTW320</td>
<td>Analysis 320</td>
<td>S2</td>
<td>2</td>
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<td>18</td>
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<tr>
<td></td>
<td>Prerequisite/s: WTW218 and WTW310</td>
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<tr>
<td>WTW389</td>
<td>Geometry 389</td>
<td>S2</td>
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<td>18</td>
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<tr>
<td></td>
<td>Prerequisite/s: WTW211</td>
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</tbody>
</table>

**Total credits for compulsory modules**: 36

A minimum of 54 elective credits at 100- to 300-level can be chosen from any WTW and WST modules. The remainder of the electives at 100-to 300-level can be chosen from any other modules in the list of modules of this faculty.

**Compulsory credits = (72) Elective credits = (72) Total credits = (144)**

A minimum of (428) credits is required to obtain the degree.

### Field of study

<table>
<thead>
<tr>
<th>Dept</th>
<th>Code</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>ANA</td>
<td>03134020</td>
<td>BSc in Medical Sciences</td>
</tr>
</tbody>
</table>

Students who have not passed all the first-year, first-semester modules in BScMedSci are excluded from carrying on with BScMedSci in the second semester and need to deregister and reregister for another BSc programme, eg BSc in Biological Sciences (or a completely different degree programme).

### First year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>ppw</th>
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<tbody>
<tr>
<td>CMY117</td>
<td>General chemistry 117</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: Par 1.2</td>
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</tbody>
</table>
### Natural and Agricultural Sciences 2013

<table>
<thead>
<tr>
<th>Code</th>
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<th>Ppw</th>
<th>Crdt</th>
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</thead>
<tbody>
<tr>
<td>FIL155</td>
<td>Science and world views 155</td>
<td>S1</td>
<td>1</td>
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</tr>
<tr>
<td>LST110</td>
<td>Language and study skills 110</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>MLB111</td>
<td>Molecular and cell biology 111 Prerequisite/s: Par 1.2</td>
<td>S1</td>
<td>4</td>
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<tr>
<td>PHY131</td>
<td>General physics 131 Prerequisite/s: Par 1.2</td>
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<td>1</td>
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<tr>
<td>WTW134</td>
<td>Mathematics 134 Prerequisite/s: Par 1.2</td>
<td>S1</td>
<td>4</td>
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</table>

**Total credits for compulsory modules**: 76

*NOTE: Students who intend to apply for admission to one of the 20 to 30 MBChB places or the 2 to 3 BChD places becoming available in the second semester, may register in the first semester for FIL155, MGW112 and MTL181 with the proviso that these students, should they not be selected, take WTW134 in the second semester.*

### First year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>Ppw</th>
<th>Crdt</th>
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</thead>
<tbody>
<tr>
<td>AIM101</td>
<td>Academic information management 101*</td>
<td>S2</td>
<td>2</td>
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<td>6</td>
</tr>
<tr>
<td>ANA121</td>
<td>Introduction: Human anatomy and embriology 121 Prerequisite/s: CMY117 and MLB111</td>
<td>S2</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>ANA122</td>
<td>Human osteology 122</td>
<td>S2</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>ANA126</td>
<td>Basic human histology 126 Prerequisite/s: CMY117 and MLB111</td>
<td>S2</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>BME120</td>
<td>Biometry 120 Prerequisite/s: At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123</td>
<td>S2</td>
<td>4</td>
<td>1</td>
<td>16</td>
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<tr>
<td>CMY127</td>
<td>General chemistry 127 Prerequisite/s: CMY117 GS</td>
<td>S2</td>
<td>4</td>
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<tr>
<td>GTS161</td>
<td>Introductory genetics 161 Prerequisite/s: MLB111 GS</td>
<td>S2</td>
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<tr>
<td>MBY161</td>
<td>Introduction to microbiology 161 Prerequisite/s: MLB111 GS</td>
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</table>

**Total credits for compulsory modules**: 66

* Students may enrol for AIM 111 and AIM 121 instead of AIM 101 (the same content presented over 2 semesters)

**Compulsory credits = (142) Elective credits = (0)**

ANA modules can only be taken by BSc (Human Physiology) and BSc (Medical Science) students in the first year.

ANA modules can only be taken by BSc (Medical Science) students in the second and third years.
### Second year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
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<th>ppw</th>
<th>Crdt</th>
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<tbody>
<tr>
<td>ANA214</td>
<td>Human cell and developmental biology 214 Prerequisite/s: ANA121 and ANA126 and CMY127</td>
<td>S1</td>
<td>2</td>
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<td>12</td>
</tr>
<tr>
<td>ANA215</td>
<td>Paleoanthropology 215</td>
<td>S1</td>
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<td>1</td>
<td>12</td>
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<tr>
<td>BCM253</td>
<td>Introduction to proteins and enzymes 253 Prerequisite/s: BCM254# and CMY117 GS and CMY127 GS and MLB111 GS</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>BCM254</td>
<td>Practical: Introduction to proteins and enzymes 254 Prerequisite/s: BCM253# and CMY117 GS and CMY127 GS and MLB111 GS</td>
<td>S1</td>
<td>0</td>
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<tr>
<td>BCM255</td>
<td>Carbohydrate metabolism 255 Prerequisite/s: BCM256# and CMY117 GS and CMY127 GS and MLB111 GS</td>
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<td>2</td>
<td>0</td>
<td>9</td>
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<tr>
<td>BCM256</td>
<td>Practical: Carbohydrate metabolism 256 Prerequisite/s: BCM255# and CMY117 GS and CMY127 GS and MLB111 GS</td>
<td>S1</td>
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<td>3</td>
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</tbody>
</table>

**Total credits for compulsory modules**: 48

**Elective credits**
- ANA + FLG option: FLG211 (12) and FLG212 (12)
- ANA + GTS option: GTS 251 (12) and MBY 251 (12)
- ANA + FLG/FAR option: Same as FLG option

### Second year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>lpw</th>
<th>ppw</th>
<th>Crdt</th>
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<tbody>
<tr>
<td>ANA226</td>
<td>Human histology 226 Prerequisite/s: ANA126</td>
<td>S2</td>
<td>1</td>
<td>1</td>
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<tr>
<td>ANA247</td>
<td>Human anatomy 247 Prerequisite/s: ANA121 and ANA122 and CMY127</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>BCM263</td>
<td>Lipid and nitrogen metabolism 263 Prerequisite/s: BCM264# and CMY117 GS and CMY127 GS and MLB111 GS</td>
<td>S2</td>
<td>2</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>BCM264</td>
<td>Practical: Lipid and nitrogen metabolism 264 Prerequisite/s: BCM263# and CMY117 GS and CMY127 GS and MLB111 GS</td>
<td>S2</td>
<td>0</td>
<td>0.5</td>
<td>3</td>
</tr>
<tr>
<td>BCM265</td>
<td>Biochemistry in perspective 265 Prerequisite/s: BCM266# and CMY117 GS and CMY127 GS and MLB111 GS</td>
<td>S2</td>
<td>2</td>
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<td>9</td>
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<tr>
<td>BCM266</td>
<td>Practical: Biochemistry in perspective 266 Prerequisite/s: BCM265# and CMY117 GS and CMY127 GS and MLB111 GS</td>
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</table>

**Total credits for compulsory modules**: 52

**Elective credits**
- ANA + FLG option: FLG221 (12) and FLG222 (12)
- ANA + GTS option: GTS 261 (12) and MBY261 (12)
- ANA + FLG/FAR option: Same as FLG option
Compulsory credits = 96
Elective credits: FLG option: 48 credits, GTS option: 48 credits, FAR option: Same as FLG option

### Third year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>ipw</th>
<th>ppw</th>
<th>Crdt</th>
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</thead>
<tbody>
<tr>
<td>ANA315</td>
<td>Forensic anthropology 315</td>
<td>S1</td>
<td>2</td>
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<tr>
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<td>Prerequisite/s: ANA122 and ANA215</td>
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<tr>
<td>ANA316</td>
<td>Cell and tissue techniques 316</td>
<td>S1</td>
<td>2</td>
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<tr>
<td></td>
<td>Prerequisite/s: ANA226</td>
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</table>

Total credits for compulsory modules 36

Elective credits:
ANA + FLG option: FLG330 (18) and FLG327 (18)
ANA + GTS option: GTS351 (18) and GTS354 (18).
ANA + FLG/FAR option: FLG 330 (18) and FAR 381(20)

### Third year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>ppw</th>
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<tbody>
<tr>
<td>ANA324</td>
<td>Applied human cell and developmental biology 324</td>
<td>S2</td>
<td>2</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Prerequisite/s: ANA214 and ANA226</td>
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<tr>
<td>ANA347</td>
<td>Human anatomy 347</td>
<td>S2</td>
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<tr>
<td></td>
<td>Prerequisite/s: ANA247 GS</td>
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</table>

Total credits for compulsory modules 36

Elective credits:
ANA + FLG option: FLG331 (18) and FLG332 (18)
ANA + GTS option: GTS367 (18) and GTS 368 (18).
ANA + FLG/FAR option: FLG331 (18) or FLG332 (18) and FAR 382 (15)

Compulsory credits = 72
Elective credits: FLG option: 72 credits, GTS option: 72 credits, FAR option: 71 credits

A minimum of 430 credits for the ANA + FLG option is required to obtain the degree.
A minimum of 430 credits for the ANA +GTS option is required to obtain the degree.
A minimum of 429 credits for the ANA + FLG/FAR option is required to obtain the degree.

### Field of study

| BSc in Meteorology | GGY | 02133312 |

### First year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>LST110</td>
<td>Language and study skills 110</td>
<td>S1</td>
<td>2</td>
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<tr>
<td>PHY114</td>
<td>First course in physics 114</td>
<td>S1</td>
<td>4</td>
<td>1</td>
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</table>

A minimum of 430 credits for the ANA + FLG option is required to obtain the degree.
A minimum of 430 credits for the ANA +GTS option is required to obtain the degree.
A minimum of 429 credits for the ANA + FLG/FAR option is required to obtain the degree.
**Natural and Agricultural Sciences 2013**

<table>
<thead>
<tr>
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<tbody>
<tr>
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<td>Atmospheric structure and processes 155</td>
<td>S1</td>
<td>4</td>
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<td>S1</td>
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### First year, second semester:

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<tr>
<td>WKD164</td>
<td>Climate and weather of Southern Africa 164</td>
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<td>WTW126</td>
<td>Linear algebra 126 Prerequisite/s: Par 1.2</td>
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* Students may enrol for AIM 111 and AIM 121 instead of AIM 101 (the same content presented over 2 semesters)  

**Compulsory credits = (106) Elective credits = (36) Total credits = (142)**

### Second year, first semester:

<table>
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<tr>
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<td>Remote sensing 220</td>
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<td>WKD261</td>
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### Second year, second semester:

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</table>

**Compulsory credits = (80) Elective credits = (68) Total credits = (148)**

### Third year, first semester:

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<td>18</td>
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89
### Climate and community 356
Prerequisite/s: Limited to students enrolled for BSc (Meteorology), BSc (Geography), BSc (Geoinformatics), BSc (Environmental Sciences) or BA own choice with major in Geography

<table>
<thead>
<tr>
<th>Code</th>
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**Total credits for compulsory modules** 36

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<td>WKD366</td>
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**Total credits for compulsory modules** 56

Electives for the first to third year can be chosen from modules in the following departments: Geography, Geoinformatics and Meteorology, Geology, Plant Production and Soil Science, Chemistry, Plant Science, Mathematics and Applied Mathematics, Physics, Computer Science.

Compulsory credits = (92) Elective credits = (52) Total credits = (144)

A minimum of (434) credits is required to obtain the degree.

### Field of study

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<thead>
<tr>
<th>Dept</th>
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### First year, first semester:

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<tbody>
<tr>
<td>CMY117</td>
<td>General chemistry 117</td>
<td>S1</td>
<td>4</td>
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<td>16</td>
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<tr>
<td></td>
<td>Prerequisite/s: Par 1.2</td>
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<td></td>
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<tr>
<td>LST110</td>
<td>Language and study skills 110</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>6</td>
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<tr>
<td>MLB111</td>
<td>Molecular and cell biology 111</td>
<td>S1</td>
<td>4</td>
<td>1</td>
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</tr>
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<td>General physics 131</td>
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<td>Mathematics 134</td>
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**Total credits for compulsory modules** 70
First year, second semester:

<table>
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<th>Name</th>
<th>Trm</th>
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<th>Crdt</th>
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<tbody>
<tr>
<td>AIM101</td>
<td>Academic information management 101*</td>
<td>S2</td>
<td>2</td>
<td>0</td>
<td>6</td>
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<tr>
<td>BME120</td>
<td>Biometry 120 Prerequisite/s: At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123</td>
<td>S2</td>
<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>BOT161</td>
<td>Plant biology 161 Prerequisite/s: MLB111 GS</td>
<td>S2</td>
<td>2</td>
<td>0.5</td>
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</tr>
<tr>
<td>CMY127</td>
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<td>4</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>GTS161</td>
<td>Introductory genetics 161 Prerequisite/s: MLB111 GS</td>
<td>S2</td>
<td>2</td>
<td>0.5</td>
<td>8</td>
</tr>
<tr>
<td>MBY161</td>
<td>Introduction to microbiology 161 Prerequisite/s: MLB111 GS</td>
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<td>2</td>
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<tr>
<td>ZEN161</td>
<td>Animal diversity 161 Prerequisite/s: MLB111 GS or TDH</td>
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</tbody>
</table>

Total credits for compulsory modules 70

* Students may enrol for AIM 111 and AIM 121 instead of AIM 101 (the same content presented over 2 semesters)

Compulsory credits = (140) Elective credits = (0)

Second year, first semester:

<table>
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<tr>
<th>Code</th>
<th>Name</th>
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<th>ppw</th>
<th>Crdt</th>
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</thead>
<tbody>
<tr>
<td>BCM253</td>
<td>Introduction to proteins and enzymes 253 Prerequisite/s: BCM254# and CMY117 GS and CMY127 GS and MLB111 GS</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>9</td>
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<tr>
<td>BCM254</td>
<td>Practical: Introduction to proteins and enzymes 254 Prerequisite/s: BCM253# and CMY117 GS and CMY127 GS and MLB111 GS</td>
<td>S1</td>
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<td>0.5</td>
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<tr>
<td>BCM255</td>
<td>Carbohydrate metabolism 255 Prerequisite/s: BCM256# and CMY117 GS and CMY127 GS and MLB111 GS</td>
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<td>2</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>BCM256</td>
<td>Practical: Carbohydrate metabolism 256 Prerequisite/s: BCM255# and CMY117 GS and CMY127 GS and MLB111 GS</td>
<td>S1</td>
<td>0</td>
<td>0.5</td>
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<tr>
<td>BOT251</td>
<td>South African flora and vegetation 251 Prerequisite/s: BOT161 or TDH</td>
<td>S1</td>
<td>2</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>GTS251</td>
<td>Molecular genetics 251 Prerequisite/s: GTS161 GS</td>
<td>S1</td>
<td>2</td>
<td>0.5</td>
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<tr>
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<td>Bacteriology 251 Prerequisite/s: MBY161 GS</td>
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<td>12</td>
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<tr>
<td>ZEN251</td>
<td>Invertebrate biology 251 Prerequisite/s: ZEN161 GS or TDH</td>
<td>K1</td>
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</table>

Total credits for compulsory modules 72

ZEN251 may be replaced with FST250.
### Second year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>ppw</th>
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<tbody>
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<td>BCM263</td>
<td>Lipid and nitrogen metabolism 263</td>
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<td>2</td>
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<td>BCM264</td>
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<td>S2</td>
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<td>Plant biochemical evolution 261</td>
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</table>

**Total credits for compulsory modules**: 72

**Applied microbiology option**: Students may replace ZEN261 and/or BOT261 with either MBY262 or FST260 or [BCM265 and BCM266].

**Microbiology and Genetics combination**: Students may replace ZEN261 with MBY262

**Microbiology and Plant Science option**: Students may replace ZEN261 with MBY262

*Compulsory credits = (144) Elective credits = (0)*

### Third year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>ppw</th>
<th>Crdt</th>
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<td>Virology 351</td>
<td>S1</td>
<td>2</td>
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<td>Bacterial genetics 355</td>
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<td>Prerequisite/s: BCM253 and BCM254 and CMY127 and MBY161</td>
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</table>

**Total credits for compulsory modules**: 36

**Applied microbiology option**: Two electives may be selected from [BCM351 and BCM352], [BCM354 and BCM355], BOT356, BOT358, GTS351, GTS354, PLG351 or ZEN355.

*Students can only take a module if they comply with all the prerequisites.*

**Microbiology and Genetics combination**: Students take GTS351 and GTS354

**Microbiology and Plant Science combination**: Students take BOT356 and BOT358
### Third year, second semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
<th>lpw</th>
<th>ppw</th>
<th>Crdt</th>
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<td>Genetic manipulation of microbes 364</td>
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<td>Micobe interactions 365</td>
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</table>

**Total credits for compulsory modules** 36

**Applied microbiology option:** Two electives may be selected from [BCM365 and BCM366], BOT365, BTC361, GTS367 or ZEN365.

**Students can only take a module if they comply with all the prerequisites**

**Microbiology and Genetics combination:** Students take GTS367 and either GTS368 or BTC361

**Microbiology and Plant Science combination:** Students take BOT365 and BTC361

**Compulsory credits = (72) Elective credits = (72) Total credits = (144)**

A minimum of (428) credits is required to obtain the degree.

### First year, first semester:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Trm</th>
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<th>ppw</th>
<th>Crdt</th>
</tr>
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<tr>
<td>CMY117</td>
<td>General chemistry 117</td>
<td>S1</td>
<td>4</td>
<td>1</td>
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<td>Prerequisite/s: Par 1.2</td>
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<td>FSG110</td>
<td>Physiology 110</td>
<td>S1</td>
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</tr>
<tr>
<td>LST110</td>
<td>Language and study skills 110</td>
<td>S1</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>MLB111</td>
<td>Molecular and cell biology 111</td>
<td>S1</td>
<td>4</td>
<td>1</td>
<td>16</td>
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<tr>
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<td>Prerequisite/s: Par 1.2</td>
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<td>S1</td>
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<td>VDS111</td>
<td>Basic food preparation 111</td>
<td>S1</td>
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**Total credits for compulsory modules** 82

### First year, second semester:

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<td>BME120</td>
<td>Biometry 120</td>
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### Natural and Agricultural Sciences 2013

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**Total credits for compulsory modules**

66

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Compulsory credits = (148) Elective credits = (0)

### Second year, first semester:

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**Total credits for compulsory modules**

83

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Total credits for compulsory modules 95

Compulsory credits = (178) Elective credits = (0)

Third year, first semester:

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Total credits for compulsory modules 75
### Third year, second semester:

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**Total credits for compulsory modules** 75

Compulsory credits = (150) Elective credits = (0)

A minimum of (472) credits is required to obtain the degree.

**Field of study**

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**Total credits for compulsory modules** 38

### First year, second semester:

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</table>

**Total credits for compulsory modules** 38
Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters).

CMY117,127 are recommended. Electives can be chosen from e.g. Mathematics, Meteorology, Geology, Geography, IT, Mathematical Statistics, Computer Science, Biochemistry, Zoology etc.

Compulsory credits = (76) Elective credits = (64) Total credits = (140)

### Second year, first semester:

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Total credits for compulsory modules: 48

### Second year, second semester:

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Total credits for compulsory modules: 48

Electives can be chosen from e.g. Mathematics, Meteorology, Geology, Geography, IT and Mathematical Statistics etc.

Compulsory credits = (96) Elective credits = (48) Total credits = (144)

### Third year, first semester:

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Total credits for compulsory modules: 36
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Total credits for compulsory modules: 36

PHY353 and/or PHY363 can be chosen as elective modules.

Compulsory credits = (72) Elective credits = (72) Total credits = (144)

A minimum of (428) credits is required to obtain the degree.

### Field of study

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Total credits for compulsory modules: 70

### First year, second semester:

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<td>Prerequisite/s: CMY117 GS</td>
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<td>GTS161</td>
<td>Introductory genetics 161</td>
<td>S2</td>
<td>2</td>
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<td>Prerequisite/s: MLB111 GS</td>
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### Natural and Agricultural Sciences 2013

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<tbody>
<tr>
<td>MBY161</td>
<td>Introduction to microbiology 161</td>
<td>S2</td>
<td>2</td>
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<td>8</td>
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<tr>
<td>ZEN161</td>
<td>Animal diversity 161</td>
<td>S2</td>
<td>2</td>
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</table>

**Total credits for compulsory modules**: 70

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

### Second year, first semester:

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<td>Introduction to proteins and enzymes 253</td>
<td>S1</td>
<td>2</td>
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<td>South African flora and vegetation 251</td>
<td>S1</td>
<td>2</td>
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<tr>
<td>GTS251</td>
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**Total credits for compulsory modules**: 72

Students specialising in plant ecology/taxonomy: Replace BCM 255 and BCM 256 with GKD 250.

### Second year, second semester:

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<thead>
<tr>
<th>Code</th>
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<td>S2</td>
<td>2</td>
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<td>12</td>
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<tr>
<td>GLY161</td>
<td>Historical geology 161</td>
<td>K4</td>
<td>4</td>
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<td>8</td>
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<tr>
<td>GLY162</td>
<td>Environmental geology 162</td>
<td>K3</td>
<td>4</td>
<td>1</td>
<td>8</td>
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### Genetic variation and evolution 261
Prerequisite/s: GTS251 GS

<table>
<thead>
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<th>ppw</th>
<th>Crdt</th>
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</thead>
<tbody>
<tr>
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<td>Genetic variation and evolution 261</td>
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### Mycology 261
Prerequisite/s: MBY161

<table>
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### African vertebrates 261
Prerequisite/s: ZEN161 GS or TDH

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<th>lpw</th>
<th>ppw</th>
<th>Crdt</th>
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</thead>
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<td>African vertebrates 261</td>
<td>K3</td>
<td>4</td>
<td>1</td>
<td>12</td>
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</table>

**Total credits for compulsory modules**: 64

Students NOT specialising in plant ecology/taxonomy: Replace GLY161 and GLY162 with either PLG262 or HSC260 and an additional elective module with at least 4 credits.

Compulsory credits = (136) Elective credits = (8) Total credits = (144)

### Third year, first semester:

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**Total credits for compulsory modules**: 36

### Third year, second semester:

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<td>Plant diversity 366</td>
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<tr>
<td>BTC361</td>
<td>Plant genetics and crop biotechnology 361</td>
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</table>

**Total credits for compulsory modules**: 54

Plant ecology specialisation: Students take ZEN364(18) and suitable elective modules.

Compulsory credits = (90) Elective credits = (54) Total credits = (144)

A minimum of (428) credits is required to obtain the degree.
### Field of study

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#### First year, first semester:

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<td>Prerequisite/s: Par 1.2</td>
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<tr>
<td>LST110</td>
<td>Language and study skills 110</td>
<td>S1</td>
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<td>6</td>
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<tr>
<td>MLB111</td>
<td>Molecular and cell biology 111</td>
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**Total credits for compulsory modules**

70

#### First year, second semester:

<table>
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<tr>
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<td></td>
<td>Prerequisite/s: MLB111 GS</td>
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<tr>
<td>GTS161</td>
<td>Introductory genetics 161</td>
<td>S2</td>
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<td>S2</td>
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**Total credits for compulsory modules**

70

* Students may enrol for AIM 111 and AIM 121 instead of AIM 101 (the same content presented over 2 semesters)

Compulsory credits = (140) Elective credits = (0)

#### Second year, first semester:

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<td>Introduction to proteins and enzymes 253</td>
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<tr>
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</table>
### Practical: Introduction to proteins and enzymes
**BCM254**
Prerequisite/s: BCM253# and CMY117 GS and CMY127 GS and MLB111 GS

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### Carbohydrate metabolism
**BCM255**
Prerequisite/s: BCM256# and CMY117 GS and CMY127 GS and MLB111 GS

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</table>

### Practical: Carbohydrate metabolism
**BCM256**
Prerequisite/s: BCM255# and CMY117 GS and CMY127 GS and MLB111 GS

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<th>Ppw</th>
<th>Crdt</th>
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<tbody>
<tr>
<td>BCM256</td>
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<td>S1</td>
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### South African flora and vegetation
**BOT251**
Prerequisite/s: BOT161 or TDH

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<th>Ppw</th>
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<tbody>
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<td>South African flora and vegetation</td>
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### Molecular genetics
**GTS251**
Prerequisite/s: GTS161 GS

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<th>Ppw</th>
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### Bacteriology
**MBY251**
Prerequisite/s: MBY161 GS

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<th>Ppw</th>
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### Invertebrate biology
**ZEN251**
Prerequisite/s: ZEN161 GS or TDH

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**Total credits for compulsory modules**: 72

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### Second year, second semester:

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<th>Ppw</th>
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<td>Historical geology 161</td>
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<td>Environmental geology 162</td>
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**Total credits for compulsory modules**: 64

**Compulsory credits = (136) Elective credits = (12) Total credits = (148)**

---

### Third year, first semester:

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**Total credits for compulsory modules**: 72

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102
### Third year, second semester:

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Total credits for compulsory modules: **72**

Compulsory credits = (144) Elective credits = (0)

A minimum of (432) credits is required to obtain the degree.

### First year, first semester:

<table>
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Total credits for compulsory modules: **64**

### First year, second semester:

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<td>Plant biology 161</td>
<td>S2</td>
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Total credits for compulsory modules: **58**

* * Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)
## Second year, first semester:

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<td>S1</td>
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<td>3</td>
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<tr>
<td>STK110</td>
<td>Statistics 110 Prerequisite/s: Par 1.2 * At least 5 (60-69%) in Mathematics in the Grade 12 examination. Candidates who do not qualify for STK 110 must register for STK 113.</td>
<td>S1</td>
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**Total credits for compulsory modules:** 65

## Second year, second semester:

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**Total credits for compulsory modules:** 71

**Compulsory credits = (136) Elective credits = (0)**

## Third year, first semester:

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**Total credits for compulsory modules** 78

EKN215 is recommended as an elective.

**Third year, second semester:**

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**Total credits for compulsory modules** 80

Compulsory credits = (158) Elective credits = (34) Total credits = (192)

**Fourth year, first semester:**

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**Total credits for compulsory modules** 82
Fourth year, second semester:

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Total credits for compulsory modules = 59

Elective modules can be chosen from the following: STK310 (take note of the prerequisites), STK320, WDE320, EKN325, and any modules from Animal and Wildlife Sciences and Plant Production and Soil Sciences on 400-level that do not clash on the lecture, practical or examination time-table.

Compulsory credits = (141) Elective credits = (20) Total credits = (161)

A minimum of (611) credits is required to obtain the degree.

First year, first semester:

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Total credits for compulsory modules = 70

Field of study | Dept | Code
---|------|-----
BScAgric in Animal Science | VKU | 03130140

First year, second semester:

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Total credits for compulsory modules: 70

Second year, first semester:

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Total credits for compulsory modules: 86

Second year, second semester:

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Total credits for compulsory modules: 146

Elective credits: 0
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Total credits for compulsory modules = 66

Compulsory credits = (152) Elective credits = (0)

Third year, first semester:

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Total credits for compulsory modules = 101
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Total credits for compulsory modules: 73

Compulsory credits = (174) Elective credits = (0)

### Fourth year, first semester:

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Total credits for compulsory modules: 72

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Total credits for compulsory modules: 94

Compulsory credits = (166) Elective credits = (0)

A minimum of (632) credits is required to obtain the degree.

### Field of study

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Total credits for compulsory modules: 70

### First year, second semester:

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110
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**Total credits for compulsory modules**: 86

### Second year, second semester:

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* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)
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Total credits for compulsory modules: 78

Compulsory credits = (164) Elective credits = (0)

Third year, first semester:

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Total credits for compulsory modules: 92

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### Natural and Agricultural Sciences 2013

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**Total credits for compulsory modules** 72

**Compulsory credits = (164) Elective credits = (0)**

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**Total credits for compulsory modules** 82

### Fourth year, second semester:

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### Field of study

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### First year, first semester:

Students who want to enrol for the main subjects: Agronomy, Horticulture or Pasture Science, must register for the BScAgric Option: Applied Plant and Soil Sciences degree programme.

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Total credits for compulsory modules: 70

### First year, second semester:

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Total credits for compulsory modules: 62

* Students may enrol for AIM 111 and AIM 121 instead of AIM 101 (the same content presented over 2 semesters)
Compulsory credits = (132) Elective credits = (8) Total credits = (140)
Electives: ZEN161 or VKU120

### Second year, first semester:

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Total credits for compulsory modules

### Second year, second semester:

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Total credits for compulsory modules

Compulsory credits = (144) Elective credits = (0)
### Third year, first semester:

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**Total credits for compulsory modules:** 76

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**Total credits for compulsory modules:** 78

**Compulsory credits = (154) Elective credits = (0)**

### Fourth year, first semester:

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**Total credits for compulsory modules:** 88
### Fourth year, second semester:

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Total credits for compulsory modules 78

Compulsory credits = (166) Elective credits = (0)

A minimum of (604) credits is required to obtain the degree.

### Field of study

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### First year, first semester:

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Total credits for compulsory modules 70

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Total credits for compulsory modules: 70

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Compulsory credits = (140) Elective credits = (0)

Second year, first semester:

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Total credits for compulsory modules: 60

Second year, second semester:

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### Natural and Agricultural Sciences 2013

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**Total credits for compulsory modules**  
72

**Compulsory credits = (132) Elective credits = (12) Total credits = (144)**

### Third year, first semester:

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**Total credits for compulsory modules**  
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### Third year, second semester:

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### Natural and Agricultural Sciences 2013

#### Compulsory modules

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Total credits for compulsory modules: 81

Compulsory credits = (144) Elective credits = (0)

#### Fourth year, first semester:

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Total credits for compulsory modules: 90

#### Fourth year, second semester:

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Total credits for compulsory modules: 70
Compulsory credits = (160) Elective credits = (0)

A minimum of (588) credits is required to obtain the degree.

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Total credits for compulsory modules 70

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Total credits for compulsory modules 70

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters)

Compulsory credits = (140) Elective credits = (0)
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<td>Bacteriology 251</td>
<td>S1</td>
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<td>Introduction: Crop protection 251</td>
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**Total credits for compulsory modules:** 60

### Second year, second semester:

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<td>Plant physiology and biotechnology 261</td>
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**Total credits for compulsory modules:** 84

**Compulsory credits = (144) Elective credits = (0)**

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### Compulsory credits = (138) Elective credits = (12)

## Fourth year, first semester:

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## Fourth year, second semester:

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<td>Weed science 413</td>
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</table>
PLG462 Research project 462  
PLG463 Plant disease epidemiology 463  
Prerequisite/s: PLG251, PLG262  
PLG490 Current concepts in plant pathology 490  
Prerequisite/s: Third-year status or TDH  
ZEN365 Applied entomology 365  

Total credits for compulsory modules 93

Compulsory credits = (164) Elective credits = (0)

A minimum of (598) credits is required to obtain the degree.
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<td>Costume and fashion history 210</td>
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<td>Flat pattern design 211</td>
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<td>Business management 114</td>
<td>S1</td>
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<td>TKS212</td>
<td>Textiles: Utility, fibres and yarns 212</td>
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**Total credits for compulsory modules** 64

**Compulsory credits = (131) Elective credits = (0)**

### Second year, second semester:

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**Total credits for compulsory modules** 61

**Compulsory credits = (131) Elective credits = (0)**

### Third year, first semester:

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<td>KTP402</td>
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<td>TKS411</td>
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<td>Clothing merchandising 420</td>
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KTP403 Experiential training 403
Prerequisite/s: Documentation of work experience as required for years 1-3
J1 0 1 5

KTP402 Clothing textile project 402
Prerequisite/s: BEM314 and Final-year status
J1 1 1 14

TKS421 Textile: marketing and consumer aspects 421
Prerequisite/s: TKS212 and TKS222 and TKS411
S2 3 0 15

Total credits for compulsory modules 54

KTP403 Experiential training in the industry: During the 4 years of study, during holidays, weekends and after hours, students must complete a total of 480 hours experiential training in the industry to develop practical and occupational skills, participate in community projects/development, engage in service learning. This is equal to 3 weeks x 40 hours (120 hours) per year, according to requirements as determine by the head of the department. These "credits" must be successfully completed together with a complete portfolio before the degree will be conferred.

Compulsory credits = (125) Elective credits = (0)
A minimum of (509) credits is required to obtain the degree.

Field of study

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First year, first semester:

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Total credits for compulsory modules 59

First year, second semester:

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<td>Economics 120</td>
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Prerequisite/s: FRK111 GS

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### Business management 124
Prerequisite/s: Admission to the examination in OBS114

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### Statistics 110
Prerequisite/s: Par 1.2** At least 5 (60-69%) in Mathematics in the Grade 12 examination. Candidates who do not qualify for STK 110 must register for STK 113.

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### Basic food preparation 121
Prerequisite/s: VDS111

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**Total credits for compulsory modules: 67**

* Students may enrol for AIM 111 and AIM 121 instead of AIM 101 (the same content presented over 2 semesters).

### Second year, first semester:

<table>
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<td>3</td>
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<td>Business law 210</td>
<td>S1</td>
<td>3</td>
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**Total credits for compulsory modules: 72**

### Second year, second semester:

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**Total credits for compulsory modules: 59**

Compulsory credits = (131) Elective credits = (0)
### Third year, first semester:

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<td>Nutrition 311</td>
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**Total credits for compulsory modules** 70

### Third year, second semester:

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**Total credits for compulsory modules** 65

**Compulsory credits = (135) Elective credits = (0)**

### Fourth year, first semester:

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**Total credits for compulsory modules** 68
Fourth year, second semester:

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Total credits for compulsory modules: 57

*OPI400 (Experiential training in industry): During the first to fourth years of study students must complete a total of 480 hours experiential training in the industry to develop practical and occupational skills, participate in community engagement and provide service learning. This is equal to 3 weeks x 40 hours (120 hours) per year, according to requirements as determine by the head of department. These credits must be successfully completed together with a complete portfolio before the degree will be conferred. Please note: Various practical and industry-interaction activities support the theoretical component of VDS417 & VDS 427, VDS413 and FST 412 and take place after hours to develop practical and industry skills.

Compulsory credits = (131) Elective credits = (0)

A minimum of (523) credits is required to obtain the degree.

Field of study | Dept | Code
---|---|---
BConsumer Science in Hospitality Management | VBR | 02130115

First year, first semester:

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Total credits for compulsory modules: 65
First year, second semester:

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Total credits for compulsory modules: 61

* Students may enrol for AIM111 and AIM121 instead of AIM101 (the same content presented over 2 semesters).

Compulsory credits = (126) Elective credits = (0)

Second year, first semester:

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<td>OBS210</td>
<td>Business management 210</td>
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Total credits for compulsory modules: 69

Second year, second semester:

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### Third year, first semester:

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**Total credits for compulsory modules**

- Compulsory credits = (138)
- Elective credits = (0)

### Third year, second semester:

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**Total credits for compulsory modules**

- Compulsory credits = (143)
- Elective credits = (0)

### Fourth year, first semester:

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**Total credits for compulsory modules**

- Compulsory credits = (143)
- Elective credits = (0)
### VNP480: Food research project 480

**Prerequisite/s:** BEM314 and Final-year status  

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<td>Prerequisite/s: Documentation of work experience as required for years 1 to 3</td>
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**Total credits for compulsory modules:** 77

**Fourth year, second semester:**

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<td>Culinary art 424</td>
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**Total credits for compulsory modules:** 59

*OPI 400 (Experiential training in industry): During the first to fourth years of study students must complete a total of 600 hours experiential training in the industry to develop practical and occupational skills, participate in community engagement and provide service learning. This is equal to 3 weeks x 40 hours (120 hours) per year for the first to third year and 6 weeks x 40 hours in the fourth year to include event management, according to requirements as determined by the head of department. These credits must be successfully completed together with a complete portfolio before the degree will be conferred. Please note: Various practical and industry interaction activities support the theoretical component of TBE220, 310 and VDS 322, VDS414 & 424 and take place after hours to develop practical and industry skills.

Compulsory credits = (145) Elective credits = (0)

A minimum of (550) credits is required to obtain the degree.

### Sc.7 DIPLOMAS

A Senior Certificate must be included in all applications.

### Advanced University Diploma in Extension and Rural Development  
(Code 03120200)

The admission requirements are:

- an appropriate initial university diploma in one of the Agricultural disciplines plus one year appropriate extensive experience; or
• an appropriate BTech degree or National Diploma plus one year relevant extensive experience; or
• an appropriate Agricultural Diploma or related diploma plus five years’ relevant extensive experience; or
• a qualification deemed appropriate by the Senate of the University plus approved experience (RPL).

**POSTGRADUATE STUDIES**

See the Postgraduate yearbook of the Faculty of Natural and Agricultural Sciences for more detail.

**Sc.8 HONOURS DEGREES**

**SC.8.1 Bachelor of Science Honours [BScHons]**

Also consult General Regulations G.1.3; G.16 – G. 29 and G.62, and postgraduate yearbook.

(a) Admission requirements and prerequisites

(i) For the BScHons degree
Subject to the stipulations of General Reg. G.16, a student is only admitted to the study for the honours degree if he or she holds the BSc degree with an average mark of at least 60% and provided that he or she complies with the stipulations for the particular modules.

(ii) The curriculum is compiled in consultation with the head of department, from whom full details may be obtained except if mentioned otherwise.

(iii) In cases where the required module or linguistic basis is lacking, additional modules may be prescribed.

(b) Examination admission and pass requirements
For preparation, evaluation and examination of research reports, consult the manual of the Faculty, which is obtainable on request from the head of department. The pass mark for research reports is at least 50%. The stipulations regarding pass requirements for dissertations in General Regulation G.60.2.1 2(a) apply *mutatis mutandis* to research reports.

(c) Degree with distinction
The BScHons degree is awarded with distinction to a candidate who obtains a weighted average of at least 75% in all the prescribed modules and a minimum of 65% in any one module.

(d) Degrees
<table>
<thead>
<tr>
<th>Discipline</th>
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Chemistry 02240121

Engineering and Environmental Geology:
  Option: Engineering in Geology 02240370
  Option: Hydrogeology 02240373

Entomology 03241031

Financial Engineering 02240274

Food Science 03240921

Genetics 03241051

Geography 02240411

Environmental Analysis and Management 02240412

Geoinformatics 02240408

Geology 02240141

Mathematical Statistics 02240191

Mathematics of Finance 02240272

Mathematics 02240181

Meteorology 02240070

Microbiology 03240911

Nutrition and Food Science 03240922

Option: Environmental Soil Science 03240902

Option: Medicinal Plant Science 03241090

Physics 02240231

Plant Science 03241091

Wildlife Management 03241001

Zoology 03241021

---

**Sc.8.2 Bachelor of Agricultural Management Honours [BInstAgrarHons]**

Also consult General Regulations G.16 to G.29

(a) **Admission requirements**

Subject to the stipulations of General Regulations G.1.3 and G.62, a candidate must hold the BInstAgrar degree or an appropriate bachelor’s degree to be admitted to the BInstAgrarHons. Additional modules in the field of specialisation other than the honours modules may be prescribed by the Dean, on the recommendation of the head(s) of the department(s) concerned.

(b) **Duration**

Training is offered full-time.

(c) **Curriculum**

The curriculum consists of a minimum of eight modules, which include the following:

- A common core of modules, ARD 780, is compulsory for all fields of specialisation, except in the case of the Extension option, for which only ARD 781 and 782 are compulsory. Credit for equivalent modules already passed may be considered, in which case suitable alternative modules will be prescribed by the Dean in consultation with the relevant head of the department concerned.

- The prescribed module work in the student’s field of specialisation. Credit for equivalent modules already passed may be considered, in which case suitable alternative modules will be prescribed by the Dean in consultation with the head of the department concerned.
Additional modules required for the particular field of specialisation, as stipulated by the Dean in consultation with the head of the department concerned.

(d) **Degree with distinction**
A student must obtain a weighted average of at least 75% in all the prescribed modules, with a minimum of 65% in each of the modules to pass the degree with distinction.

(e) **Degrees**

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Sc.9 MASTER’S DEGREES

Sc.9.1 Master of Science [MSc]

Also consult General Regulations G.30 – G.44.

(a) **Admission requirements for the MSc degree**
Subject to the stipulations of General Regulations G.30, G.1.3 and G.62, an applicable BScHons degree is a prerequisite for admission. Additional requirements may be set by the Dean on the recommendation of the head of department. A candidate with an average mark of less than 60% for the honours degree will only be admitted to the MSc degree programme with the approval of the Dean on the recommendation of the head of department.

(b) **Conferment of degree**
The MSc degree is conferred by virtue of a dissertation and such additional postgraduate modules as may be prescribed.

(c) **Pass requirements**
(i) A pass mark of at least 50% must be obtained in both the dissertations and the additional prescribed modules, if such additional module work is prescribed.
(ii) Guidelines with regard to the preparation, evaluation and examination of dissertation is available from the head of department on request. The pass mark for dissertations is at least 50%. The stipulations with regard to pass requirements for dissertations in G.60.2.1.2 (a) apply *mutatis mutandis* to mini-dissertations.

(d) **Degree with distinction**
The degree is conferred with distinction on a student who obtains a final average of at least 75%, as well as at least 75% for the dissertation and provided that all the members of the Examination Commission indicate in writing that the degree be conferred with distinction.
(e) **General**
Students should take particular note of the maximum period of registration (General Regulation G.32.4), as well as of the requirement regarding submission of a draft article/articles for publication (General Regulation G. 61).

(f) **Degrees**

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</table>
Sc.9.2  Master of Philosophy [MPhil] (Code: 03250700)

Also consult General Regulation G. 62

(a) **Admission requirements**
Students wishing to enrol for the MPhil (Wildlife Management) should have an approved four-year first degree at a recognised university or any qualification that is accepted by the Senate as equivalent to it in terms of Regulation G. 62.

(b) **Duration**
The duration of the internet-based part-time programme is two years. The theoretical component forms 40%, the research project 35% and the practical component 25% of the programme.

(c) **Curriculum**
This programme aims to educate candidates interested in this field but who come from non-biological backgrounds. It is a postgraduate programme focusing on the philosophy, ethics, ecological principles and application of wildlife management.

Sc.9.3  Master of Agricultural Science [MScAgric]

Also consult General Regulations G.30 to G.44.

(a) **Requirements for admission**
Subject to the stipulations of General Regulations G.1.3 and G.62, the four-year BScAgric degree with an average of 60% in the final year of the major subject is a requirement for admission to the MScAgric degree. Additional requirements may be stipulated by the head of department.

(b) **Duration**
Duration of study is at least two years of uninterrupted full-time study (or the part-time equivalent) at this University.

(c) **Residence**
The Dean may on the recommendation of the head of the department concerned, set particular requirements concerning residence during master’s degree studies.

(d) **Curricula**
The curriculum for the MScAgric degree consists of:
(i) a dissertation; and
further study in the major subject, supplemented by ancillary module/s as may be required by the Dean, on the recommendation of the head of department. Students who hold the BScAgricHons degree may be exempted from further ancillary modules.
(ii) A total of 240 credits is required for the MScAgric degree, of which 120 are for the dissertation.

(e) **Examinations and pass requirements**
(i) The final examinations for the MScAgric may only be taken at the end of the second year of study.
(ii) The examinations in the ancillary modules, if required, must be passed before or concurrent with the examinations in the major subject, unless the Board of the Faculty decides differently.

(iii) General Regulation G.12.2, as well as paragraph 4 of the Faculty regulations pertaining to examination admission and pass requirements, are applicable to the calculation of marks.

(iv) A student must pass all prescribed modules as well as the dissertation to obtain the MScAgric degree.

(v) The degree is conferred with distinction on a student who obtains a final mark of at least 75%, as well as at least 75% for the dissertation and provided that all the members of the Examination Commission indicate in writing that the degree be conferred with distinction.

(f) General
Students should take particular note of the maximum period of registration (General Regulation G.32.4), as well as of the requirement regarding submission of a draft article/articles for publication (General Regulation G.61).

(g) Degrees

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<td>Animal Science: Production Management</td>
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</table>

| Sc.9.4 Master of Agricultural Management [MInstAgrar] |

Also consult General Regulations G. 30 to G. 44.

(a) Admission requirements
Subject to the stipulations of General Requirements G.1.3 and G. 62, a candidate must hold the BInstAgrarHons or an appropriate honours degree for admission to the MInstAgrar degree study. Additional modules may be prescribed by the Dean on the recommendation of the head of department. A candidate with an average mark of less than 60 % for the honours degree will only be admitted to MInstAgrar study with the approval of the Dean, on the recommendation of the head of the department.
(b) **Curriculum**
The curriculum consists of further study in the field of specialisation and a mini-dissertation, which encompasses research conducted by the student under supervision of a member of the academic staff.

(c) **Degree with distinction**
The degree is conferred with distinction on a student who obtains a final mark of at least 75%, as well as at least 75% for the mini-dissertation and provided that all the members of the Examination Commission indicate in writing that the degree be conferred with distinction.

(d) **General**
Students must take particular note of the maximum period of registration (General Regulation G.32.4), as well as of the requirement regarding submission of a draft article/articles for publication (General Regulation G. 61).

(e) **Degrees**

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<td>Plant Quarantine</td>
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</table>

### Sc.9.5 Master of Consumer Science [MConsumer Science]

(a) **Admission requirements**
A four-year BConsumer Science or other applicable degree.

(b) **Duration**
A minimum of two years full-time and a maximum of four years part-time study.

(c) **Programme options**
There are four disciplines with a further two options to choose from, each with a minimum of 240 credits:

(i) **Dissertation option**
- Interior Merchandise Management 02253004
- Clothing Management 02253006
- General 02253009
- Food Management 02253008

(ii) **Coursework option with research report**
- Interior Merchandise Management 02253003
- Clothing Management 02253005
- General 02253010
- Food Management 02253007
(d) **Curriculum (a minimum of 240 credits)**

(i) **Dissertation option**
- Research Methodology 814 (30 credits)
- Theoretical Orientation (15 credits)*
- Electives (30 credits each) (a minimum of 60 credits)
- VBR 890 (Dissertation) (120 credits)

(ii) **Coursework option**
- Research Methodology 814 (30 credits)
- Theoretical Orientation (15 credits)*
- Electives (30 credits each) (4x30=120 credits)
- VBR 892 (Research report) (60 credits)

*To earn credits for the Theoretical Orientation, at least one of the following options must be taken:
- HSK 810: Theoretical frameworks in cultural studies 810 (15 credits)
- HSK 812: Theoretical frameworks in consumer studies 812 (15 credits)
- HSK 813: Socio-cultural studies 813 (15 credits)

Other applicable orientations offered in and outside the Department can be taken additionally (15-30 credits).

Students choose electives on 800-level from the following four electives groupings:
- Clothing and textiles
- Foods, nutrition and food service management
- Interior merchandising and consumer facilitation

Depending on the field of study, a maximum of two postgraduate modules may be selected from disciplines from other departments.
Depending on the academic background of the student and the chosen area of study, it may be required of the student to take additional modules.
Work on the dissertation/research report consists of three parts, namely the research proposal, project execution and an oral presentation of the research results.

A basic module in Statistics is compulsory when a quantitative approach is used for the research project.

(e) **Degree with distinction**
The degree is conferred with distinction on a student who obtains a final average of at least 75%, as well as at least 75% for the dissertation and provided that all the members of the Examination Commission indicate in writing that the degree be conferred with distinction.

(f) **Prerequisites for the dissertation/research report**
Consult the Department for more information on the structuring of programmes, the content of the theoretical orientations, and electives including their prerequisites.

(g) **Degrees**

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<tr>
<td>Clothing Management (Coursework)</td>
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</tr>
</tbody>
</table>
(a) Admission requirements
   (i) PhD degree
   Subject to the stipulations of General Regulations G.1.3, G.45 and G.62, no student will be admitted to the study for a doctor's degree unless he or she holds an applicable master's degree or has been admitted to the status thereof. Further requirements for admission, if any, are set out in the syllabi of the various departments.

   (ii) PhD in Consumer Science
   MConsumer Science or applicable master's degree with a pass mark of at least 60%.

   To proceed with the thesis, a student should have fulfilled the requirements for the master's degree regarding:
   • Theoretical orientation
   • Research methodology (NMN 814)
   • The student should also have published at least one article in a research journal during the two years prior to registration for the PhD degree or have proof that the article has been accepted for publication in a refereed journal. Furthermore, it should also be evident from the master’s dissertation or publications that research can be undertaken independently.

   NB: The student may be required to do additional modules/coursework.

(b) Duration
   A minimum of two years full-time study.

(c) Residence
   Doctoral students may be required to reside at the University for further study on the recommendation of the head of department and with the approval of the Dean.

(d) Curriculum
   The curriculum for the PhD degree consists of:
   (i) theoretical knowledge of the major subject and such ancillary modules as may be required; and
   (ii) a thesis.
(e) **Conferring of degree**

(i) A PhD student must submit a thesis which deals with a topic from the list of subject disciplines.

(ii) The doctoral examination, either written and/or oral, is compulsory and covers the content of the thesis as well as the subdivisions of the field of study on which the thesis is based.

(f) **General**

Students must take particular note of the maximum period of registration (General Regulation G. 47), as well as of the requirements regarding the submission of a draft article/articles for publication (General Regulation G. 61).

(g) **Degrees**

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This degree usually follows on the PhD degree and is conferred by virtue of publications emanating from independent research. The publication must represent a meaningful contribution to a specific subdiscipline.

(a) Guidelines for evaluation

(i) Disciplines
The DSc degree in the Faculty of Natural and Agricultural Sciences is conferred by virtue of published research work in one of the disciplines in the faculty.

(ii) Criteria
The work submitted for the DSc must constitute an original and important contribution to scientific knowledge and insight in that it is regarded as a substantial and coherent contribution to the advancement of the frontiers of knowledge and insight into the specific subdiscipline, and proof of the candidate’s achievement with regard to international leadership in the specific field of scientific research.

The emphasis in the assessment of the work of a DSc candidate must be placed on originality, substance and excellence.

(iii) Presentation
The document submitted for examination must consist of a selection of published articles as well as a substantiated representation in which the grounds for submission and coherency of the work presented is evident.
ALPHABETICAL LIST OF MODULES IN THE FACULTY OF NATURAL AND AGRICULTURAL SCIENCES

# = Concurrent registration
() = Examination admission
dpw = discussions per week
GS = combined (final) mark (semester/year mark plus examination mark) of at least 40% - 49%
hpw = hours per week
LP = Lecturer’s permission
lpw = lectures per week
ppw = practicals per week
spw = seminars per week
TDH = Permission by head of department
tpw = tutorials per week

Language of tuition – options:
Afrikaans: Classes only presented in Afrikaans
English: Classes only presented in English
Both: 2 classes scheduled separately at the same time (1 English and 1 Afrikaans)
Double medium: One class scheduled in which English and Afrikaans are used in the same class

AGR 361 Field crops 361
Academic organisation: Plant Production and Soil Science
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Module content:
Botanical characteristics, classification, growth requirements, production practices and utilisation of crops rich in starch, oil and protein, fibre crops, tobacco, sugarcane and medicinal plants. Visits to research institutions and producers.

AGR 410 Vegetable crops 410
Academic organisation: Plant Production and Soil Science
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Module content:
Integration of agronomic, pedological, botanical, economic and management considerations in crop production systems with a view to sustainable maximum economic yield. Case studies of specific crops.

AGV 421 Communication 421
Academic organisation: Agricultural Economics, Extension and Rural Development
Contact time: 2 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Module content:
Communication: Definition and clarification of concepts. Theory and elements of communication. Verbal and non-verbal communication. Determinants of interpersonal

**APS 461 Crop physiology 461**  
**Academic organisation:** Plant Production and Soil Science  
**Prerequisite:** GKD 250 and BOT 356  
**Contact time:** 2 lpw fortnightly practicals  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 14  
**Module content:**  
An overview of photosynthesis and respiration, with the aim of examining the physiological basis of yield in cropping systems. This includes an assessment of parameters for determining plant growth, factors governing yield, partitioning of photo assimilates within plants and opportunities for increasing yield. Crop growth and yield will be put into context of a changing global climate. Evaluation of the manner in which plants respond to various abiotic stresses and how plants sense changing environments. The various roles of plant growth regulators in plants and the importance of these compounds in agriculture.

**APZ 325 Livestock breeding 325**  
**Academic organisation:** Animal and Wildlife Sciences  
**Prerequisite:** GTS 261  
**Contact time:** 2 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 10  
**Module content:**  
Introduction to applied animal breeding and genetics: Genetic defects in farm and companion animals (single gene and multifactor characteristics). Phenotypic expression of genes in qualitative and quantitative inheritance. Principles of breeding and selecting farm and companion animals, breeding systems, application and interpretation of breeding values and animal recording schemes.

**ARD 480 Agriculture and rural development studies 480**  
**Academic organisation:** Agricultural Economics, Extension and Rural Development  
**Contact time:** 3 lpw  
**Period of presentation:** Year  
**Language of tuition:** English  
**Credits:** 40  
**Module content:**  
Overview of the concepts and theories of rural development; the role of agriculture in rural development. Rural livelihood systems: household farming systems; decisions and the operation of farming systems; non-farm enterprises and SMMEs in the rural economy; household food security. Rural institutions: definitions and role of institutions; land tenure; rural financial markets; local institutional development; human capital, knowledge systems. Methodologies for rural development: the farming systems approach; participatory techniques; assessment of land use patterns (zoning techniques); typology techniques; technology transfer and decision-making support; communication for rural development; planning rural development at local level.

**ARD 482 Resources and development 482**  
**Academic organisation:** Agricultural Economics, Extension and Rural Development  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 2
Module content:
Review of the most important physical-biological agricultural resources – soil, water, climate, topography, plant species, animal species; differences in characteristics, quality and vulnerability; the concept of optimum land use; resource conservation; general ecological principles; examples of problems caused by mismatching of physical-biological resources and land use during development planning; principles of sensible technology transfer.

BCM 253 Introduction to proteins and enzymes 253
Academic organisation: Biochemistry
Prerequisite: Natural and Agricultural Sciences students: BCM 254 #, CMY 117 GS, CMY 127 GS and MLB 111 GS; Health Sciences students: MLB 111 GS
Contact time: 2 lpw
Period of presentation: Semester 1
Language of tuition: Double medium
Module content:

BCM 254 Practical: Introduction to proteins and enzymes 254
Academic organisation: Biochemistry
Prerequisite: Natural and Agricultural Sciences students: BCM 253 #, CMY 117 GS, CMY 127 GS and MLB 111 GS; Health Sciences students: CMY 117 GS, CMY 127 GS
Contact time: 0.5 ppw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Module content:
Laboratory techniques and Good Laboratory Practice. Techniques for the quantitative and qualitative analysis of biological molecules. Processing and presentation of scientific data.

BCM 255 Carbohydrate metabolism 255
Academic organisation: Biochemistry
Prerequisite: Natural and Agricultural Sciences students: BCM 256 #, CMY 117 GS, CMY 127 GS and MLB 111 GS; Health Sciences students: MLB 111 GS
Contact time: 2 lpw
Period of presentation: Semester 1
Language of tuition: Double medium
Module content:

BCM 256 Practical: Carbohydrate metabolism 256
Academic organisation: Biochemistry
Prerequisite: Natural and Agricultural Sciences students: BCM 255 #, CMY 117 GS,
CMY 127 GS and MLB 111 GS  
**Contact time:** 0.5 ppw  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 3  
**Module content:**  
Study and analysis of metabolic pathways and enzymes. Scientific method and design: hypothesis design and testing, method design and scientific controls.

**BCM 263 Lipid and nitrogen metabolism 263**  
**Academic organisation:** Biochemistry  
**Prerequisite:** Natural and Agricultural Sciences students: BCM 264 #, CMY 117 GS, CMY 127 GS and MLB 111 GS; Health Sciences students: BCM 253 GS, BCM 254 GS, BCM 255 GS and BCM 256 GS  
**Contact time:** 2 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Double medium  
**Credits:** 9  
**Module content:**  

**BCM 264 Practical: Lipid and nitrogen metabolism 264**  
**Academic organisation:** Biochemistry  
**Prerequisite:** Natural and Agricultural Sciences students: BCM 263 #, CMY 117 GS, CMY 127 GS and MLB 111 GS  
**Contact time:** 0.5 ppw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 3  
**Module content:**  
Scientific writing skills: evaluation of a scientific report. Techniques for separation and analysis of biological molecules.

**BCM 265 Biochemistry in perspective 265**  
**Academic organisation:** Biochemistry  
**Prerequisite:** Natural and Agricultural Sciences students: BCM 266 #, CMY 117 GS, CMY 127 GS and MLB 111 GS; Health Sciences students: BCM 253 GS, BCM 254 GS, BCM 255 GS and BCM 256 GS  
**Contact time:** 2 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Double medium  
**Credits:** 9  
**Module content:**  
Integration of metabolic pathways; biochemistry of nutrition and xenobiochemistry; hormones and second messengers; hormonal control in metabolism, a case study in connectivity among metabolic pathways, nutrition, regulation and the immune system.

**BCM 266 Practical: Biochemistry in perspective 266**  
**Academic organisation:** Biochemistry  
**Prerequisite:** Natural and Agricultural Sciences students: BCM 265 #, CMY 117 GS,
CMY 127 GS and MLB 111 GS; Health Sciences students: BCM 253 GS, BCM 254 GS, BCM 255 GS and BCM 256 GS

**Contact time:** 0.5 ppw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 3  
**Module content:**  
Study of structure-function relationships and biological activity. Critical evaluation of results and identification of patterns or tendencies in observations.

**BCM 271 Biochemistry practical 271**  
**Academic organisation:** Biochemistry  
**Prerequisite:** BCM 253 and BCM 254 and BCM 255 and BCM 256 and BCM 263 and BCM 264 and BCM 265 and BCM 266 and CMY 283 and CMY 284  
**Contact time:** 1 ppw  
**Period of presentation:** Year  
**Language of tuition:** Both Afr and Eng  
**Credits:** 12  
**Module content:**  
*Note: For students majoring in biochemistry only.*  
Basic biochemical separation methods, experimental design, biochemical calculations.

**BCM 351 Biochemistry of proteins 351**  
**Academic organisation:** Biochemistry  
**Prerequisite:** BCM 253 and BCM 254  
**Contact time:** 2 lpw 1 ppw  
**Period of presentation:** Quarter 1  
**Language of tuition:** Double medium  
**Credits:** 9  
**Module content:**  

**BCM 352 Proteome analysis 352**  
**Academic organisation:** Biochemistry  
**Prerequisite:** BCM 253, BCM 254 and BCM 351 GS  
**Contact time:** 2 lpw 1 ppw  
**Period of presentation:** Quarter 2  
**Language of tuition:** Double medium  
**Credits:** 9  
**Module content:**  

**BCM 354 Biochemistry of nucleic acids 354**  
**Academic organisation:** Biochemistry  
**Prerequisite:** BCM 253 and BCM 254 and BCM 255 and BCM 256 and BCM 263 and BCM 264 and BCM 265 and BCM 266  
**Contact time:** 1 lpw 0.5 ppw  
**Period of presentation:** Semester 1
Language of tuition: Double medium  
Credits: 9

Module content:

BCM 355 Immunobiology 355

Academic organisation: Biochemistry
Prerequisite: BCM 253 and BCM 254 and BCM 255 and BCM 256 and BCM 263 and BCM 264 and BCM 265 and BCM 266
Contact time: 1 lpw 0.5 ppw
Period of presentation: Semester 1
Language of tuition: Double medium  
Credits: 9

Module content:

BCM 362 Nutritional biochemistry 362

Academic organisation: Biochemistry
Prerequisite: BCM 265
Contact time: 1 lpw
Period of presentation: Quarter 3
Language of tuition: Double medium  
Credits: 4

Module content:

BCM 363 Xeno biochemistry 363

Academic organisation: Biochemistry
Prerequisite: BCM 265
Contact time: 1 lpw
Period of presentation: Quarter 4
Language of tuition: Double medium  
Credits: 5
Module content:
Metabolism of xenobiotics: absorption, distribution, metabolism and excretion; oxidation/reduction (Phase I), conjugations (Phase II), export from cells (Phase III); factors affecting metabolism and disposition. Toxic responses: tissue damage and physiological effects; teratogenesis, immunotoxicity, mutagenesis and carcinogenesis. Examples of toxins: biochemical mechanisms of common toxins and their antidotes.

BCM 364 Building the cell 364
Academic organisation: Biochemistry
Contact time: 1 lpw 0.5 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 9
Module content:
Membrane structure: plasma membrane structure, organisation of lipid membranes, membrane proteins, glycoproteins and glycolipids, principles of membrane organisation (cytoskeletal components), specialisations of the plasma membrane (neuronal tissue). Transport across cell membranes: major types of membrane transport proteins; diffusion of small molecules across pure phospholipid bilayers; uniporter-catalysed transport of specific molecules; ion channels, intracellular ion environment and membrane electric potential; active ion transport and ATP hydrolysis; cotransport catalysed by symporters and antiporters; osmosis, water channels and the regulation of cell volume. Calculation of free energy change during transport. Synthesis and sorting of plasma membrane, secretory and lysosomal proteins. Protein modifications, folding and quality control in the ER, further glycoprotein processing in the Golgi. Vesicular traffic, protein secretion and endocytosis. Introduction to signaling: G-proteins, adenylyl cyclase, phospholipase C and secondary messenger molecules (cyclic AMP, calcium and inositol-triphosphates).

BCM 365 Immunobiochemistry 365
Academic organisation: Biochemistry
Prerequisite: BCM 355 GS
Contact time: 1 lpw 0.5 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 9
Module content:
Interactions between antigens and antibodies: quantitative and qualitative properties, regulation of the immune response, integrated immunology. Practical: tutorials on integrated and quantitative immunology.

BCM 366 Enzymology 366
Academic organisation: Biochemistry
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 9
Module content:
Nomenclature: enzyme nomenclature and classification. Specificity and mechanisms: the active site, mechanisms of catalysis and examples of specific enzyme mechanisms e.g. lysozyme and carboxypeptidase A. Enzyme kinetics: derivation of Michaelis-Menten (MM) equation by equilibrium and steady state assumptions, significance of Km and Vmax in the catalytic efficiency of enzymes and linear transformations of the MM equation. Enzyme inhibition: competitive, uncompetitive, non-competitive and irreversible inhibitors with examples of specific toxins and drugs. Multi-substrates: Cleland nomenclature and multisubstrate reactions. Allosteric enzymes: models by Koshland, Hill and Monod.
Problems and answers: tutorials of problems and answers based on above concepts. Practical: isolation of an enzyme, determination of pH and temperature optimum, determination of Km and Vmax, enzyme activation, enzyme inhibition, purification table and final report, oral defense of report.

**BIF 311 Bioinformatics 311**

*Academic organisation:* Biochemistry  
*Prerequisite:* WTW 114 OR WTW 134 and BME 120 and GTS 251 or TDH  
*Contact time:* 2 lpw 1 pw  
*Period of presentation:* Semester 1  
*Language of tuition:* English  
*Credits:* 18  
*Module content:*  

**BOT 161 Plant biology 161**

*Academic organisation:* Plant Science  
*Prerequisite:* MLB 111 GS  
*Contact time:* 2 lpw fortnightly practicals  
*Period of presentation:* Semester 2  
*Language of tuition:* Both Afr and Eng  
*Credits:* 8  
*Module content:*  
Basic plant structure and function; introductory plant taxonomy and plant systematics; principles of plant molecular biology and biotechnology; adaptation of plants to stress; medicinal compounds from plants; basic principles of plant ecology and their application in natural resource management.

**BOT 251 South African flora and vegetation 251**

*Academic organisation:* Plant Science  
*Prerequisite:* BOT 161 or TDH  
*Contact time:* 2 lpw 1 pw  
*Period of presentation:* Semester 1  
*Language of tuition:* Both Afr and Eng  
*Credits:* 12  
*Module content:*  
Origin and affinity of South African flora and vegetation types; principles of plant geography; plant diversity in southern Africa; characteristics, environments and vegetation of South African biomes; centra of plant endemism; rare and threatened plant species; red data lists; biodiversity conservation and ecosystem management; international conventions; conservation status of South African vegetation types.

**BOT 261 Plant physiology and biotechnology 261**

*Academic organisation:* Plant Science  
*Prerequisite:* BOT 161, CMY 117, CMY 127 or TDH  
*Contact time:* 2 lpw 1 pw  
*Period of presentation:* Semester 2  
*Language of tuition:* Both Afr and Eng  
*Credits:* 12
Module content:
Nitrogen metabolism in plants; nitrogen fixation in agriculture, plant secondary metabolism and natural products, photosynthesis and carbohydrate metabolism in plants; applications in solar energy; plant growth regulation and the Green Revolution; plant responses to the environment; developing drought-tolerant and disease-resistant plants.

BOT 356 Plant ecophysiology 356
Academic organisation: Plant Science
Prerequisite: BOT 161 or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 18
Module content:
The emphasis is on the efficiency of the mechanisms whereby C3-, C4- en CAM-plants bind CO₂ and how it is impacted upon by environmental factors. The mechanisms and factors which determine the respiratory conversion of carbon skeletons and how production is affected thereby will be discussed. Insight into the ecological distribution and manipulation of plants for increased production is gained by discussing the internal mechanisms whereby carbon allocation, hormone production, growth, flowering and fruitset are influenced by external factors. To understand the functioning of plants in diverse environments, the relevant structural properties of plants and the impact of soil composition and water flow in the soil-plant-air continuum and long-distance transport of assimilates will be discussed. Various important techniques will be used in the practicals to investigate aspects such as water-use efficiency photosynthesis and respiration of plants.

BOT 358 Plant ecology 358
Academic organisation: Plant Science
Prerequisite: BOT 161 or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 18
Module content:
A description of the environment of plants. Theory of plant community concepts, vegetation change over space and time; floristic and structural composition plant diversity, ecological succession, landscape ecology. Data-processing techniques; ecological interpretation and description of plant communities. Vegetation and environmental management. Fundamentals of plant population biology; life tables; plant breeding systems and pollination; population dynamics; life history strategies; intraspecific competition; interspecific competition and co-existence.

BOT 365 Phytomedicine 365
Academic organisation: Plant Science
Prerequisite: BOT 161 or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:
The module includes a review on the discovery and use of plant medicines and phyto-therapeutically important molecules obtained from plants. Certain aspects of natural product chemistry ie the biosynthesis ecological role and toxicity of the three main classes of secondary compounds; terpenoids, phenolics, and alkaloids are discussed. An
introduction to the principles and applications of metabolomics are presented. The role of these natural products in defence against micro-organisms and herbivores is reviewed. The basics of alternative medicines such as homeopathy, ayurvedic medicine, acupuncture etc are also discussed. Practical sessions on drug discovery approaches using chromatographic techniques for phytochemical analysis of secondary metabolites such as tannins, alkaloids, sterols and saponins are conducted. Bioassays on micro-organisms are also done during the practical sessions in order to develop the skills for the potential discovery of new antibiotics. Visits to several pharmaceutical laboratories are arranged.

BOT 366 Plant diversity 366
Academic organisation: Plant Science
Prerequisite: BOT 161 or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 18
Module content:

BTC 361 Plant genetics and crop biotechnology 361
Academic organisation: Genetics
Prerequisite: GTS251 and [GTS261 GS or BOT261 GS] and [GTS351 and GTS352] are recommended
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:

CGS 152 Introductory physics 152
Academic organisation: Physics
Contact time: 2 lpw 2 ppw 2 dpw
Period of presentation: Semester 1
Language of tuition: English
Credits: 8
Module content:
Heat and temp: Thermal interaction; operational definition of temperature; expansion; temperature in the kinetic molecular model; work, energy and heat; phase transitions and mechanisms of heat transfer. Measurements: What is measuring; the scientific method;
measuring error; significant figures. Geometric optics: Light travels straight; shadow formation; plane, convex and concave mirrors; refraction and lenses (thin); optical instruments. Practicals related to the topics.

**CGS 162 Introductory physics 162**  
**Academic organisation:** Physics  
**Prerequisite:** CGS 152  
**Contact time:** 2 lpw 2 ppw 2 dpw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 8  
**Module content:**  
- Kinematics: Basic concepts in kinematics in vector notation; different representations to describe motions; instantaneous velocity; acceleration; equations of motion (constant acceleration).  
- Dynamics: Interactions, Newton's third law, Newton's first and second law; gravitation; normal force and friction. Forces in two dimensions: resolving and adding forces. Work energy and power.  
- Electricity: Static and flowing electricity, current, potential difference, power, resistance, simple DC-circuits.  
Practicals related to the topics.

**CHM 171 General chemistry 171**  
**Academic organisation:** Chemistry  
**Contact time:** 4 lpw 1 ppw 1 web-based period per week 1 dpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 16  
**Module content:**  
- General introduction to inorganic, analytical and physical chemistry. Nomenclature of inorganic ions and compounds, stoichiometric calculations concerning chemical reactions, redox reactions, solubilities and solutions, atomic structure, periodicity. Molecular structure and chemical bonding using the VSEPR model. Principles of reactivity, electrochemistry, energy and chemical reactions, entropy and free energy.  
- Appropriate tutorial classes and practicals.

**CHM 172 General chemistry 172**  
**Academic organisation:** Chemistry  
**Contact time:** 4 lpw 1 ppw 1 web-based period per week 1 dpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 16  
**Module content:**  
- General introduction to inorganic, analytical and physical chemistry. Nomenclature of inorganic ions and compounds, stoichiometric calculations concerning chemical reactions, redox reactions, solubilities and solutions, atomic structure, periodicity. Molecular structure and chemical bonding using the VSEPR model. Principles of reactivity, electrochemistry, energy and chemical reactions, entropy and free energy.  
- Appropriate tutorial classes and practicals.

**CHM 181 General chemistry 181**  
**Academic organisation:** Chemistry  
**Contact time:** 4 lpw 1 ppw 1 web-based period per week 1 dpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 16  
**Module content:**  
- General physical-analytical chemistry: Physical behaviour of gases, liquids and solids,
intermolecular forces, solutions, chemical equilibrium, acids and bases, buffers, precipitation. Organic chemistry: Structure (bonding) and functional groups, nomenclature, isomerism, introductory stereo-chemistry, introduction to chemical reactions and chemical properties of organic compounds. Appropriate tutorial classes and practicals.

**CHM 215 Chemistry 215**

**Academic organisation:** Chemistry

**Prerequisite:** CHM 171 or CHM 172 and CHM 181

**Contact time:** 1 web-based period per week 3 lpw 1 ppw 1 dpw

**Period of presentation:** Semester 1

**Language of tuition:** Double medium

**Credits:** 16

**Module content:**


**CHM 226 Chemistry 226**

**Academic organisation:** Chemistry

**Prerequisite:** CHM 171 or CHM 172 and CHM 181

**Contact time:** 2 lpw 6 ppw

**Period of presentation:** Semester 2

**Language of tuition:** Double medium

**Credits:** 8

**Module content:**

Theory: Introduction to instrumental chemical analysis. Integration of electronic, chemical, optical and computer principles for the construction of analytical instrumentation. Detail discussion of principles and some instrumental methods from three disciplines within analytical chemistry, namely electrochemistry, spectroscopy and chromatography. This includes potentiometry, (AA) atomic absorption, (ICP) atomic emission, ultraviolet (UV), and infrared (IR) spectroscopy, potentiometric and photometric titrations, gas chromatography, liquid chromatography as well as combinations of these techniques. Practical: IR spectroscopy, UV spectroscopy, AA spectroscopy, potentiometric titration, gas chromatography.

**CMY 117 General chemistry 117**

**Academic organisation:** Chemistry

**Prerequisite:** Refer to Regulation 1.2

**Contact time:** 4 lpw 1 ppw

**Period of presentation:** Semester 1

**Language of tuition:** Double medium

**Credits:** 16

**Module content:**

Theory: General introduction to inorganic and analytical chemistry. Nomenclature of inorganic ions and compounds, stoichiometric calculations concerning chemical reactions, redox reactions, solubilities, atomic structure, periodicity. Inorganic and physical chemistry. Molecular structure and chemical bonding using the VSEPR models. Chemical equilibrium, acids and bases, buffers, precipitation.

**CMY 127 General chemistry 127**

**Academic organisation:** Chemistry

**Prerequisite:** Natural and Agricultural Sciences students: CMY 117 GS

Health Sciences students: none

**Contact time:** 4 lpw 1 ppw
Period of presentation: Semester 2  
Language of tuition: Double medium  
Credits: 16  

Module content:  
Theory: General physical-analytical chemistry: Physical behaviour of gases, liquids and solids, intermolecular forces, solutions. Principles of reactivity: energy and chemical reactions, entropy and free energy, electrochemistry. Organic chemistry: Structure (bonding), nomenclature, isomerism, introductory stereochemistry, introduction to chemical reactions and chemical properties of organic compounds and biological compounds, i.e. carbohydrates, lipids and aminoacids. Practical: Molecular structure (model building), synthesis and properties of simple organic compounds.

CMY 133 Chemistry 133  
Academic organisation: Chemistry  
Prerequisite: As for BSc Four-year programme  
Contact time: 2 lpw Fortnightly practicals 3 dpw Foundation Course  
Period of presentation: Semester 1  
Language of tuition: English  
Credits: 8  

Module content:  
The field of Chemistry – an overview; Mathematics in Chemistry; atomic theory: historical overview; atoms, molecules and ions; relative atomic mass; electronic structure of atoms; the periodic table; periodicity; chemical bonding.

CMY 143 Chemistry 143  
Academic organisation: Chemistry  
Prerequisite: CMY 133  
Contact time: 2 lpw Fortnightly practicals 3 dpw Foundation Course  
Period of presentation: Semester 1  
Language of tuition: Both Afr and Eng  
Credits: 8  

Module content:  
Bonding and molecular geometry: VSEPR theory; bonding and organic compounds (structural formulas, classification and nomenclature); matter and its properties; mole concept; reaction stoichiometry; reactions in aqueous solutions: precipitation, acid base and redox.

CMY 151 Chemistry 151  
Academic organisation: Chemistry  
Prerequisite: Refer to Regulation 1.2  
Contact time: 4 lpw 1 ppw  
Period of presentation: Semester 1  
Language of tuition: Both Afr and Eng  
Credits: 16  

Module content:  
Theory: Introduction to general chemistry: Measurement in chemistry, matter and energy, atomic theory and the periodic table, chemical compounds and chemical bonds; quantitative relationships in chemical reactions, states of matter and the kinetic theory; solutions and colloids, acids, bases and ionic compounds, chemical equilibria. Introduction to organic chemistry: Chemical bonding in organic compounds, nature, physical properties and nomenclature of simple organic molecules, isomerism, chemical properties of alkanes and cycloalkanes, alkenes, alcohols, aldehydes and ketones, carboxylic acids and esters, amines and amides, carbohydrates, proteins, and lipids. Practicals.
CMY 154 Chemistry 154  
**Academic organisation:** Chemistry  
**Contact time:** 3 lpw fortnightly practicals 2 tpw Foundation Course  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 8  
**Module content:**  
Chemical equilibrium; acid and base equilibria; applications of aqueous equilibria: buffers and solubility; introduction to electrochemistry; introduction to thermochemistry and thermodynamics; introduction to electrochemistry organic chemistry; introduction to chemical kinetics; organic chemistry: hybridisation, isomers (structural, geometrical and conformational), reactions (substitution, addition and elimination), introduction to reaction mechanisms.

CMY 282 Physical chemistry 282  
**Academic organisation:** Chemistry  
**Prerequisite:** CMY 117 and CMY 127  
**Contact time:** 4 lpw 2 ppw 1 tpw  
**Period of presentation:** Quarter 1  
**Language of tuition:** English  
**Credits:** 12  
**Module content:**  
Theory: Classical chemical thermodynamics, gases, first and second law and applications, physical changes of pure materials and simple compounds. Phase rule: Chemical reactions, chemical kinetics, rates of reactions. Fundamentals of spectroscopy (including NMR).

CMY 283 Analytical chemistry 283  
**Academic organisation:** Chemistry  
**Prerequisite:** CMY 117 and CMY 127  
**Contact time:** 4 lpw 2 ppw 1 tpw  
**Period of presentation:** Quarter 3  
**Language of tuition:** English  
**Credits:** 12  
**Module content:**  
Theory: Statistical evaluation of data, aqueous solution chemistry, chemical equilibrium, precipitation, neutralisation and complex formation titrations, redox titrations, potentiometric methods, introduction to electrochemistry.

CMY 284 Organic chemistry 284  
**Academic organisation:** Chemistry  
**Prerequisite:** CMY 117 and CMY 127  
**Contact time:** 4 lpw 2 ppw 1 tpw  
**Period of presentation:** Quarter 2  
**Language of tuition:** English  
**Credits:** 12  
**Module content:**  
*Selection criteria based on performance in CMY 127 will be applied due to limited capacity in the practical course.*  
CMY 285 Inorganic chemistry 285
Academic organisation: Chemistry
Prerequisite: CMY 117 and CMY 127
Contact time: 4 lpw 2 ppw 1 tpw
Period of presentation: Quarter 4
Language of tuition: English
Credits: 12
Module content:
Theory: Atomic structure, structure of solids (ionic model). Coordination chemistry of transition metals: Oxidation states of transition metals, ligands, stereochemistry, crystal field theory, consequences of d-orbital splitting, chemistry of the main group elements, acid-base concepts, non-aqueous solvents, electrochemical properties of transition metals in aqueous solution, industrial applications of transition metals. Introduction to IR spectroscopy.

CMY 382 Physical chemistry 382
Academic organisation: Chemistry
Prerequisite: CMY 282, CMY 283, CMY 284 and CMY 285
Contact time: 4 lpw 1 ppw 1 dpw
Period of presentation: Quarter 4
Language of tuition: English
Credits: 18
Module content:

CMY 383 Analytical chemistry 383
Academic organisation: Chemistry
Prerequisite: CMY 282, CMY 283, CMY 284 and CMY 285
Contact time: 4 lpw 1 ppw 1 dpw
Period of presentation: Quarter 1
Language of tuition: English
Credits: 18
Module content:

CMY 384 Organic chemistry 384
Academic organisation: Chemistry
Prerequisite: CMY 282, CMY 283, CMY 284 and CMY 285
Contact time: 4 lpw 1 ppw 1 tpw
Period of presentation: Quarter 3
Language of tuition: English
Credits: 18
Module content:
CMY 385 Inorganic chemistry 385
Academic organisation: Chemistry
Prerequisite: CMY 282, CMY 283, CMY 284 and CMY 285
Contact time: 4 lpw 1 ppw 1 dpw
Period of presentation: Quarter 2
Language of tuition: English
Credits: 18
Module content:
Theory: Structure and bonding in inorganic chemistry. Molecular orbital approach, diatomic and polyatomic molecules, three-centre bonds, metal-metal bonds, transition metal complexes, magnetic properties, electronic spectra, reactivity and reaction mechanisms, reaction types, special topics.

DAF 200 Animal anatomy and physiology 200
Academic organisation: Animal and Wildlife Sciences
Prerequisite: CMY 127 or TDH
Contact time: 4 lpw 1 ppw
Period of presentation: Year
Language of tuition: English
Credits: 36
Module content:
General structure and plan of the body of livestock. Types and characteristics of cells and tissues. Body water. Anatomy, physiology and histology of systems: Skin; skeleton; muscles, connective tissue, ligaments, joints; nervous system; sensory organs of sight, sound, smell, touch, taste; circulatory system; respiratory system; endocrinology; male and female reproductive systems; digestive system, gastrointestinal tract, liver, pancreas; kidneys, acid-base balance and homeostasis; lactation; immune system. General species differences.

DAN 310 Animal anatomy 310
Academic organisation: Animal and Wildlife Sciences
Prerequisite: DAF 200
Contact time: 1 lpw fortnightly practicals
Period of presentation: Semester 1
Language of tuition: English
Credits: 8
Module content:
Functional anatomy, growth and development of tissues and organ systems. Changes during maturation, reproduction, the post-partum period and lactation. Ageing and tissue changes with erosion diseases. The influence of hormones, production and reproduction on conformation and a critical evaluation of assessment of animals for functional efficiency.

DFS 311 Animal physiology 311
Academic organisation: Animal and Wildlife Sciences
Prerequisite: DAF 200
Contact time: 2 lpw
Period of presentation: Semester 1
Language of tuition: English
Credits: 10
Module content:
Homeostasis and homeorhesis in animals: Thermoregulation. Adaptation of glucose, lipid and protein metabolism in response to short- and long-term changes in the supply and balance of nutrients and to changes in tissue demand for nutrients during different physiological states. Deviations from normal homeostasis, metabolic diseases and the prevention thereof. Pathogenesis of inflammation and infections; immunity.
DFS 320 Growth physiology 320
Academic organisation: Animal and Wildlife Sciences
Prerequisite: DFS 311 and DAN 310
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: English
Module content:
The underlying physiological processes in growth and development. Pre- and postnatal growth and factors which determine growth rate: growth curves, stimulants of growth, age, nutrition, race, gender, et al.

ENV 101 Introduction to environmental sciences 101
Academic organisation: Geography, Geoinformatics and Meteorology
Contact time: 3 lpw
Period of presentation: Quarter 1
Language of tuition: English
Module content:
Introducing the basic concepts and interrelationships required to understand the complexity of natural environmental problems, physical and human environment, human induced environmental problems, the ways in which the natural environment affects human society and biodiversity, an introduction to major environmental issues in southern Africa and sustainable development in the context of environmental issues.

ENV 301 Human environmental interactions 301
Academic organisation: Geography, Geoinformatics and Meteorology
Contact time: 4 lpw 2 ppw
Period of presentation: Quarter 2
Language of tuition: English
Module content:
The module focuses on contemporary environmental issues in southern Africa. Recent and future impacts of human pressures on natural resources, the state of the environment in South Africa, management of critical resources, population trends, biodiversity loss, pollution, water scarcity, desertification, climate change, waste accumulation and management, environmental management tools, environmental education and environmental management legislation.

ERG 282 Ergonomics 282
Academic organisation: Consumer Science
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Module content:
Study of general ergonomic principles as applied to the design of workplaces, workspaces and ways of performing work. The interaction between the human (user) and his work, workspace (immediate surroundings, including space layout, furniture, movement patterns) and the general environment (climate, lighting, and noise, etc) serve as a point of reference.

EST 121 Aesthetics 121
Academic organisation: Consumer Science
Prerequisite: OBG 111
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium Credits: 9
Module content:
Presentation techniques: story boards and technical drawings. Presentation techniques using CAD.

EST 212 Aesthetics: Product, consumer and environment 212
Academic organisation: Consumer Science
Prerequisite: EST 121
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 10
Module content:
Introduction to aesthetics: framework of approach; physical as premise; role of clothing and clothing environments; perceptual process; factors that influence evaluation. Aesthetics of the product: Design elements in clothing products; visual, tactile, audio and olfactory elements; complexity, order, novelty. Aesthetics of the consumer: figure analysis; colour; design elements: clothing product and figure. Aesthetics of the environment: visual presentation in clothing environments.

EST 320 Aesthetics: Product, consumer and environment 320
Academic organisation: Consumer Science
Prerequisite: OBG 111
Contact time: 2 lpw
Period of presentation: Semester 2
Language of tuition: Double medium Credits: 8
Module content:
Introduction to aesthetics. The interaction between environment and consumers’ aesthetic experience. Visual merchandising: basic components; tools and techniques; planning in clothing, interior and foods retail settings.

FPP 451 Chemical and microbiological aspects of food 451
Academic organisation: Food Science
Prerequisite: Third-year status or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1 or Semester 2
Language of tuition: English Credits: 20
Module content:

FSK 116 Physics 116
Academic organisation: Physics
Prerequisite: WTW 114 # and refer to Regulation 1.2
Contact time: 4 lpw 1 ppw 1 dpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 16
Module content:

FSK 176 Physics 176
Academic organisation: Physics
Contact time: 4 lpw 1 ppw 1 dpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 16
Module content:

FST 250 Introduction to food science and technology 250
Academic organisation: Food Science
Prerequisite: CMY 117, CMY 127, PHY 131 and WTW 134 or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 12
Module content:
Practicals: Group assignments applying the theory in practice; practical demonstrations in pilot plants; guest lecturers on the world of food scientists and nutritionists; factory visit/videos of food processing.

FST 260 Principles of food processing and preservation 260
Academic organisation: Food Science
Prerequisite: CMY 117, CMY 127, MBY 161, PHY 131 and WTW 134 or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1 and Semester 2
Language of tuition: English  
Credits: 12
Module content:
Lectures: Food preservation technologies: concept of hurdle technology; heat (blanching, pasteurisation and sterilisation); cold (refrigeration and freezing); concentration and dehydration; food irradiation; fermentation; preservatives; new methods of food preservation. Effect of various food preservation technologies on the microbiological (shelf-life and safety issues), sensory and nutritional quality of foods. Practicals: Practical applications of above processes. Physical, chemical and sensory evaluation of processed foods. Assignment: Application of hurdle technology concept to a specific food product.

FST 350 Integrated food science 350
Academic organisation: Food Science
Prerequisite: Second-year status, FST 250 and FST 260 or TDH
Contact time: 2 lpw
Period of presentation: Year
Language of tuition: English  
Credits: 18
Module content:
Literature studies and seminar presentations on topics in food science, nutrition and health.

FST 351 Food chemistry 351
Academic organisation: Food Science
Prerequisite: [BCM 253 and BCM 254] and [BCM 255 and BCM 256] and [BCM 263 and BCM 264] and [BCM 265 and BCM 266] or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English  
Credits: 18
Module content:

FST 352 Food chemistry 352
Academic organisation: Food Science
Prerequisite: [BCM 253 and BCM 254] and [BCM 255 and BCM 256] and [BCM 263 and BCM 264] and [BCM 265 and BCM 266]
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English  
Credits: 18
Module content:
Lectures – Basic food analysis and chemistry of the minor food components: Basic food analysis, vitamins, minerals, additives, contaminants. Chemical and nutritional aspects of food processing: implications of different processing techniques on minor food components. Functional properties of the minor food components. Food analysis methodology. Practical work: Food analysis.
FST 353 Food engineering 353
Academic organisation: Food Science
Prerequisite: FST 260 or TDH
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 18
Module content:

FST 360 Principles of the science and technology of plant foods 360
Academic organisation: Food Science
Prerequisite: FST 250, FST 260, FST 351 and FST 352 or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:

FST 361 Animal food science 361
Academic organisation: Food Science
Prerequisite: FST 250, FST 260, FST 351 and FST 352 or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:
Dairy science: Composition of milk; some physical properties of milk; factors affecting composition of milk; microbiological aspects of milk production; lactation; mechanical milking; milk defects; nutritive value of milk and milk products. Practical work: Chemical and microbiological tests of milk. Demonstration of the cheese-making process. Meat, poultry, fish and egg science: The composition, nutritional value and quality of meat, poultry, fish and eggs; factors affecting quality from slaughter or harvesting to consumption. Practical work: Visits to red meat and poultry abattoirs; quality determinations, egg quality and protein functionality.

FST 400 Research methodology and seminar 400
Academic organisation: Food Science
Prerequisite: Third-year status or TDH
Contact time: 1 workshop of 5 days in semester 1, 1 day seminar in semester 2
Period of presentation: Year
Language of tuition: English  
Credits: 20

Module content:
Lectures and assignments: Research methodology. Literature study and seminar presentations on topics in food science and/or technology. The student must also pass an oral examination at the end of the module.

FST 401 Animal food technology 401  
Academic organisation: Food Science  
Prerequisite: FST 361 or TDH  
Contact time: 9 practical sessions 30 discussion classes  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 20

Module content:

FST 402 Advanced plant food science and technology 402  
Academic organisation: Food Science  
Prerequisite: FST 360 or TDH  
Contact time: 5 practical sessions in semester 1, 8 discussion classes in semester 1, 5 discussion classes in semester 2, 3 practical sessions in semester 2  
Period of presentation: Year  
Language of tuition: English  
Credits: 20

Module content:
Plant food functionality: Starch, non-starch polysaccharides, protein. Advanced rheology and texture. Malting and brewing. Ready-to-eat (RTE) technologies and their impact on functional and nutritional quality. Plant oil processing. Minimal processing of fruits and vegetables. Practical work: Pasting properties of starch; Dough rheology; Isolation of legume and cereal proteins; SDS-PAGE electrophoreses of legume and cereal proteins; Malting and mashing of sorghum and barley malt; Extraction of essential oils; Extraction and identification of phenolic compounds; Minimal processing of fruits and vegetables.

FST 412 Sensory evaluation 412  
Academic organisation: Food Science  
Prerequisite: FST 260, FST 351 and FST 352 or TDH  
Contact time: 12 discussion classes 6 practical sessions  
Period of presentation: Semester 1  
Language of tuition: English  
Credits: 10

Module content:
Principles and applications of sensory evaluation. Types of panels, tests and test conditions and their functions. Selection and training of panellists for descriptive sensory evaluation. Instrumental sensory quality measurements. Statistical analysis and
interpretation of data. Practicals: Practical aspects and execution of sensory evaluation techniques, analysis and interpretation of data. Instrumental sensory quality measurements.

FST 413 Product development and quality management 413
Academic organisation: Food Science
Prerequisite: FST 260 and FST 351 and FST 352 or TDH
Contact time: 6 practical sessions 15 discussion classes
Period of presentation: Semester 1
Language of tuition: English
Credits: 30
Module content:
Lectures: Principles involved and steps that are followed to develop new food products that are safe, tasty, nutritious and cost effective. Application of the theory of food product development. Quality management systems with specific reference to Good Manufacturing Practices, HACCP and ISO 9000. National and international standards, Codex Alimentarius, FDA. Application of food legislation. Food packaging. Practicals: A product development project will be planned, conducted and presented. Application and implementation of HACCP.

FST 414 Research methodology 414
Academic organisation: Food Science
Prerequisite: Third-year status or TDH
Period of presentation: Semester 1
Language of tuition: English
Credits: 8
Module content:
Five-day intensive research methodology workshop: Philosophy of research; where to start research – problem statement; role and importance of the literature review; how to formulate hypotheses and objectives; experimental design; the good practical way to do research, including getting the results down; application of statistics to research; writing an honours report/master's dissertation-doctoral thesis; writing a scientific paper; preparing and presenting posters and oral papers.

FST 420 Advanced food science 420
Academic organisation: Food Science
Prerequisite: Third-year status or TDH
Contact time: 12 discussion classes
Period of presentation: Year
Language of tuition: English
Credits: 20
Module content:
Discussion classes in advanced level food chemistry, food microbiology, food engineering, food processing and nutrition. Problem solving and literature discussion.

FST 463 Research project 463
Academic organisation: Food Science
Prerequisite: Third-year status in Food Science or TDH
Contact time: 1 ppw
Period of presentation: Year
Language of tuition: English
Credits: 40
Module content:
Planning, execution and reporting of a research project on a selected Food Science and/or Technology subject.
GGY 156 Aspects of human geography 156
**Academic organisation:** Geography, Geoinformatics and Meteorology
**Contact time:** 3 lpw 1 tpw
**Period of presentation:** Quarter 2
**Language of tuition:** English  
**Credits:** 8

**Module content:**
This module begins by fostering an understanding of human geography. Then follows the political ordering of space; cultural diversity as well as ethnic geography globally and locally; population geography of the world and South Africa; and four economic levels of development. The purpose is to place South Africa in a world setting and to understand the future of the country.

GGY 166 Southern African geomorphology 166
**Academic organisation:** Geography, Geoinformatics and Meteorology
**Contact time:** 4 lpw
**Period of presentation:** Quarter 3
**Language of tuition:** English  
**Credits:** 8

**Module content:**
Investigating southern African landscapes and placing them in a theoretical and global context. The geomorphological evolution of southern Africa. Introduction to the concepts of Geomorphology and its relationships with other physical sciences (e.g., meteorology, climatology, geology, hydrology, and biology). The processes and controls of landform and landscape evolution. Tutorial exercises cover basic techniques of geomorphological analysis, and topical issues in Geomorphology.

GGY 252 Process geomorphology 252
**Academic organisation:** Geography, Geoinformatics and Meteorology
**Prerequisite:** GGY 166 or GLY 155
**Contact time:** 4 lpw 2 ppw
**Period of presentation:** Quarter 2
**Language of tuition:** English  
**Credits:** 12

**Module content:**
Physical processes that influence the earth’s surface and management. Specific processes and their interaction in themes such as weathering; soil erosion; slope, mass movement and fluvial processes. Practical laboratory exercises are based on the themes covered in the module theory component.

GGY 265 Geomorphology of the built environment 265
**Academic organisation:** Geography, Geoinformatics and Meteorology
**Contact time:** 4 lpw
**Period of presentation:** Quarter 3
**Language of tuition:** English  
**Credits:** 12

**Module content:**
*This module is for Architecture and Landscape Architecture students only.*
The theory component covers geomorphological aspects of the built environment including landscape identification; weathering or deterioration of natural stone and application to design and preservation of buildings and monuments; slope hydrology and stability conditions; soil erosion processes and construction impacts; drainage modification in urban areas; wetland identification, human impacts and rehabilitation; recreational impacts and management. In addition to the theory a field-based project is undertaken.
GGY 266 City structure, environment and society 266
Academic organisation: Geography, Geoinformatics and Meteorology
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 24
Module content:

GGY 283 Introductory geographic information systems 283
Academic organisation: Geography, Geoinformatics and Meteorology
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 12
Module content:
*This is a closed module, only available to students studying [BT&RP] (12132022), [BSc(Arch)] (12132002), [BSc(LArch)] (12132004), BSc (Meteorology) (02133312), BSc (Geoinformatics) (02133383), BSc (Environmental Sciences) (02133361), BSc (Earth Sciences) (02133012), BSc (Geography) (02133385), BEd (Further Education and Training) (General) (09133040), BA (01130001) or as approved by the head of department. The content of this module is the same as GIS 221 and students are not allowed to earn credits for both GGY 283 and GIS 221.
Introduction to Geographic Information Systems (GIS), theoretical concepts and applications of GIS. The focus will be on the GIS process of data input, data analysis, data output and associated technologies.

GGY 356 Sustainable development 356
Academic organisation: Geography, Geoinformatics and Meteorology
Contact time: 3 lpw 1 ppw
Period of presentation: Quarter 1
Language of tuition: English
Credits: 18
Module content:
The module conceptually integrates environmental, economic, and social components of sustainable development. Other topics covered include changing perceptions on development and environment, development paradigms, challenges of sustainable development, actors and actions in sustainable development, rural and urban livelihoods, and a Third World assessment of sustainable development in the developing world.

GGY 361 Environmental geomorphology 361
Academic organisation: Geography, Geoinformatics and Meteorology
Prerequisite: GGY 252
Contact time: 4 lpw 2 ppw
Period of presentation: Quarter 4
Language of tuition: English
Credits: 18
Module content:
*Note: The module is for BSc (Geography), BSc (Environmental Sciences) and BSc (Geology) students only. The theory content of this module is the same as GGY 363 and students are not allowed to earn credits for both GGY 361 and GGY 363.
Interactions of geomorphic processes within the physical and built environments; themes such as geomorphology and environmental change, slope processes and the environment, geomorphic risks and hazards, soil erosion and conservation, geomorphology in
environmental management, applied weathering. Practicals involve fieldwork including sampling and mapping and subsequent laboratory analysis.

**GGY 363 Applied geomorphology 363**  
**Academic organisation:** Geography, Geoinformatics and Meteorology  
**Prerequisite:** GGY 252  
**Contact time:** 4 lpw  
**Period of presentation:** Quarter 4  
**Language of tuition:** English  
**Credits:** 12  
**Module content:**  
*Note: The content of this module is the same as GGY 361 and students are not allowed to earn credits for both GGY 361 and GGY 363.*  
Interactions of geomorphic processes within the physical and built environments; themes such as geomorphology and environmental change, slope processes and the environment, geomorphic risks and hazards, soil erosion and conservation, geomorphology in environmental management, applied weathering.

**GGY 366 Development frameworks 366**  
**Academic organisation:** Geography, Geoinformatics and Meteorology  
**Contact time:** 3 lpw 1 ppw  
**Period of presentation:** Quarter 3  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  

**GIS 120 Geoinformatics 120**  
**Academic organisation:** Geography, Geoinformatics and Meteorology  
**Prerequisite:** GMC 110  
**Contact time:** 3 lpw 1 ppw  
**Period of presentation:** Semester 2  
**Language of tuition:** Double medium  
**Credits:** 12  
**Module content:**  

**GIS 220 Geographic data analysis 220**  
**Academic organisation:** Geography, Geoinformatics and Meteorology  
**Contact time:** 3 lpw 1 ppw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 12  
**Module content:**  
The nature of geographical data and measurement. Probability, probability distributions and densities, expected values and variances, Central Limit theorem. Sampling techniques. Exploratory data analysis, descriptive statistics, statistical estimation, hypothesis testing, correlation analysis and regression analysis.
GIS 221 Geographic information systems introduction 221  
Academic organisation: Geography, Geoinformatics and Meteorology  
Contact time: 2 lpw 1 ppw  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 12  
Module content:  
*The content of this module is the same as GGY 283 and students are not allowed to earn credits for both GGY 283 and GIS 221.  
Introduction to Geographic Information Systems (GIS), theoretical concepts and applications of GIS. The focus will be on the GIS process of data input, data analysis, data output and associated technologies.

GIS 310 Geographic information systems 310  
Academic organisation: Geography, Geoinformatics and Meteorology  
Prerequisite: GGY 283 or GIS 221  
Contact time: 3 lpw 1 ppw  
Period of presentation: Semester 1  
Language of tuition: English  
Credits: 24  
Module content:  
Advanced theory and practice of Geographic Information Systems; GIS applications; design and implementation of GIS applications.

GIS 320 Spatial analysis 320  
Academic organisation: Geography, Geoinformatics and Meteorology  
Prerequisite: GIS 310 or TDH  
Contact time: 3 lpw 1 ppw  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 24  
Module content:  

GKD 225 General soil science 225  
Academic organisation: Plant Production and Soil Science  
Contact time: 3 lpw 1 ppw  
Period of presentation: Quarter 3  
Language of tuition: English  
Credits: 12  
Module content:  

GKD 250 Introductory soil science 250  
Academic organisation: Plant Production and Soil Science  
Prerequisite: CMY 117 GS or TDH  
Contact time: 3 lpw 1 ppw  
Period of presentation: Semester 1  
Language of tuition: Both Afr and Eng  
Credits: 12
Module content:

GKD 320 Soil chemistry 320
Academic organisation: Plant Production and Soil Science
Prerequisite: GKD 250
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng Credits: 14
Module content:
The more exact chemistry of soils systematically explained by understanding the particular chemical principles. Charge origin. Chemical equilibriums. Manifestations of sorption. Ion exchange. Acidic soils, saline soils and the organic fraction of soil. The chemistry of the important plant nutrient elements P, K and N is explained.

GKD 350 Soil classification and surveying 350
Academic organisation: Plant Production and Soil Science
Prerequisite: GKD 250 GS
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng Credits: 14
Module content:

GKD 420 Soil fertility, soil microbiology and plant nutrition 420
Academic organisation: Plant Production and Soil Science
Prerequisite: GKD 250 GS
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English Credits: 14
Module content:
Soil ultimately controls nutrient supply to plants and organisms. The health and resilience of biota are therefore closely link to the interaction between the pedosphere and the biosphere. This module deals with the availability and uptake of macro- and micro-nutrients in the plant-microbial-soil system, nutrient deficiencies and toxicities, as well as soil properties and soil environmental conditions that influence soil fertility and its suitability to act as a growth medium. Practical work includes the laboratory evaluation of soil fertility and greenhouse pot trials to investigate nutrient uptake as well as deficiencies and toxicities symptoms in plants.

GLY 155 Introduction to geology 155
Academic organisation: Geology
Prerequisite: Refer to Regulation 1.2
**Contact time:** 4 lpw 1 ppw  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 16  

**Module content:**  
Solar system; structure of solid matter; minerals and rocks; introduction to symmetry and crystallography; important minerals and solid solutions; rock cycle; classification of rocks. External geological processes (gravity, water, wind, sea, ice) and their products (including geomorphology). Internal structure of the earth. The dynamic earth – volcanism, earthquakes, mountain building – the theory of plate tectonics. Geological processes (magmatism, metamorphism, sedimentology, structural geology) in a plate tectonic context. Geological maps and mineral and rock specimens.

**GLY 161 Historical geology 161**  
**Academic organisation:** Geology  
**Prerequisite:** Refer to Par 1.2  
**Contact time:** 4 lpw 1 ppw  
**Period of presentation:** Quarter 4  
**Language of tuition:** English  
**Credits:** 8  

**Module content:**  
Principles of stratigraphy and stratigraphic nomenclature; geological dating and international and South African time scales; Africa framework and tectonic elements of South Africa; introduction to depositional environments. Overview of the historical geology of South Africa, from the Archaean to the present: major stratigraphic units, intrusions and tectonic metamorphic events – their rock types, fossil contents, genesis and economic commodities. Principles of palaeontology and short description of major fossil groups: fossil forms, ecology and geological meaning. Geological maps and profiles; rock samples.

**GLY 162 Environmental and hazard geology 162**  
**Academic organisation:** Geology  
**Prerequisite:** Refer to Regulation 1.2  
**Contact time:** 4 lpw 1 ppw  
**Period of presentation:** Quarter 3  
**Language of tuition:** English  
**Credits:** 8  

**Module content:**  
Hazardous exogenic and endogenic geological processes and their influence on the human environment; impact of human activities on the geological environment; natural resource utilisation including materials for construction; natural and mine-induced seismicity; waste disposal; groundwater and environmental pollution. Geological maps; geological profiles; rock specimens; fossil specimens.

**GLY 253 Sedimentology 253**  
**Academic organisation:** Geology  
**Prerequisite:** CMY 117, GLY 155 and 1 of GLY 161, GLY 162 and WTW 114/WTW 158 or PHY 114  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 3  
**Language of tuition:** English  
**Credits:** 12  

**Module content:**  
Introduction to sedimentology; grain studies; composition and textures of sedimentary rocks; flow dynamics and behaviour of sediment particles in transport systems; description and genesis of sedimentary structures; diagenesis; depositional environ-
ments and their deposits, modern and ancient; chemical sedimentary rocks; economic sedimentology; field data acquisition from sedimentary rocks and writing of reports; sieve analysis; Markov analysis; analysis of palaeocurrent trends; interpretation of sedimentary profiles.

GLY 254 Structural geology 254
Academic organisation: Geology
Prerequisite: CMY117, GLY 155 and 1 of GLY 161, GLY 162 and WTW 114 or WTW 158 or PHY 114
Contact time: 4 lpw 1 ppw
Period of presentation: Quarter 2
Language of tuition: English
Credits: 12
Module content:
Integrated theoretical and practical course dealing with the principles of rock deformation and analysis of deformed rocks. Stress, strain and rheology, joints, experimental rock deformation, fault systems and Anderson's theory of faulting. Folds and interference folding, tectonic fabrics, shear zones, progressive deformation. Stereographic projection and structural analysis.

GLY 255 Fundamental and applied mineralogy 255
Academic organisation: Geology
Prerequisite: CMY 117, GLY 155 and 1 of GLY 161, GLY 162 and WTW 114/WTW 158 or PHY 114
Contact time: 4 lpw 2 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 24
Module content:
Fundamental concepts in mineralogy, and practical applications of mineralogy, including: the basics of crystal structure; the crystallographic groups; the rules of atomic substitution; phase transitions and phase diagrams; the structure and uses of olivine, pyroxene, feldspar, amphibole, mica, aluminosilicates, garnet, cordierite, and more uncommon mineral groups such as oxides, sulphides and carbonates; the calculation of mineral formulae from chemical analyses using various methods. Practical sessions: the basics of optical mineralogy and the use of transmitted light microscopy for thin section examination of minerals and rocks; the practicals will develop mineral identification skills for the minerals covered in the lectures, and cover basic textural identification.

GLY 261 Igneous petrology 261
Academic organisation: Geology
Prerequisite: GLY 255 or TDH
Contact time: 4 lpw 2 ppw
Period of presentation: Quarter 3
Language of tuition: English
Credits: 12
Module content:
Classification and nomenclature of igneous rocks. The nature of silicate melts; physical and chemical factors influencing crystallisation and textures of igneous rocks. Phase diagrams, fractional crystallisation and partial melting. Trace elements and isotopes, and their use in petrogenetic studies. Global distribution of magmatism and its origin. Mid-oceanic ridges, active continental margins, intraplate magmatism.
GLY 262 Metamorphic petrology 262  
**Academic organisation:** Geology  
**Prerequisite:** GLY 255 or TDH  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 4  
**Language of tuition:** English  
**Credits:** 12  
**Module content:**  
Classification of metamorphic rocks. Anatexis, migmatite and granite; eclogite. Metamorphic textures. PT-time loops. Metamorphism in various plate tectonic environments.

GLY 265 Groundwater 265  
**Academic organisation:** Geology  
**Prerequisite:** GLY 155 and 1 of GLY 161, GLY 162 and WTW 114/WTW 158 and WTW 128/WTW 168 or PHY 114  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 4  
**Language of tuition:** English  
**Credits:** 12  
**Module content:**  
Origin and classification of groundwater; classification of aquifers; groundwater movement; equations for groundwater flow into boreholes; the La Place equation and solutions for pump tests; execution and interpretation of pump tests. Groundwater flow modelling; classification of aquifers in southern Africa; groundwater exploration and management. Mapping techniques.

GLY 361 Ore deposits 361  
**Academic organisation:** Geology  
**Prerequisite:** Five of the second-year modules: GLY 253, GLY 254, GLY 255, GLY 261, GLY 262, GLY 265  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 3  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  
Systematic review of major metallic and non-metallic ore types and examples in South Africa and world-wide; ore type models (grades, tonnages); geometry of ore bodies; mining. Ore samples and ore mineralogy. Mapping techniques.

GLY 362 Geostatistics and ore reserve calculations 362  
**Academic organisation:** Geology  
**Prerequisite:** GLY 253, GLY 254, GLY 255, GLY 261, GLY 262, GLY 265  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 4  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  
Review of classical geostatistical methods; problem evaluation; descriptive statistics, normal, lognormal, three parameter lognormal distributions; confidence intervals; t-test. Sampling; cut-off values; grid generation and trend surface analysis. Semivariogram; error estimation; Kriging (BLUE) techniques. Ore reserve calculations.

GLY 363 Engineering geology 363  
**Academic organisation:** Geology  
**Prerequisite:** GLY 155 and GLY 265 and 4 of the second-year modules: GLY 253, GLY 254, GLY 255, GLY 261, GLY 262
Contact time: 4 lpw 2 ppw  
Period of presentation: Quarter 2  
Language of tuition: English  
Credits: 18

Module content:  
Definition and scope of engineering geology; engineering geological properties and problems of rocks and soils within different stratigraphic units and climatic regions in southern Africa.

GLY 364 Rock mechanics 364  
Academic organisation: Geology  
Prerequisite: GLY 254 and 4 of the second-year modules: GLY 255, GLY 253, GLY 261, GLY 262, GLY 265  
Contact time: 4 lpw 2 ppw  
Period of presentation: Quarter 1  
Language of tuition: English  
Credits: 18

Module content:  
Strength and failure modes of rock material and rock failure criteria. The characteristics of joints in rock. Joint line surveys and interpretation of data. Characteristics of a rock mass, rock mass classification and determination of strength. Slope stability in surface mines. Induced seismicity due to deep mining and rock bursts.

GMA 220 Remote sensing 220  
Academic organisation: Geography, Geoinformatics and Meteorology  
Contact time: 3 lpw 1 ppw  
Period of presentation: Semester 1  
Language of tuition: English  
Credits: 16

Module content:  
This module will provide a thorough introduction to the basic scientific principles involved in remote sensing, and some of the applications to studies of the Earth’s surface. This include examining the basic physics of electromagnetic radiation and the complex interactions of radiation with the surface and atmosphere (ie spectral signatures). In addition, basic concepts of photogrammetry will be discussed. The theoretical background laid out in the first half of the module will provide the tools for examining various remote sensing applications using data obtained in different parts of the electromagnetic spectrum. The applications will include uses of satellite remote sensing data for mapping and monitoring vegetation, soils and minerals, snow and ice, water resources and quality, and urban landscapes. The laboratory section will include hands-on experience with various satellite image data sets.

GMA 320 Remote sensing 320  
Academic organisation: Geography, Geoinformatics and Meteorology  
Prerequisite: GMA 220 or TDH  
Contact time: 3 lpw 1 ppw  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 24

Module content:  
This module aims to provide students with a working knowledge and skills to learn methods and techniques for collecting, processing and analysing remotely sensed data. Throughout the module, emphasis will be placed on image processing, image analysis, image classification, remote sensing and applications of remote sensing in geographical analysis and environmental monitoring. The module is composed of lectures, readings, laboratory exercises and research tasks.
GMC 110 Cartography 110
Academic organisation: Geography, Geoinformatics and Meteorology
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 12
Module content:
History, present and future of cartography. Introductory geodesy: shape of the earth, graticule and grids, datum definition, elementary map projection theory, spherical calculations. Representation of geographical data on maps: Cartographic design, cartographic abstraction, levels of measurement and visual variables. Semiotics for cartography: signs, sign systems, map semantics and syntactics, explicit and implicit meaning of maps (map pragmatics).

GMC 310 Geometrical and space geodesy 310
Academic organisation: Geography, Geoinformatics and Meteorology
Prerequisite: GMC 110 and WTW 114
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 24
Module content:

GMT 320 Geoinformatics project 320
Academic organisation: Geography, Geoinformatics and Meteorology
Prerequisite: GIS 310 and INF 214 and INF 261 or TDH. Only for Geoinformatics students.
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 24
Module content:
A project which is approved by the lecturer and in which one or more of the studied techniques of data acquisition and processing are used to produce an output of spatially referenced information. The project must be fully described in a project report.

GTS 161 Introductory genetics 161
Academic organisation: Genetics
Prerequisite: MLB111 GS
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 8
Module content:
GTS 251 Molecular genetics 251
Academic organisation: Genetics
Prerequisite: GTS161 GS
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 1
Language of tuition: English
Credits: 12
Module content:

GTS 261 Genetic variation and evolution 261
Academic organisation: Genetics
Prerequisite: GTS251 GS
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: English
Credits: 12
Module content:

GTS 351 Eukaryotic gene control and development 351
Academic organisation: Genetics
Prerequisite: GTS 251 GS and GTS 261 GS
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 18
Module content:
Regulation of gene expression in eukaryotes: regulation at the genome, transcription, RNA processing and translation levels. DNA elements and protein factors involved in gene control. The role of chromatin structure and epigenetic changes. Technology and experimental approaches used in studying eukaryotic gene control. Applications of the principles of gene control in embyonic development and differentiation, cancer and other diseases in humans.

GTS 352 Genomes 352
Academic organisation: Genetics
Prerequisite: GTS 251 GS and GTS 261 GS or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 18
Module content:
Analysis of the genome as central entity in molecular genetics. Comparison of the molecular organisation of prokaryote and eukaryote genomes, nuclear and mito-chondrial genomes. Genome organisation in different organisms; gene families, over-lapping genes, pseudogenes, DNA repeat content. Genetic techniques for genome mapping, physical mapping, genome sequencing and the localisation of genes. Processing of DNA sequencing data using computer technology. Approaches for studying genome function. Functional genomics, transcriptomics and proteomics. Genome evolution.
GTS 353 Advanced population genetics 353
Academic organisation: Genetics
Prerequisite: GTS 251 GS and GTS 261 GS or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 18
Module content:
Genetic variation and mating systems. Allele frequency change: genetic drift, natural and kin selection, mutation and migration. Molecular evolution: nucleotide substitutions to multigene families, and the neutral theory. Quantitative genetics: analysis of genetic variation, heritability, natural selection and artificial selection of quantitative traits. Identification of quantitative trait loci (QTLs).

GTS 354 Genome evolution and phylogenetics 354
Academic organisation: Genetics
Prerequisite: GTS 251 GS and GTS 261 GS
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 18
Module content:

GTS 361 Human genetics 361
Academic organisation: Genetics
Prerequisite: GTS 352 GS or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:

GTS 363 Evolutionary and phylo-genetics 363
Academic organisation: Genetics
Prerequisite: GTS 353 GS or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:
GTS 365 Applied medical genetics 365
Academic organisation: Genetics
Prerequisite: GTS 251 GS and GTS 261 GS or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:
The clinical manifestations of common Mendelian diseases and congenital anomalies; Risk assessment/calculating and genetic counselling; genes and diseases – the use of polymorphisms, gene mapping, gene linkage and association studies in medicine; genetic diagnosis – common molecular and cytogenetic techniques and the application thereof; carrier detection and predictive testing; population screening – prenatal and neonatal screening; Treatment of genetic diseases and gene-based therapy; pharmacogenetics and cancer genetics. Ethical issues.

GTS 367 Population and evolutionary genetics 367
Academic organisation: Genetics
Prerequisite: GTS 251 and GTS 261 or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:

GTS 368 Genetics in human health 368
Academic organisation: Genetics
Prerequisite: GTS 251 and GTS 261 GS
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:

GVK 420 Large stock science 420
Academic organisation: Animal and Wildlife Sciences
Prerequisite: RPL 320, VGE 301 and VKU 210
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 12
Module content:
Industrial science and management of large stock. Revision of the principles of agricultural management. Aspects of business management of the large stock enterprise. Management programmes, production systems and techniques applicable to beef cattle,
dairy cattle and horses. Design and planning of farm buildings and structures. Storage and handling of fodder. The handling and management of refuse. Hygiene and herd health programmes.

**HSC 351 Nursery management: Principles and practices 351**
**Academic organisation:** Plant Production and Soil Science
**Contact time:** 2 lpw fortnightly practicals
**Period of presentation:** Semester 1
**Language of tuition:** Both Afr and Eng
**Credits:** 14

**Module content:**
The organised nursery industry in South Africa. Principles of seed production and seed germination; rooting of cuttings budding and grafting: propagation using specialised organs; micro propagation (tissue culturing). Practices: Greenhouse construction, lighting in the nursery; cooling and heating; soil-based and soil-less growing media; container types; irrigation and fertilisation; growth manipulation; pest and disease management. Management, economical and marketing aspects of a typical nursery operation. Students will get hands-on experience and visit nurseries.

**HSC 490 Ornamental horticulture 490**
**Academic organisation:** Plant Production and Soil Science
**Contact time:** 2 lpw fortnightly practicals
**Period of presentation:** Semester 1
**Language of tuition:** Both Afr and Eng
**Credits:** 14

**Module content:**
Economic importance of cut flowers and pot plants. Taxonomy and plant description. Climatic requirements and production practices including establishing, growth manipulation, nutritional requirements, irrigation, pest and disease control, harvest and post-harvest handling. Identification of ornamental plants for commercial and land-scape use. Climatic, reproduction and maintenance requirements for trees, palms, shrubs, flowering plants, groundcovers, climbers and indoor plants. Functional and aesthetic value of plants in a landscape or indoors. Excursions to nurseries and practical experience on the experimental farm is compulsory for all participants in this module.

**IAS 211 Actuarial mathematics 211**
**Academic organisation:** Insurance and Actuarial Science
**Prerequisite:** Both WTW 114 and WTW 128 60%
**Contact time:** 2 lpw 1 ppw
**Period of presentation:** Semester 1
**Language of tuition:** Both Afr and Eng
**Credits:** 12

**Module content:**
Accumulation functions, interest, time value of money, compounding periods, cashflow models, equations of value, annuities certain, continuous time application, life tables, derivation of contingent probabilities from life tables, contingent payments, fundamentals of survival models, simple laws of mortality, expectation of life, elementary survival contracts, commutation functions, premiums for elementary survival contracts.

**IAS 221 Actuarial mathematics 221**
**Academic organisation:** Insurance and Actuarial Science
**Prerequisite:** IAS 211 GS #
**Contact time:** 2 lpw 1 ppw
**Period of presentation:** Semester 2
**Language of tuition:** Both Afr and Eng
**Credits:** 12
Module content:
Select and ultimate life tables, advanced life annuities, accumulation and discounting, life insurance, net and gross premiums, reserves, pension applications, statistical considerations, loan schedules, performance measurement, valuation of fixed interest securities.

IAS 282 Financial mathematics 282
Academic organisation: Insurance and Actuarial Science
Prerequisite: IAS 211 70% or TDH
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: English
Credits: 12
Module content:

IAS 361 Insurance and actuarial applications 361
Academic organisation: Insurance and Actuarial Science
Prerequisite: IAS 211 GS
Contact time: 3 lpw
Period of presentation: Semester 1
Language of tuition: English
Credits: 18
Module content:
Concepts of risk and insurance, legal aspects, common products, product providers, pricing, reserving, reinsurance, accounting, wider fields, professionalism.

IAS 382 Actuarial modelling 382
Academic organisation: Insurance and Actuarial Science
Prerequisite: IAS 282
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 20
Module content:

INB 220 Interior planning 220
Academic organisation: Consumer Science
Prerequisite: ERG 282 GS and OBG 111
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 16
Module content:
Application of basic clothing construction techniques and quality control.
INB 320 Interior planning 320
Academic organisation: Consumer Science
Prerequisite: ITW 311 and OBG 111
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium Credits: 11
Module content:
The planning and arrangement of existing living and working spaces to provide for the various needs of the individual, family or group. Evaluation of floor plans; arrangement of furniture.

INB 322 Interior planning 322
Academic organisation: Consumer Science
Prerequisite: ERG 282, ITW 311 and OBG 111
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium Credits: 11
Module content:
The planning and designing of living and working spaces to provide for the different needs of the client. Visual and oral presentations for clients.

INB 410 Interior planning 410
Academic organisation: Consumer Science
Prerequisite: CIL 122 and INB 322
Contact time: 1 lpw 2 ppw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 23
Module content:
Advanced interior planning.

INK 210 Interior production 210
Academic organisation: Consumer Science
Prerequisite: INK 110
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 10
Module content:
Evaluation of ready-made interior products; measuring, planning and construction of custom-made interior products: window coverings, upholstery and assorted furnishings.

INK 310 Interior production 310
Academic organisation: Consumer Science
Prerequisite: INK 210
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 11
Module content:
IPO 380 Interior experiential training 380
Academic organisation: Consumer Science
Prerequisite: INK 310 and ITW 311
Contact time: 1 lpw
Period of presentation: Semester 2
Language of tuition: Double medium Credits: 8
Module content:
Controlled experiential training. During the third year of study, during holidays, weekends and after hours, students must complete a total of 120 hours experiential training in the industry to develop practical and occupational skills. This is equal to 3 weeks x 40 hours (120 hours), according to requirements as determined by the head of department. This exposure must be successfully completed, together with a final report, before the degree will be conferred.

ITP 481 Project: Interior merchandise 481
Academic organisation: Consumer Science
Prerequisite: Final-year status, INB 322, INB 410 # and SEM 381 GS
Contact time: 1 lpw 1 ppw
Period of presentation: Year
Language of tuition: Double medium Credits: 22
Module content:
Project to illustrate the ability to integrate relevant theory in the planning and presentation of an interior merchandise project for specific clients.

ITW 221 Interior merchandise 221
Academic organisation: Consumer Science
Prerequisite: ITW 121
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium Credits: 10
Module content:
Equipment studies: study of major and portable electrical household appliances in terms of consumer needs, specific end-use situations, running and life cycle costs, sustainability aspects and environmental concerns to facilitate consumer decision making.

ITW 261 Interior merchandise 261
Academic organisation: Consumer Science
Contact time: 2 lpw 1 ppw
Period of presentation: Quarter 3
Language of tuition: Double medium Credits: 5
Module content:
Equipment studies: study of selected major and portable electrical household appliances in terms of consumer needs, specific end-use situations, running and life cycle costs, sustainability aspects and environmental concerns to facilitate consumer decision making.

ITW 311 Interior merchandise 311
Academic organisation: Consumer Science
Prerequisite: ITW 121
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 11
Module content:
A study of furniture (case goods and upholstered), floor coverings, wall finishes, lighting and household textile products in terms of construction techniques, composition, properties, quality indicators, advantages and disadvantages, appearance, durability, cost and maintenance and care factors.

KEP 220 Cultural eating patterns 220
Academic organisation: Consumer Science
Prerequisite: VDS 121
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Double medium  Credits: 12
Module content:
Origin and development of food habits; Factors influencing food habits and choice; Dynamics of food habits. Influence of religion on food habits. Food habits of different ethnic groups. The influence of culture on cuisines. Study of the cuisines of selected African, European and Eastern countries.

KLD 210 Costume and fashion history 210
Academic organisation: Consumer Science
Contact time: 3 lpw
Period of presentation: Semester 1
Language of tuition: Double medium  Credits: 12
Module content:
Costume and fashion history: Appearance characteristics of Western dress. Influencing factors. Evolution of styles from Ancient Egyptian up to and including the present.

KLD 222 Fashion forecasting 222
Academic organisation: Consumer Science
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Double medium  Credits: 12
Module content:
The South African fashion industry: Basic principles of fashion; fashion as a product; and the consumer. Fashion production: haute couture and ready-to-wear clothes. Fashion forecasting and fashion analyses.

KLD 311 Social and cultural aspects of clothing 311
Academic organisation: Consumer Science
Contact time: 3 lpw
Period of presentation: Semester 1
Language of tuition: Double medium  Credits: 15
Module content:
Social-psychological and cultural aspects of clothing: Development of a framework; Symbolic interaction as a framework; the cognitive approach. Development of the self: self and self-concept: the body as indicator; personal values and norms. Appearance management and presentation of the self: role acceptance, identity, social control, roles in social cognition. Cultural context and dress: reflection of human adaptation; culture creations (technical, moral and ceremonial patterns); societies and clothing; beauty standards and beauty ideals.
Social context, identity, change and clothing: the family, politics, religion, economy and the role of clothing as a reflection of social and personal identities; mentefacts and identities; social change and clothing.
KLD 322 Social and cultural aspects of clothing 322
Academic organisation: Consumer Science
Contact time: 4 lpw
Period of presentation: Semester 2
Language of tuition: Double medium  
Credits: 20

Module content:
Social-psychological and cultural aspects of clothing: Development of a framework; Symbolic interaction as a framework; the cognitive approach. Development of the self: self and self-concept: the body as indicator; personal values and norms. Appearance management and presentation of the self: role acceptance, identity, social control, roles in social cognition. Cultural context and dress: reflection of human adaptation; culture creations (technical, moral and ceremonial patterns); societies and clothing; beauty standards and beauty ideals.
Social context, identity, change and clothing: the family, politics, religion, economy and the role of clothing as a reflection of social and personal identities; mentefacts and identities; social change and clothing.

KLD 410 Clothing retail management 410
Academic organisation: Consumer Science
Prerequisite: Fourth-year status; BEM 224 and BEM 321
Contact time: 4 lpw
Period of presentation: Semester 1
Language of tuition: Double medium  
Credits: 20

Module content:
Clothing retail aspects: Functioning of clothing retail. Environments, formats and structures of clothing retailers. Merchandising and store positioning. Fashion consumer behaviour. Ethics and social responsibilities of clothing retailers. Fashion marketing communication; advertising, direct marketing, sales promotions, personal selling and service provision, publicity and public relations, fashion shows and special events.

KLD 420 Clothing merchandising 420
Academic organisation: Consumer Science
Prerequisite: Fourth-year status KLD 410; BEM 224 and BEM 321
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Double medium  
Credits: 20

Module content:
Clothing merchandise managerial aspects: fashion buying and planning function, controlling inventories, factors influencing stock movement, redistribution of stock; merchandising processes, sourcing and relationship with suppliers; management roles and responsibilities. Buying strategies, forecasting and records, preparing a buying plan, developing an assortment plan. Use of relevant soft wear in the buying and planning function. Global perspective of the clothing industry.

KLR 110 Clothing production: Sewing techniques 110
Academic organisation: Consumer Science
Contact time: 1 lpw 1 ppw 1 dpw
Period of presentation: Semester 1
Language of tuition: Double medium  
Credits: 9

Module content:
Basic clothing construction techniques and quality control.
KLR 120 Clothing production: Processes 120
Academic organisation: Consumer Science
Prerequisite: KLR 110
Contact time: 1 lpw 1 ppw 1 dpw
Period of presentation: Semester 2
Language of tuition: Double medium
Module content: Application of basic clothing construction techniques and quality control.

KLR 211 Flat pattern design 211
Academic organisation: Consumer Science
Prerequisite: KLR 120
Contact time: 2 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Module content: Flat pattern design. Computer-aided Design (CAD).

KLR 221 Pattern use and good fit 221
Academic organisation: Consumer Science
Prerequisite: KLR 211
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Module content: Pattern use and good fitting.

KLR 311 Tailoring 311
Academic organisation: Consumer Science
Prerequisite: KLR 211 and KLR 221
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Module content: Tailoring.

KLR 321 Clothing production 321
Academic organisation: Consumer Science
Prerequisite: KLR 221
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Module content: Small-scale production: Industrial machines, production systems, quality assurance.

KLR 411 Product development 411
Academic organisation: Consumer Science
Prerequisite: KLR 221 and KLR 321
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Module content:
Module content:
Production: product analysis, planning and execution. Application clothing, textile and consumer knowledge by utilising a CAD-program for planning and assembling apparel.
The small business enterprise: Introduction: clothing small business enterprises; types and locations. Marketing aspects: target market selection; product mix; pricing methods; distribution channels; marketing communication mix; financial aspects.

KTP 220 Experiential training 220
Academic organisation: Consumer Science
Contact time: 1 ppw 1 dpw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 4
Module content:
Compulsory practical training in the clothing industry during the year, approved in consultation with the head of the department.

KTP 402 Clothing textile project 402
Academic organisation: Consumer Science
Prerequisite: Fourth-year status and BEM 314
Contact time: 1 ppw 1 dpw
Period of presentation: Year
Language of tuition: Double medium
Credits: 28
Module content:
Project in field of application: planning and execution.

KTP 403 Experiential training in industry 403
Academic organisation: Consumer Science
Prerequisite: Documentation of work experience as required for years 1 to 3
Contact time: 1 ppw 1 dpw
Period of presentation: Year
Language of instruction: Double medium
Credits: 28
Module content:
During the first to fourth years of study, students must complete a total of 480 hours experiential training in the industry to develop practical and occupational skills, participate in community engagement and provide service learning. This is equal to 3 weeks x 40 hours (120 hours) per year, according to requirements as determine by the head of department. These credits must be successfully completed together with a complete portfolio before the degree will be conferred.

KVK 420 Small stock science 420
Academic organisation: Animal and Wildlife Sciences
Prerequisite: RPL 320, VGE 301 and VKU 220
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: English
Credits: 12
Module content:
Small stock management, shearing organisation, sheds and equipment, pens, dipping, drinking and feeding facilities. Preparation and marketing of hides, wool, mohair and karakul. Lambing seasons and herd management. Management programmes for the production of wool, meat, karakul pelt and mohair according to the particular ecological region and for conditions of drought. Herd health programmes.
LBU 260 Agroclimatology 260  
**Academic organisation:** Plant Production and Soil Science  
**Contact time:** 2 lpw fortnightly practicals  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 12  
**Module content:**  
*This module may only be taken by students enrolled for a BScAgric programme.*  

LEK 220 Agricultural economics 220  
**Academic organisation:** Agricultural Economics, Extension and Rural Development  
**Prerequisite:** [LEK 251 and LEK 252] or [EKN 113 and/or EKN 120]  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Double medium  
**Credits:** 12  
**Module content:**  
The agribusiness system; the unique characteristics of agricultural products; marketing functions and costs; market structure; historical evolution of agricultural marketing in South Africa. Marketing environment and price analysis in agriculture: Introduction to supply and demand analysis. Marketing plan and strategies for agricultural commodities; market analysis; product management; distribution channels for agricultural commodities, the agricultural supply chain, the agricultural futures market.

LEK 251 Introduction to financial management in agriculture 251  
**Academic organisation:** Agricultural Economics, Extension and Rural Development  
**Contact time:** 3 lpw  
**Period of presentation:** Quarter 1  
**Language of tuition:** Double medium  
**Credits:** 6  
**Module content:**  
Introduction to financial management in agriculture: Farm management and agricultural finance, farm management information; analysis and interpretation of farm financial statements; risk and farm planning. Budgets: partial, break-even, enterprise, total, cashflow and capital budgets. Time value of money.

LEK 252 Introduction to agricultural production economics 252  
**Academic organisation:** Agricultural Economics, Extension and Rural Development  
**Prerequisite:** LEK 251  
**Contact time:** 3 lpw  
**Period of presentation:** Quarter 2  
**Language of tuition:** Double medium  
**Credits:** 6  
**Module content:**  
LEK 310 Agricultural economics 310
Academic organisation: Agricultural Economics, Extension and Rural Development
Prerequisite: [LEK 251 or EKN 110] and [LEK 252 or EKN 120]
Contact time: 3 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 12
Module content:

LEK 320 Agricultural economics 320
Academic organisation: Agricultural Economics, Extension and Rural Development
Prerequisite: LEK 220, LEK 251 and LEK 252
Contact time: 3 lpw 2 ppw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 18
Module content:
The modern food and agribusiness system: The financing decision: capital acquisition, different capital sources, capital structures. The investment decision and working capital management. Strategic marketing. Operational management and human resources management.

LEK 415 Agricultural economics 415
Academic organisation: Agricultural Economics, Extension and Rural Development
Prerequisite: EKN 110, LEK 220 and WTW 134
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 18
Module content:
Derivative instruments in agriculture: To prepare students for taking the SAFEX Agricultural Markets Division brokerage exam. Giving an in-depth knowledge on the importance of hedging. Giving an in-depth knowledge on designing and implementation of low/zero-risk hedging strategies. Introduction to the mathematics of portfolio management and mathematical modelling of derivatives. Working knowledge of the mathematical relationships in the management of a hedged portfolio. Working knowledge on the applicable software for managing derivative portfolios. Introduction into the management of option portfolios. To expand the thinking on the uses of derivatives, by also dealing with the hedging of diesel cost, interest rates and weather events.

LEK 421 Agricultural economics 421
Academic organisation: Agricultural Economics, Extension and Rural Development
Prerequisite: LEK 451, STK 210 and STK 281
Contact time: 3 lpw 2 ppw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 24
Module content:
Price and production function analysis. Input-output, input-input and product-product relationships; profit maximisation; the production process through time, economies of size; decision making in agriculture under risk and uncertain circumstances; linear programming.
LEK 424 Introduction to resource economics 424
Academic organisation: Agricultural Economics, Extension and Rural Development
Prerequisite: LEK 251 and LEK 252
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: English
Module content: This module reviews the origins and evolution of natural and environmental resource economics and its present-day main paradigms. Sources of externalities and causes of environmental degradation are examined. An introduction to the concepts and methods backing the design and implementation of environmental policies are provided. Economic valuation of natural and environmental resources is introduced.

LEK 451 Agricultural demand-and-supply analysis 451
Academic organisation: Agricultural Economics, Extension and Rural Development
Prerequisite: LEK 220, LEK 252 and STK 281
Contact time: 3 lpw 2 ppw
Period of presentation: Quarter 1
Language of tuition: Double medium
Module content: This module will focus on the demand and supply shifters as well as the elasticities, flexibilities, and impact multipliers. After providing an appropriate background in the theoretical concepts of demand and supply these basics will be applied in the generation of econometric simulation models. Practical experience in the formulation of these models will be attained from practical sessions. The student will submit a project in which he/she must analyse the demand or supply patterns of a commodity of his/her choice by generating an econometric model.

LEK 452 Commodity price analysis 452
Academic organisation: Agricultural Economics, Extension and Rural Development
Prerequisite: LEK 220, LEK 252, LEK 451 and STK 281
Contact time: 3 lpw 2 ppw
Period of presentation: Quarter 2
Language of tuition: Double medium
Module content: This module will focus primarily on price determination under different market structures, which will be followed by practical sessions on measuring market structures in various ways. This will include the calculation of market concentration. Some time will also be spent on measuring price changes by using indexes, and especially seasonal indexing. All of this will be supported by the relevant practical sessions. The relevance of changes to the main macroeconomic indicators will be discussed throughout this module.

LKM 450 Environmental biophysics 450
Academic organisation: Plant Production and Soil Science
Prerequisite: WTW 134
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Module content: Environmental variables. Quantitative description and measurement of atmospheric environmental variables and water in organisms. Mass and energy fluxes. Quantitative
description of energy fluxes in organisms' environments. Energy balances of animals and plant communities will be derived.

**LST 133 Language, life and study skills 133**  
**Academic organisation:** Natural and Agricultural Sciences Dean's Office  
**Prerequisite:** As for Four-year programme  
**Contact time:** 1 lpw 3 dpw Foundation Course  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 8  
**Module content:**  
In this module students use different information and time management strategies, build academic vocabulary, revise basic grammar concepts and dictionary skills, examine learning styles, memory and note-taking techniques, practise academic reading skills and explore basic research and referencing techniques, learn how to use discourse markers and construct definitions, and are introduced to paragraph writing. The work is set in the context of the students’ field of study.

**LST 143 Language, life and study skills 133**  
**Academic organisation:** Natural and Agricultural Sciences Dean's Office  
**Prerequisite:** LST 133  
**Contact time:** 1 lpw 3 dpw Foundation Course  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 8  
**Module content:**  
In this module students learn how to interpret and use visual literacy conventions. Students write more advance paragraphs, and also learn how to structure academic writing, how to refine their use of discourse markers and referencing techniques and how to structure their own academic arguments. Students' writing is expected to be rational, clear and concise. As a final assignment all aspects of the LST 133 and LST 143 modules are combined in a research assignment. In this project, students work in writing teams to produce a chapter on a career and to present an oral presentation of aspects of the chapter. The work is set in the context of the students’ field of study.

**MBY 161 Introduction to microbiology 161**  
**Academic organisation:** Microbiology and Plant Pathology  
**Prerequisite:** MLB 111 GS  
**Contact time:** 2 lpw 1 ppw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 8  
**Module content:**  
The module will introduce the student to the field of Microbiology. Basic microbiological aspects that will be covered include introduction into the diversity of the microbial world (bacteria, archaea, eukaryotic microorganisms and viruses), basic principles of cell structure and function, microbial nutrition and microbial growth and growth control. Applications in microbiology will be illustrated by specific examples i.e. bioremediation, animal-microbial symbiosis, plant-microbial symbiosis and the use of microorganisms in industrial microbiology. Wastewater treatment, microbial diseases and food will be introduced using specific examples.

**MBY 251 Bacteriology 251**  
**Academic organisation:** Microbiology and Plant Pathology  
**Prerequisite:** MBY 161 GS
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 12
Module content:

MBY 261 Mycology 261
Academic organisation: Microbiology and Plant Pathology
Prerequisite: MBY 161
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 12
Module content:
Organisation and molecular architecture of fungal thalli, chemistry of the fungal cell. Chemical and physiological requirements for growth and, nutrient acquisition. Mating and meiosis; spore development; spore dormancy, dispersal and germination. Fungi as saprobies in soil, air, plant, aquatic and marine ecosystems; role of fungi as decomposers and in the deterioration of materials; fungi as predators and parasites; mycoses, mycetisms and mycotoxicoses; fungi as symbionts of plants, insects and animals. Applications of fungi in biotechnology.

MBY 262 Food microbiology 262
Academic organisation: Microbiology and Plant Pathology
Prerequisite: MBY 251
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 12
Module content:
Primary sources of microorganisms in food. Factors affecting the growth and survival of micro-organisms in food. Microbial quality, spoilage and safety of food. Different organisms involved, their isolation, screening and detection. Conventional approaches, alternative methods; rapid methods. Food fermentations: fermentation types, principles and organisms involved.

MBY 351 Virology 351
Academic organisation: Microbiology and Plant Pathology
Prerequisite: [BCM 253 and BCM 254] and CMY 127 and MBY 161
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 18
Module content:
Introduction to the viruses as a unique kingdom inclusive of their different hosts, especially bacteria, animals and plants; RNA and DNA viruses; viroids, tumour viruses and oncogenes, mechanisms of replication, transcription and protein synthesis; effect on hosts; viral immunology; evolution of viruses.
MBY 352 Environmental microbiology 352  
**Academic organisation:** Microbiology and Plant Pathology  
**Prerequisite:** MBY 161  
**Contact time:** 2 lpw 1 ppw  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  
Basic principals in microbial ecology; microbial evolution, microbial interactions, ecossystems and communities, gene transfer, abiotic factors and extreme environments, microbial habitats which include air, water, soil, man, insects, animals and plants. The role of micro-organisms in biogeochemical cycling and microbial food webs. Potential exploitation of extreme environments, organisation of native populations in extreme environments, ecological aspects of deterioration control, soil, waste and water management.

MBY 353 Vertebrate-microbe interaction 353  
**Academic organisation:** Microbiology and Plant Pathology  
**Prerequisite:** MBY 251  
**Contact time:** 2 lpw 1 ppw  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  
Normal interactions between humans or animals and micro-organisms; Host-pathogen interactions; Principles of pathogenesis; Important infectious diseases of man and animals; Principles of diagnostics; Introduction to epidemiology.

MBY 354 Veterinary virology 354  
**Academic organisation:** Microbiology and Plant Pathology  
**Prerequisite:** [BCM 253 and BCM 254] and CMY 127 and MBY 161  
**Contact time:** 2 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 9  
**Module content:**  
*Capita selecta only for BVSc programme*  
Introduction to viruses important in veterinary science; mechanisms of virus replication, transcription and protein synthesis; effect on hosts; viral immunology; epidemiology and evolution of viruses; prions; diagnoses and control of viral diseases and viral vaccines.

MBY 355 Bacterial genetics 355  
**Academic organisation:** Microbiology and Plant Pathology  
**Prerequisite:** [BCM 253 and BCM 254] and CMY 127 and MBY 161  
**Contact time:** 2 lpw 1 ppw  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  
MBY 361 Trends in microbiology 361
Academic organisation: Microbiology and Plant Pathology
Prerequisite: [BCM 253 and BCM 254] and GTS 261 and MBY 251
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:
Biotechnological advances and gene-based innovations in microbiology: Microbial diagnostics and epidemiology; microbial biosensors; vaccinology and therapeutic agents; biological control of plant pathogens; microbial diversity and bioprospecting; and bioremediation. Regulation, intellectual property rights and patenting in biotechnology.

MBY 362 Food microbiology 362
Academic organisation: Microbiology and Plant Pathology
Prerequisite: MBY 251
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:

MBY 363 Molecular biology of prokaryotes 363
Academic organisation: Microbiology and Plant Pathology
Prerequisite: [BCM 253 and BCM 254] and CMY 127 and MBY 161
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:

MBY 364 Genetic manipulation of microbes 364
Academic organisation: Microbiology and Plant Pathology
Prerequisite: [BCM 253 and BCM 254] and CMY 127 and MBY 161
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English  
Credits: 18

Module content:
Isolation of clonable DNA (genomic libraries, cDNA synthesis) cloning vectors (plasmids, bacteriophages, cosmids) plasmid incompatibility and control of copy number. Ligation of DNA fragments, modification of DNA end and different ligation strategies. Direct and indirect methods for the identification of recombinant organisms. Characterisation (polymerase chain reaction, nucleic acid sequencing) and mutagenesis of cloned DNA fragments. Gene expression in Gram negative (E.coli) Gram positive (B.subtilis) and yeast cells (S.cerevisea). Use of Agrobacterium and baculoviruses for gene expression in plant and insect cells respectively. Applications in protein engineering, diagnostics and synthesis of useful products.

MBY 365 Microbe interactions 365
Academic organisation: Microbiology and Plant Pathology
Prerequisite: MBY251, MBY261 and MBY351
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English  
Credits: 18

Module content:
Interactions between microbes and their abiotic environment; microbial interaction with other strains of the same and other species; microbial interactions across kingdoms; pathogenic interactions between microbes and plant or animal hosts; mutualistic interactions between microbes and their hosts; introduction to systems biology.

MLB 111 Molecular and cell biology 111
Academic organisation: Genetics
Prerequisite: Refer to Regulation 1.2
Contact time: 4 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium  
Credits: 16

Module content:
Introductory study of the ultra structure, function and composition of representative cells and cell components. General principles of cell metabolism, molecular genetics, cell growth, cell division and differentiation.

MLB 133 Molecular and cell biology 133
Academic organisation: Plant Science
Prerequisite: As for BSc (Four-year programme)
Contact time: 2 lpw 2 ppw 2 dpw Foundation Course
Period of presentation: Semester 1
Language of tuition: English  
Credits: 8

Module content:
The scientific method, the meaning of life, principles of microscopy, introduction to taxonomy and systematics, introductory study of the structure, function and composition of akaryotes, HIV/aids, the immune system and other health issues, ecosystems and human interference.

MLB 143 Molecular and cell biology 143
Academic organisation: Plant Science
Prerequisite: MLB 133
Contact time: 2 lpw 2 ppw 2 dpw Foundation Course
Period of presentation: Semester 2
Language of tuition: English  
Credits: 8
Module content:
Chemistry of the cell, introduction to the structure, function and composition of prokaryotic and eukaryotic cells, energy and cellular metabolism, photosynthesis.

MLB 153 Molecular and cell biology 153

Academic organisation: Genetics
Prerequisite: MLB 143
Contact time: 2 lpw 2 ppw 2 tpw Foundation Course
Period of presentation: Semester 1
Language of tuition: English Credits: 8

Module content:
Cell growth and cell division, Mendelian and human genetics, principles of molecular genetics, principles of recombinant DNA technology and its application.

MTT 210 Furniture and textile history 210

Academic organisation: Consumer Science
Contact time: 3 lpw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 12

Module content:
Influences of ideologies, social institutions and technology on the development of Western and other material cultures, especially on furniture and textiles. Style periods from Egyptian to the French Revolution.

MTT 220 Furniture and textile history 220

Academic organisation: Consumer Science
Prerequisite: MTT 210 GS
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Double medium Credits: 12

Module content:
Influences of ideologies, social institutions and technology on the development of Western and other material cultures, especially on furniture and textiles. Style periods from early nineteenth century to the present.

OBG 111 Design principles 111

Academic organisation: Consumer Science
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 7

Module content:
An introduction to the elements and principles of design as is applicable to interior and clothing design and food preparation. Colour theory.

OKW 413 Weed science 413

Academic organisation: Plant Production and Soil Science
Prerequisite: PLG 251
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng Credits: 14

Module content:
Identification of important weeds of crops, gardens and recreational areas.

**OPI 400 Experiential training in industry 400**
**Academic organisation:** Consumer Science
**Prerequisite:** Documentation of work experience as required for years 1 to 3
**Contact time:** 1 ppw
**Period of presentation:** Year
**Language of instruction:** Double Medium  
**Credits:** 28

**Module content:**
During the first to fourth years of study students must complete a total of 600 hours experiential training in the industry to develop practical and occupational skills, participate in community engagement and provide service learning. This is equal to 3 weeks x 40 hours (120 hours) per year for the first to third year and 6 weeks x 40 hours in the fourth year to include event management, according to requirements as determined by the head of department. These credits must be successfully completed together with a complete portfolio before the degree will be conferred. Please note: Various practical and industry-interaction activities support the theoretical component of VDS414 & VDS 424, VDS413 and FST 413 and take place after hours to develop practical and industry skills.

**OPI 480 Experiential training in industry 480**
**Academic organisation:** Consumer Science
**Contact time:** 1 dpw
**Period of presentation:** Year
**Language of tuition:** Double medium  
**Credits:** 6

**Module content:**
Experiential training in the industry: During the four years of study, during holidays, weekends and after hours, students must complete a total of 480 hours experiential training in the industry to develop practical and occupational skills. This is equal to 3 weeks x 40 hours (120 hours) per year, according to requirements as determine by the head of department. This training must be successfully completed together with a complete portfolio before the degree will be conferred.

**PGB 410 Project: Research methodology 410**
**Academic organisation:** Consumer Science
**Prerequisite:** Final-year status
**Contact time:** 2 lpw
**Period of presentation:** Semester 1
**Language of tuition:** Double medium  
**Credits:** 10

**Module content:**
Research methodology. Planning, executing and reporting a research project in hospitality management.

**PGB 420 Project: Hospitality management 420**
**Academic organisation:** Consumer Science
**Prerequisite:** PGB 410 and Final-year status
**Contact time:** 4 lpw
**Period of presentation:** Semester 2
**Language of tuition:** Double medium  
**Credits:** 20

**Module content:**
Research methodology. Planning, executing and reporting a research project in Hospitality Management.

**PGW 350 Soil-water relationship and irrigation 350**  
**Academic organisation:** Plant Production and Soil Science  
**Prerequisite:** GKD 250  
**Contact time:** 2 lpw fortnightly practicals  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 16

**Module content:**

**PGW 400 Seminar 400**  
**Academic organisation:** Plant Production and Soil Science  
**Contact time:** 1 lpw 3 spw  
**Period of presentation:** Year  
**Language of tuition:** Both Afr and Eng  
**Credits:** 20

**Module content:**
Basic principles of the scientific process. Literature accessing and article assessment. Manuscript preparation and presentation of seminars. Basic instruction on the use of visual aids, etc for effective oral presentations.

**PGW 421 Experimental design and analysis 421**  
**Academic organisation:** Plant Production and Soil Science  
**Prerequisite:** BME 120  
**Contact time:** 2 lpw fortnightly practicals  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 14

**Module content:**
Basic experimental designs. Measurement and control over experimental error. Factorial experiments and interactions. Analysis of variance (ANOVA) and data interpretation.

**PHY 114 First course in physics 114**  
**Academic organisation:** Physics  
**Prerequisite:** Refer to Regulation 1. 2  
**Contact time:** 4lpw 1ppw 1bpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Double medium  
**Credits:** 16

**Module content:**

**PHY 124 First course in physics 124**  
**Academic organisation:** Physics  
**Prerequisite:** WTW 114 GS and PHY 114 GS  
**Contact time:** 4lpw 1ppw 1 bpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Double medium  
**Credits:** 16  
**Module content:**  

**PHY 131 Physics for Biology students 131**  
**Academic organisation:** Physics  
**Prerequisite:** Refer to Regulation 1.2  
**Contact time:** 4lpw 1ppw 1 dpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Double medium  
**Credits:** 16  
**Module content:**  
Units, vectors, one dimensional kinematics, dynamics, work, equilibrium, sound, liquids, heat, thermodynamic processes, electric potential and capacitance, direct current and alternating current, optics, modern physics, radioactivity.

**PHY 133 Physics 133**  
**Academic organisation:** Physics  
**Prerequisite:** As for BSc (Four-year programme)  
**Contact time:** 2 lpw 2 ppw 2 dpw Foundation Course  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 8  
**Module content:**  

**PHY 141 General physics 141**  
**Academic organisation:** Physics  
**Prerequisite:** PHY 131 GS as well as 50% minimum for the practical component of PHY 131 or TDH  
**Contact time:** 1 lpw 2 tpw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 16  
**Module content:**  
*This is an anti-semester presentation of the module PHY 131 General Physics 131. Refer to PHY 131 for the content description. Students will not be credited for both PHY 131 and PHY 141 for degree purposes.*
PHY 143 Physics 143  
**Academic organisation:** Physics  
**Prerequisite:** PHY 133  
**Contact time:** 2 lpw 2 ppw 2 dpw Foundation Course  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 8  
**Module content:**  

PHY 144 Physics 144  
**Academic organisation:** Physics  
**Prerequisite:** PHY 133  
**Contact time:** 2 lpw 2 ppw 2 dpw Foundation Course  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 8  
**Module content:**  

PHY 153 Physics 153  
**Academic organisation:** Physics  
**Prerequisite:** PHY 143  
**Contact time:** 3 lpw 2 ppw 2 dpw Foundation Course  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 8  
**Module content:**  

PHY 154 Physics 154  
**Academic organisation:** Physics  
**Prerequisite:** PHY 143  
**Contact time:** 4 lpw 1 ppw Foundation Course  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 8  
**Module content:**  
The main topics in this module are Electricity, Sound, Optics, and Modern Physics. Static Electricity: Electric charge and force, electric field, the electric energy, electric potential, conservation of electrical energy. Flow of charge: Capacitors, application of charge flow to nerves.
Sound: Vibrations, waves in unconfined and confined media, applications to human hearing.
Optics: Reflection, refraction, applications to optometry and ophthalmology.
Atomic physics: Atomic models, x-rays.
Nuclear physics: The stable atomic nucleus, radioactivity, nuclear spin and applications to medical diagnostics.

**PHY 163 General physics 163**

**Academic organisation:** Physics

**Prerequisite:** PHY 153

**Contact time:** 4 lpw 1 ppw 1 tpw Foundation Course

**Period of presentation:** Semester 2

**Language of tuition:** Double medium

**Credits:** 8

**Module content:**

*This module corresponds with the module PHY 124.
The four modules PHY 133, PHY 143, PHY 153 and PHY 163 are equivalent to PHY 114 and PHY 124.


**PHY 255 Waves, thermodynamics and modern physics 255**

**Academic organisation:** Physics

**Prerequisite:** [PHY114 & PHY124] or [PHY171] or [PHY143 & PHY153 & PHY163] and [WTW211#] and [WTW218#]

**Contact time:** 4 lpw 1 ppw 2 dpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 24

**Module content:**

Vibrating systems and waves (14 lectures)

Modern physics (30 lectures)

Heat and thermodynamics (12 lectures)

Modelling and simulation (7 practical sessions)
Introduction to programming in a high level system: Concept of an algorithm and the
basic logic of a computer programme. Symbolic manipulations, graphics, numerical computations. Applications: Selected illustrative examples.
Error analysis (7 practical sessions)

**PHY 263 Classical mechanics, materials and optics 263**

**Academic organisation:** Physics

**Prerequisite:** PHY 255 GS and WTW 218 GS and WTW 220 # and WTW 248 #

**Contact time:** 4 lpw 1 ppw 2 dpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 24

**Module content:**
Classical mechanics (28 lectures)
Fundamental concepts, energy and angular momentum, calculus of variations and Lagrangian mechanics, conservative central forces and two body problems, scattering, mechanics in rotating reference frames, many body systems.
Physical optics (14 lectures)
Maxwell’s equations, wave equation and plane wave solution, coherence, interference, diffraction, polarisation.
Physics of materials (14 lectures)
Experiments (14 sessions)

**PHY 353 Physics project 353**

**Academic organisation:** Physics

**Prerequisite:** TDH

**Contact time:** 3 ppw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 12

**Module content:**
*Cannot be used as substitute for other Physics 300 modules to obtain admission to the BScHons in Physics.
A student is required to complete a project under guidance of the lecturer. The nature of the project is determined jointly by the student, lecturer and the head of department.

**PHY 356 Electronics, electromagnetism and quantum mechanics 356**

**Academic organisation:** Physics

**Prerequisite:** PHY255 GS and PHY263 GS and WTW211 GS and WTW218 GS and WTW220 GS and WTW248 GS

**Contact time:** 4 lpw 2 ppw 2 dpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 36

**Module content:**
Electronics (14 lectures)
Electromagnetism (21 lectures)
Electrostatics: Coulomb’s law, divergence and curl of $E$, Gauss’ law, Laplace’s equation, image charge problems, multipole expansion.
Magnetostatics: Lorenz force, Biot-Savart law, divergence and curl of magnetic field strength, Ampère’s law, magnetic vector potential, multipole expansion, boundary conditions.
Electrodynamics: Electromotive force, electromagnetic induction, Maxwell’s equations, wave equation.
Electric and magnetic fields in matter: Polarisation, electric displacement and Gauss’s law in dielectrics, linear dielectrics. Magnetisation (diamagnets, paramagnets, ferromagnets), auxiliary field $H$ and Ampère’s law in magnetised materials, linear and nonlinear media.
Quantum mechanics (28 lectures)
The Schrödinger equation, the statistical interpretation of the wavefunction, momentum, the uncertainty principle, the time-independent Schrödinger equation, stationary states, the infinite square well potential, the harmonic oscillator, the free particle, the Delta-Function potential, the finite square well potential, Hilbert spaces, observables, eigenfunctions of a Hermitian operator, Dirac notation, the Schrödinger equation in spherical coordinates, the hydrogen atom, angular momentum spin.

PHY 363 Physics project 363
Academic organisation: Physics
Prerequisite: TDH
Contact time: 3 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 12
Module content:
*PHY 363 cannot be used as substitute for other Physics 300 modules to obtain admission to the BScHons in Physics.
A student is required to complete a project under guidance of the lecturer. The nature of the project is determined jointly by the student, lecturer and the head of department.

PHY 364 Statistical mechanics, solid state physics and modelling 364
Academic organisation: Physics
Prerequisite: PHY356 GS and WTW211 and WTW218 and WTW220 GS and WTW248 GS
Contact time: 4 lpw 2 ppw 2 dpw
Period of presentation: Semester 2
Language of tuition: English
Credits: 36
Module content:
Statistical mechanics (28 lectures)
Isolated systems in thermodynamical equilibrium. Systems in equilibrium with a heat bath: the canonical ensemble, Gibbs’ entropic formula, classical statistical mechanics, energy equipartition theorem, thermodynamic potentials, paramagnetism. The classical limit of perfect gases: non-distinguishable character of quantum particles, the equation of state of the classical ideal gas. Quantum perfect gases: Black body radiation, the grand canonical ensemble, Fermi-Dirac distribution, the free electron gas in metals, the Bose-Einstein distribution, Bose-Einstein condensation.
Solid state physics (28 lectures)
Crystal structures, the reciprocal lattice, x-ray diffraction, lattice vibration, the Debye model, characteristics of solids, the free electron model, Pauli paramagnetism, electronic heat capacity, the relaxation time, electrical conduction, the classical Hall effect, thermal conduction in metals, failures of the free electron model, the independent electron model, band theory of solids.
Computational physics and modelling. Assessment will be done through a portfolio of project reports. The topics for the projects will be selected from various subdisciplines of Physics.

**PLG 251 Introduction to crop protection 251**
*Academic organisation:* Microbiology and Plant Pathology  
*Contact time:* 2 lpw 1 ppw  
*Period of presentation:* Semester 1  
*Language of tuition:* Double medium  
**Credits:** 12  
**Module content:**  

**PLG 262 Principles of plant pathology 262**  
*Academic organisation:* Microbiology and Plant Pathology  
*Prerequisite:* MBY 161  
*Contact time:* 2 lpw 1 ppw  
*Period of presentation:* Semester 2  
*Language of tuition:* Double medium  
**Credits:** 12  
**Module content:**  

**PLG 351 General plant pathology 351**  
*Academic organisation:* Microbiology and Plant Pathology  
*Prerequisite:* MBY161, MBY261 and PLG262  
*Contact time:* 2 lpw 1 ppw  
*Period of presentation:* Semester 1  
*Language of tuition:* Double medium  
**Credits:** 18  
**Module content:**  
Principles and examples of plant diseases and their socio-economic importance. Current trends in plant pathology such as biosecurity, sanitary and phytosanitary issues of trade. Risk asessment and international food safety standards. The use of global information systems to assess disease spread and impact of global warming. Supply chain analysis, postharvest technology and food trade aspects.

**PLG 363 Plant disease control 363**  
*Academic organisation:* Microbiology and Plant Pathology  
*Prerequisite:* PLG 251 or PLG 262 or TDH. MBY 261 is recommended  
*Contact time:* 2 lpw 1 ppw  
*Period of presentation:* Semester 2  
*Language of tuition:* Double medium  
**Credits:** 18  
**Module content:**  
PLG 364 Host pathogen interactions 364
Academic organisation: Microbiology and Plant Pathology
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:
Includes fungal, bacterial and viral interactions. Focuses on molecular and cellular events occurring during recognition, during fungal evasion of the host’s defence mechanisms and during disease symptom development. Topics discussed will also include cell biology of interactions, systemic acquired resistance and the role of pathogenesis related proteins and toxins in pathogenesis. Basic aspects of plant disease epidemiological theory and concepts. Introduction to equipment and techniques used in epidemiological research as well as practical applications of epidemiology in plant disease management.

PLG 462 Research project 462
Academic organisation: Microbiology and Plant Pathology
Contact time: 1 lpw 1 ppw
Period of presentation: Year
Language of tuition: Double medium
Credits: 30
Module content:
A practical research project of limited extent under the supervision of one of the lecturers in plant pathology within the department. Any topic in plant pathology can be selected.

PLG 463 Plant disease epidemiology 463
Academic organisation: Microbiology and Plant Pathology
Prerequisite: PLG 251, PLG 262 and PLG 363
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:
Understanding of how plant disease epidemics occur in nature and how they can be monitored and analysed. In-depth knowledge how of plant diseases cause crop losses, how these losses are quantified, and how losses are predicted. Examples of how epidemiology is used to set the strategy of plant disease control. Use of some statistical procedures for quantifying and comparing epidemics.

PLG 483 Advanced plant disease control 483
Academic organisation: Microbiology and Plant Pathology
Prerequisite: PLG 363 or TDH
Contact time: 1 ppw 2 dpw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 18
Module content:
Advanced aspects of chemical and biological control of plant diseases as well as disease resistance.

PLG 490 Current concepts in plant pathology 490
Academic organisation: Microbiology and Plant Pathology
Prerequisite: Third-year status or TDH
Contact time: 2 lpw 1 dpw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 18
Module content:
This module will address the most recent concepts in plant pathology.

PPK 251 Sustainable production systems 251
Academic organisation: Plant Production and Soil Science
Prerequisite: BOT 161
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng Credits: 12
Module content:

PVK 420 Poultry science 420
Academic organisation: Animal and Wildlife Sciences
Prerequisite: VGE 301 and VKU 220
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 1
Language of tuition: English Credits: 12
Module content:

RPL 310 Reproduction science 310
Academic organisation: Animal and Wildlife Sciences
Prerequisite: DAF 200
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English Credits: 8
Module content:
Theriogenology, spermatogenesis, zoogenesis, the female sexual cycle. Species differences. Hormonal control of the sexual functions.

RPL 320 Reproduction science 320
Academic organisation: Animal and Wildlife Sciences
Prerequisite: RPL 310
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English Credits: 10
Module content:

SCI 154 Exploring the universe 154
Academic organisation: Physics
Contact time: 4 lpw
Period of presentation: Semester 1  
Language of tuition: English  
Credits: 16

Module content:
The content of this module is the same as SCI 164 and students are not allowed to register for both SCI 154 and SCI 164. Students from all faculties are welcome to join us in our exploration of the universe from an earth-bound perspective. We reflect on the whole universe from the sub-microscopic to the vast macroscopic and mankind’s modest position therein. To what degree is our happiness determined by stars? Echo's from ancient firmaments – the astronomy of old civilisations. The universe is born with a bang. Stars, milky ways and planets are formed. Life is breathed into the landscape on earth, but is there life elsewhere? The architecture of the universe – distance measurements, structure of our solar system and systems of stars. How does it look like on neighbouring planets? Comets and meteorites. Life cycles of stars. Spectacular exploding stars! Exotica like pulsars and black holes.

SCI 164 Exploring the universe 164
Academic organisation: Physics
Contact time: 4 lpw  
Period of presentation: Semester 2  
Language of tuition: Afrikaans  
Credits: 16

Module content:
*This module is presented in Afrikaans only. See SCI 154 for a summary of the module content. The content of this module is the same as SCI 154 and students are not allowed to register for both SCI 154 and SCI 164.

SEM 381 Seminar 381
Academic organisation: Consumer Science
Prerequisite: Third-year status
Contact time: 1 lpw  
Period of presentation: Semester 2  
Language of tuition: Double medium  
Credits: 5

Module content:
Introduction to research methodology.

SGM 210 Geomaterials and processes 210
Academic organisation: Geology
Contact time: 4 lpw 3 ppw  
Period of presentation: Semester 1  
Language of tuition: Both Afr and Eng  
Credits: 16

Module content:
Solar system; Earth structure and systems; plate tectonics; classification and contextual setting of rocks and minerals; rock cycle. Internal and external geological processes; landscape formation; influences of geological environment on mankind. Geological time and the Earth’s history through time. Practicals involving identification and description of crystals, minerals and rocks.

SUR 210 Surveying 210
Academic organisation: Geography, Geoinformatics and Meteorology
Contact time: 3 lpw 4 ppw  
Period of presentation: Semester 1  
Language of tuition: Double medium  
Credits: 16

SUR 220 Surveying 220
Academic organisation: Geography, Geoinformatics and Meteorology
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 16


TKS 212 Textiles: Utility, fibres and yarns 212
Academic organisation: Consumer Science
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 14

Module content: Utility aspects: basic components of textiles, consumer decision making, utility aspects that include durability, comfort, maintenance, health/safety/protection and aesthetic aspects. Fibres and yarns: Fibre structure and performance including textile chemistry, fibre morphology and formation, fibre properties, classification and identification. Yarn structure and performance (including spun yarns, filament yarns, compound and novelty yarns).

TKS 222 Textiles: Structures and finishes 222
Academic organisation: Consumer Science
Prerequisite: TKS 212 GS
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 10


TKS 310 New developments and textiles in use 310
Academic organisation: Consumer Science
Prerequisite: TKS 212 and TKS 222 GS
Contact time: 2 lpw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 10

TKS 411 New developments, sustainability and textiles in use 411
Academic organisation: Consumer Science
Prerequisite: TKS 212 and TKS 222
Contact time: 2 lpw 1ppw
Period of presentation: Semester 1
Language of tuition: Double medium  Credits: 13
Module content:
New developments (apparel textiles). Textile product use and basic physical quality testing procedures. Impact of textiles on the environment and sustainability.

TKS 421 Textiles: marketing and consumer aspects 421
Academic organisation: Consumer Science
Prerequisite: TKS 212, TKS 222 and TKS 310
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Double medium  Credits: 15
Module content:
Clothing textiles and textile products from a marketing and consumer perspective. Practical project: Project to assess performance properties of textiles for specific end use by using laboratory tests. A written report of the results is also required.

TLR 320 Animal breeding 320
Academic organisation: Animal and Wildlife Sciences
Prerequisite: GTS 261
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: English  Credits: 10
Module content:

TLR 411 Animal breeding 411
Academic organisation: Animal and Wildlife Sciences
Prerequisite: TLR 320 and simultaneously register for GVK 420, PVK420, KVK420 and VKD 410
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 1
Language of tuition: English  Credits: 12
Module content:

TLR 420 Animal breeding 420
Academic organisation: Animal and Wildlife Sciences
Prerequisite: TLR 411
Formulation and application of breeding objectives. Animal recording systems and international guidelines for evaluation. Species-specific breeding systems. Breeding objectives and selection programmes for beef and dairy cattle, small stock, poultry, pigs and companion animals. Selection of traits of economic importance and the efficiency thereof. Cross-breeding systems in meat-producing farm animals. Breed development.

TRN 213 Site surveying 213
Academic organisation: Geography, Geoinformatics and Meteorology
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 12
Module content:
General surveying; instruments, their handling and adjusting; surveying systems and simple calculations; determining of levels; setting out of the works; tacheometry and plotting; scales, planimetry; areas and volumes; construction surveying; aerial photography.

VBF 411 Consumer facilitation 411
Academic organisation: Consumer Science
Contact time: 2 lpw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 10
Module content:

VDB 321 Food service management 321
Academic organisation: Consumer Science
Prerequisite: Natural and Agricultural Sciences students: VDS 322 #
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 18
Module content:
Planning and layout of food service units for different food service systems. Equipment for food services. Factors influencing the choice and purchasing of equipment for different food service units. Hygiene and safety in food services. Management in food service systems. Financial management in food services.

VDB 410 Food service management 410
Academic organisation: Consumer Science
Prerequisite: VDB 321 GS
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 24
Module content:
The professional food service manager's roles, responsibilities and characteristics.
Contemporary leadership and management styles in food service systems. Professionalism and ethics. Advanced food service systems and production management techniques. Marketing of food services.

**VDB 420 Food service management 420**

**Academic organisation:** Consumer Science  
**Prerequisite:** VDB 320 and VDB 321 GS  
**Contact time:** 3 lpw 1 ppw  
**Period of presentation:** Semester 1  
**Language of tuition:** Double medium  
**Credits:** 21  
**Module content:**  
The professional food service manager’s roles, responsibilities and characteristics. Contemporary leadership and management styles in food service systems. Professionalism and ethics. Advanced food service systems and production management techniques. Marketing of food services.

**VDG 220 Nutrition 220**

**Academic organisation:** Consumer Science  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Double medium  
**Credits:** 12  
**Module content:**  
Integration of natural science concepts basic to the study of human nutrition. Cell and tissue; energy metabolism and balance; body temperature; cardiovascular system; kidneys and acid-base equilibrium.

**VDG 260 Nutrition 260**

**Academic organisation:** Animal and Wildlife Sciences  
**Prerequisite:** CMY 127  
**Contact time:** 3 lpw 1 ppw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 12  
**Module content:**  
Nutrition in the context of growth, development and composition of organisms. Metabolic processes and control in the body. Overview of nutritional processes. The study of the fundamental principles of nutrient metabolism (including macro- and micro-nutrients and water) and digestion physiology. Applications are made regarding man and animals. Practical work: Experimental work and problem-orientated tasks.

**VDG 311 Nutrition 311**

**Academic organisation:** Consumer Science  
**Prerequisite:** [FSG 110 and FSG 120] or VDG 220  
**Contact time:** 3 lpw 1 ppw  
**Period of presentation:** Semester 1  
**Language of tuition:** Double medium  
**Credits:** 17  
**Module content:**  
The study of nutrients and water regarding their chemical composition, characteristics, basic digestion, absorption, metabolism, functions, food sources and symptoms of deficiency and toxicity. Energy metabolism. Dietary recommendations and guidelines, dietary guides and meal planning. The use and application of food composition tables in dietary analysis.
VDG 321 Nutrition during life cycle 321
Academic organisation: Consumer Science
Prerequisite: VDG 311
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 17
Module content:
The role of nutrition in the life cycle. The role of nutrition in the prevention of lifestyle-related diseases – osteoporosis, cancer, coronary heart disease, tooth decay. Vegetarianism. Different conditions of malnutrition: Protein energy malnutrition and obesity.

VDS 111 Basic food preparation 111
Academic organisation: Consumer Science
Contact time: 1 lpw 1 ppw 1 dpw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 6
Module content:
Module 1: Basic food preparation and food preparation techniques. Mise en place, weighing and measurement techniques, equipment and terminology as applied in food preparation. History of the food service industry and contemporary chefs. Basic food quality control.
Module 2: Food preparation basics of the following: stocks, soups and sauces.

VDS 121 Basic food preparation 121
Academic organisation: Consumer Science
Prerequisite: VDS 111
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 6
Module content:
Module 1: Principles and practices of food preparation and cooking techniques. Mise en place, weighing and measurement techniques, equipment and terminology as applied in food preparation. Basic food quality control.
Module 2: Food preparation basics of the following: starches and cereals.

VDS 210 Food commodities and preparation 210
Academic organisation: Consumer Science
Prerequisite: VDS 121
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 18
Module content:
Module 1: The study of different food systems with regard to food preparation. Physical and chemical properties and the influence of the composition in food preparation.
Module 2: Food preparation basics of the following: fruit and vegetables; salads; frozen desserts; gelatine.
Module 3: Origin and development of food habits; Factors influencing habits and choice; Dynamics of food habits. Influence of religion on food habits. Food habits of different ethnic groups.
VDS 221 Food commodities and preparation 221
Academic organisation: Consumer Science
Prerequisite: VDS 210
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium Credits: 18
Module content:
Module 1: The study of different food systems with regard to food preparation. Physical and chemical properties and the influence of the composition in food preparation.
Module 2: Food preparation basics of the following: meat; poultry; fish, legumes, eggs and milk, baked products (whole spectrum); leavening agents.
Module 3: The influence of culture on cuisines. Study of the cuisines of selected African, European and Eastern countries.

VDS 310 Consumer food research 310
Academic organisation: Consumer Science
Prerequisite: VDS 221
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 21
Module content:
Planning, executing and reporting consumer food research. Food preservation and evaluation techniques. Experiments in food, emphasising ingredient function and standard preparation methods. Application of experimental methods through which the chemical and physical reactions of food to different food handling, preparation and preservation techniques are illustrated. Quality evaluation and consumer-orientated sensory evaluation of food products.

VDS 322 Large-scale food production and restaurant management 322
Academic organisation: Consumer Science
Prerequisite: VDS 210 and VDS 221
Contact time: 3 lpw 3 ppw
Period of presentation: Semester 2
Language of tuition: Double medium Credits: 31
Module content:
Module 1 and practical work: Principles of large-scale food preparation and the practical application thereof in a restaurant situation. Restaurant management. Recipe formats and adjustment applicable to large-scale food preparation. Work scheduling and the practical exposure to the use of large scale catering equipment in a real-life situation.
Module 2: Menu planning for different food service systems and styles of food service.
Module 3: Large scale food procurement, consumption and storage.
Practical work: Principles of large-scale food preparation and the practical application thereof in a practical restaurant situation. Recipe formats and adjustment applicable to large-scale food preparation. Work scheduling and the practical exposure to the use of large-scale catering equipment in a real-life situation.

VDS 354 Food safety and hygiene 354
Academic organisation: Consumer Science
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 14
Module content:
Module 1: General anatomy and morphology of bacteria, viruses and fungi. Basic nutritional requirements of micro-organisms and the effect of environmental factors on microbiological growth. Food decay, food poisoning and preservation of food by micro-organisms. Basic principles involved in disinfections, sterilisation and control of microbes; techniques of microbial repression: sterilisation by using heat, radiation, filtration, chemicals decimation of numbers.
Module 2: Food safety approached from retail, commercial and institutional angles. Safety issues surrounding food. Principles of food safety and food hygiene; good manufacturing practices; HACCP and risk analysis; employee health, hygiene and safety; Consumer rights and protection; occupational health and safety; health and food safety legislation in South Africa.

VDS 355 Food and beverage service management 355
Academic organisation: Consumer Science
Prerequisite: VDS 221
Contact time: 2 lpw 1 ppw
Period of presentation: Quarter 1
Language of tuition: Double medium
Module content:
Table setting, table serving, wine service, food and wine pairing, beverage management.

VDS 413 Recipe development and standardisation 413
Academic organisation: Consumer Science
Prerequisite: VDS 310 or VDS 322
Contact time: 3 lpw 2 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Module content:
Recipe development process. Development of appropriate recipes and food products for a given situation. Standardisation of recipes. Food styling and food photography.

VDS 414 Culinary art 414
Academic organisation: Consumer Science
Prerequisite: VDS 210 and VDS 221
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Double medium
Module content:
Advanced food preparation and presentation techniques.

VDS 415 Visual merchandising of foods 415
Academic organisation: Consumer Science
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Double medium
Module content:
Aspects of food retailing with special emphasis on food packaging and labelling of food products. Aspects of food retailing with regard to display, presentation and shop layout as applied to food products.
VDS 417 Consumer aspects of food 417
Academic organisation: Consumer Science
Prerequisite: BEM 212 [for module 2] and Final-year status
Contact time: 3 lpw
Period of presentation: Semester 1
Language of instruction: Double medium  
Credits: 15
Module content:
Module 1: Role-playing factors relating to consumer behaviour, food procurement and consumption. The introduction of the 2011 Consumer Protection Act and food labelling laws. Consumer education in relation to consumers’ social responsibility.
Module 2: A South African perspective on food retail management with a focus on how general logistics throughout the supply chain is implemented with the South African consumer in mind.

VDS 423 Foods 423
Academic organisation: Consumer Science
Contact time: 3 lpw
Period of presentation: Semester 1
Language of tuition: Double medium  
Credits: 15
Module content:
Factors influencing food consumption, consumer behaviour and food choice. Food product advice. Consumer advice, marketing of food products, consumer education.

VDS 424 Culinary art 424
Academic organisation: Consumer Science
Prerequisite: VDS 221, VDS 322 # and VDS 414
Contact time 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium  
Credits: 19
Module content:
Advanced food preparation and presentation techniques. Event planning and banqueting.

VDS 425 Project: Foods visual merchandising of foods 425
Academic organisation: Consumer Science
Prerequisite: VDS 415 and VDS 423
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Double medium  
Credits: 15
Module content:
Practical application of the principles in visual merchandising of food and food retailing in the food industry.

VDS 426 Food research project 426
Academic organisation: Consumer Science
Prerequisite: PGB 410 # and VDS 310
Contact time: 1 lpw 2 ppw
Period of presentation: Semester 2
Language of tuition: Double medium  
Credits: 18
Module content:
Planning, executing and reporting a research project in a food-related field.
VDS 427 Food retailing and visual merchandising of food 427
Academic organisation: Consumer Science
Prerequisite: VDS 417 and Final-year status
Contact time: 1 lpw; 1 ppw
Period of presentation: Semester 2
Language of instruction: Double medium  
Credits: 17
Module content:
Aspects of food retailing with regard to display, presentation and shop layout as applied to food products. Practical application of the principles in visual merchandising of food and food retailing in the food industry.

VGE 301 Nutrition science 301
Academic organisation: Animal and Wildlife Sciences
Prerequisite: [BCM 263 and BCM 264] and [BCM 265 and BCM 266] and DAF 200, and VDG 260 and VKU 220
Contact time: 3 lpw fortnightly practicals
Period of presentation: Year
Language of tuition: English  
Credits: 32
Module content:

VGE 411 Nutrition science 411
Academic organisation: Animal and Wildlife Sciences
Prerequisite: VGE 301
Contact time: 4 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: English  
Credits: 18
Module content:
Specialised nutrition of monogastric animals: poultry, pigs, horses and selected freshwater aquatic organisms. The use of computer systems in feeding management.

VGE 421 Nutrition science 421
Academic organisation: Animal and Wildlife Sciences
Prerequisite: VGE 301
Contact time: 3 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: English  
Credits: 16
Module content:

VGE 423 Nutrition science 423
Academic organisation: Animal and Wildlife Sciences
Prerequisite: VGE 301
Contact time: 3 lpw
Period of presentation: Semester 1
Language of tuition: English  
Credits: 16

Module content:
Specialised nutrition of beef and dairy cattle according to production systems. The use of computer systems in feeding management. The practicals will include compiling rations in terms of requirements and least cost formulations, specialised assignments and on-farm experiential training.

V KD 410 Pig science 410  
Academic organisation: Animal and Wildlife Sciences  
Prerequisite: VGE 301, VKU 220  
Contact time: 1 lpw fortnightly practicals  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 8

Module content:

V K F 411 Animal science pharmacology 411  
Academic organisation: Animal and Wildlife Sciences  
Prerequisite: DFS 320 and VGE 301  
Contact time: 3 lpw  
Period of presentation: Semester 1  
Language of tuition: English  
Credits: 12

Module content:
The pharmacology, laws, control and use of substances for animal production.

V K U 120 Animal science 120  
Academic organisation: Animal and Wildlife Sciences  
Contact time: 2 lpw 0.5ppw  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 8

Module content:
Origin and domestication of farm and companion animals. The ecological environment in which animal production and development is practised. Livestock species, breeds and breed characterisation and genetic variation. Terminology. Practical work includes identification and classification of different breeds of livestock.

V K U 122 Animal nutrition 122  
Academic organisation: Animal and Wildlife Sciences  
Contact time: 2 lpw  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 6

Module content:

V K U 210 Animal science 210  
Academic organisation: Animal and Wildlife Sciences  
Prerequisite: VKU 120 GS of TDH  
Contact time: 2 lpw 1 ppw
Period of presentation: Quarter 1
Language of tuition: English
Credits: 8
Module content:
Basic principles of nutrition, physiology, breeding and production. Applied principles of livestock production, production management and systems (large livestock, small stock, pigs and poultry). Organisation of the livestock industry and relevant legislation. Animal handling.
Practical work includes the general care and handling of farm stock.

VKU 220 Animal science 220
Academic organisation: Animal and Wildlife Sciences
Prerequisite: VKU 210 GS or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Quarter 2
Language of tuition: English
Credits: 12
Module content:
Livestock ecology, interaction between genotype and environment. Production regions and systems. Animal ecological factors that influence regional classification. Animal ecological factors to be considered in production factors, planning and management of different livestock production systems. Conservation farming and adapted farming and management systems; environmental conservation. Practical work will consist of compulsory farm practical during vacation after the 1st year and or during the 2nd year of study.

VKU 250 Animal science 250
Academic organisation: Animal and Wildlife Sciences
Prerequisite: VKU 120 GS or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 8
Module content:
Introduction to the basic principles and terminology of large stock, small stock, pig and poultry production systems.

VKU 260 Livestock ecology 260
Academic organisation: Animal and Wildlife Sciences
Prerequisite: VKU 250 GS or TDH
Contact time: 2 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 8
Module content:
Livestock ecology, interaction between genotype and environment. Production regions and systems. Animal ecological factors that influence regional classification. Animal ecological factors to be considered in production factors, planning and management of different livestock production systems. Conservation farming and adapted farming and management systems; environmental conservation. Practical work will consist of compulsory farm practical during vacation after the 1st year and or during the 2nd year of study.

VKU 320 Animal science 320
Academic organisation: Animal and Wildlife Sciences
Prerequisite: VKU 210, VKU 220 and WDE 310
Contact time: 3 lpw 1 ppw  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 12  
Module content:  
Functional management of intensive and extensive beef, dairy, sheep and goat production systems. Discussions and literature studies on applied animal nutrition, breeding production planning and production processes.

VKU 361 Animal ecology 361  
Academic organisation: Animal and Wildlife Sciences  
Prerequisite: TDH  
Contact time: 2 lpw  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 8  
Module content:  
Animal ecology, interaction between genotype and environment. Animal ecological factors which influence regional classification. Animal ecological factors which must be taken into consideration in the obtaining of the production factors, planning and management of the cattle farming enterprise. Conservation farming and adapted farming and management systems; environmental conservation.

VKU 362 Animal science biotechnology 362  
Academic organisation: Animal and Wildlife Sciences  
Prerequisite: GTS 261  
Contact time: 1 lpw  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 8  
Module content:  
Application of biotechnology in farm animals with specific reference to reproductive biotechnology such as AI MOET and sex manipulation, which has an effect on genetic progress. Application of DNA technology such as parentage verifications, identification of genetic defects, QTL's and MAS.

VKU 400 Research methodology 400  
Academic organisation: Animal and Wildlife Sciences  
Prerequisite: Simultaneously register for GVK 420, PVK 420, TLR 411, VGE 423, VKF 411  
Contact time: 2 lpw 1 spw  
Period of presentation: Year  
Language of tuition: English  
Credits: 16  
Module content:  
Research methodology in animal science: Literature studies and seminars. Introduction to the problem, approach to problem solving, methodology and appropriate reporting. Practice.

VNP 480 Food research project 480  
Academic organisation: Consumer Science  
Prerequisite: BEM 314 / FST 414 and Final-year status  
Contact time: 1 lpw; 1 ppw  
Period of presentation: Year  
Language of instruction: Double medium  
Credits: 28
Module content:
Research methodology. Planning, executing and reporting a research project in Food Management/Hospitality Management/Food Retail Management.

VSX 420 Meat and dairy science 420
Academic organisation: Animal and Wildlife Sciences
Prerequisite: DFS 320
Contact time: 2 lpw
Period of presentation: Semester 2
Language of tuition: English
Credits: 10
Module content:

VVW 350 Community nutrition and public health 350
Academic organisation: Human Nutrition
Prerequisite: HNT 210 or TDH and VDG 250 or VDG 260 and VDG 321
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 21
Module content:
Theory and practice of community nutrition and public health (capita selecta CNT 411). Environmental health issues and health indicators in communities.

VVW 363 Food, nutrition and health 363
Academic organisation: Consumer Science
Prerequisite: BCM253 and BCM254 and BCM255 and BCM256 and BCM263 and BCM264 and BCM265 and BCM266 and VDG311 and VDG321
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 21
Module content:
Scientific foundation of food and nutrition in health promotion and disease prevention. Principles of interpretation of nutritional assessment data.

VVW 364 Food composition and applied nutritional programmes 364
Academic organisation: Food Science
Prerequisite: FST 351 and FST 352 or TDH
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:

WDE 253 Basic principles of pasture science 253
Academic organisation: Plant Production and Soil Science
Contact time: 4 lpw
Period of presentation: Semester 1
Language of tuition: English   Credits: 18

Module content:
The influence of biotic and abiotic factors on the productivity of different strata and components of natural and planted pastures. This will enable the student to understand the management, production, appropriate and optimal utilisation as well as the conservation of these pastures. These principles can be used to ensure sustainable animal production and health.

WDE 310 Principles of veld management 310
Academic organisation: Plant Production and Soil Science
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng   Credits: 14

Module content:
The influence of biotic and abiotic factors on the productivity of different strata and components of natural pastures. This will enable the student to advise users, with the necessary motivation, on the appropriate use of these strata and components and will form a basis for further research on this system. The principles of veld management and the influence of management practices on sustainable animal production from natural pastures. This will enable the student to advise users on veld management and veld management principles. It will also form a basis for further research on veld management.

WDE 320 Planted pastures and fodder crops 320
Academic organisation: Plant Production and Soil Science
Prerequisite: WDE 310
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng   Credits: 14

Module content:
The establishment and use of planted pastures species and fodder crops and the conservation of fodder. This will enable students to advise users on establishment and utilisation of planted pastures species as well as farmers on the production, conservation and optimum use of fodder. This will also form a basis for further research on planted pastures.

WDE 450 Environmental resource assessment and management 450
Academic organisation: Plant Production and Soil Science
Contact time: 3 lpw fortnightly practicals
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng   Credits: 20

Module content:
Determining the resource potential of land on the basis of botanical composition, vegetation cover, animal grazing and browsing potential, water quality, soil quality, chemical, physical and biological soil degradation, soil erosion and other important environmental processes etc which are essential for integrated agricultural land use practices. Evaluation of grasses and other vegetation types in terms of environmental adaptation, acceptability and adaptability to a sustainable utilisation system and the management requirements of an integrated and adaptive management system.

WKD 155 Atmospheric structure and processes 155
Academic organisation: Geography, Geoinformatics and Meteorology
Contact time: 4 lpw  
Period of presentation: Semester 1  
Language of tuition: English  
Credits: 16  
Module content:  

WKD 164 Climate and weather of Southern Africa 164  
Academic organisation: Geography, Geoinformatics and Meteorology  
Contact time: 4 lpw  
Period of presentation: Quarter 4  
Language of tuition: English  
Credits: 8  
Module content:  

WKD 261 Physical meteorology 261  
Academic organisation: Geography, Geoinformatics and Meteorology  
Contact time: 4 lpw 1 ppw  
Period of presentation: Quarter 1  
Language of tuition: English  
Credits: 14  
Module content:  

WKD 263 Introduction to dynamic meteorology 263  
Academic organisation: Geography, Geoinformatics and Meteorology  
Prerequisite: WKD 261 and WTW 218 or TDH  
Contact time: 4 lpw 1 ppw  
Period of presentation: Quarter 4  
Language of tuition: English  
Credits: 14  
Module content:  

WKD 352 Atmospheric vorticity and divergence 352  
Academic organisation: Geography, Geoinformatics and Meteorology  
Prerequisite: WTW 248  
Contact time: 4 lpw 1 ppw
**Period of presentation:** Quarter 2  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**
Scale analyses and simplification of the basic equations. The geostrophic, thermal and gradient wind. The vorticity equation and divergence.

**WKD 356 Climate and community 356**  
**Academic organisation:** Geography, Geoinformatics and Meteorology  
**Prerequisite:** Limited to students enrolled for BSC (Meteorology), BSc (Geography), BSc (Geoinformatics), BSc (Environmental Sciences) or BA own choice with major in Geography  
**Contact time:** 2 lpw 2 ppw  
**Period of presentation:** Quarter 1  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**

**WKD 361 Quasi-geostrophic analysis 361**  
**Academic organisation:** Geography, Geoinformatics and Meteorology  
**Prerequisite:** WKD 352 GS  
**Contact time:** 4 lpw 1 ppw  
**Period of presentation:** Quarter 3  
**Language of tuition:** English  
**Credits:** 20  
**Module content:**
Tendency and Omega equations. Model of a boroclinic system. Introduction to numerical models. Application in meteorology display and analysis software.

**WKD 366 Fundamentals of weather forecasting 366**  
**Academic organisation:** Geography, Geoinformatics and Meteorology  
**Prerequisite:** WKD 261 GS  
**Contact time:** 1 lpw 2 ppw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 36  
**Module content:**
Meteorological observations, data, codes. Weather applications software systems and computing environments for meteorological analysis and weather forecasting techniques. Applications of remote sensing in weather forecasting. Aerological diagrams. Applications of numerical weather prediction, and types of weather forecasts. Integration of information to describe the current state of the atmosphere and to predict a future state of the atmosphere.

**WKE 420 Wildlife science 420**  
**Academic organisation:** Animal and Wildlife Sciences  
**Prerequisite:** VGE 301 and VKU 361 or TDH  
**Contact time:** 2 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Double medium  
**Credits:** 10  
**Module content:**
Introductory aspects of wildlife conservation, habitat management, wildlife nutrition and keeping wildlife in zoological gardens.
WTW 114 Calculus 114
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: Refer to Regulation 1.2
Contact time: 4 lpw 1 tpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 16
Module content:
*This module serves as preparation for students majoring in Mathematics (including all students who intend to enrol for WTW 218 and WTW 220). Students will not be credited for more than one of the following modules for their degree: WTW 114, WTW 158, WTW 134.

Functions, limits and continuity. Differential calculus of single variable functions, rate of change, graph sketching, applications. The mean value theorem, the rule of L'Hospital. Definite and indefinite integrals, evaluating definite integrals using anti-derivatives, the substitution rule.

WTW 115 Discrete structures 115
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: Refer to Regulation 1.2
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 8
Module content:

WTW 123 Numerical analysis 123
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 114 GS
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 8
Module content:
Non-linear equations, numerical integration, initial value problems for differential equations, systems of linear equations. Algorithms for elementary numerical techniques are derived and implemented in computer programmes. Error estimates and convergence results are treated.

WTW 126 Linear algebra 126
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: Refer to Regulation 1.2
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 8
Module content:
*This module serves as preparation for students majoring in Mathematics (including all students who intend to enrol for WTW 211).

Vector algebra with applications, matrix algebra, systems of linear equations, the vector space Rn, bases, determinants. Mathematical induction. Complex numbers and factorisation of polynomials.
WTW 128 Calculus 128
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** WTW 114 GS
**Contact time:** 2 lwp 1 tpw
**Period of presentation:** Semester 2
**Language of tuition:** Both Afr and Eng
**Credits:** 8

**Module content:**
*This module serves as preparation for students majoring in Mathematics (including all students who intend to enrol for WTW 218 and WTW 220). Applications of integration. The formal definition of a limit. The fundamental theorem of Calculus and applications. Parametric and polar equations. Vector functions of one variable, quadratic curves. Introduction to functions of several variables and partial derivatives.

WTW 133 Precalculus 133
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** As for BSc (Four-year programme)
**Contact time:** 5 lwp 1 ppw 1 tpw Foundation Course
**Period of presentation:** Semester 1
**Language of tuition:** English
**Credits:** 8

**Module content:**
Real numbers, elementary set notation, exponents and radicals. Algebraic expressions, fractional expressions, linear and quadratic equations, inequalities. Coordinate geometry: lines, circles. Functions: definition, notation, piecewise defined functions, absolute value, domain and range, graphs, transformations of functions, symmetry, even and odd functions, combining functions, one-to-one functions and inverses, polynomial functions and zeros.
Sequences, summation notation, arithmetic, geometric sequences, infinite geometric series, annuities and instalments. Degrees and radians, unit circle, trigonometric functions, fundamental identities, trigonometric graphs, trigonometric identities, double-angle, half-angle formulae, inverse trigonometric functions, trigonometric equations, applications.

WTW 134 Mathematics 134
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** Refer to Regulation 1.2
**Contact time:** 4 lwp 1 tpw
**Period of presentation:** Semester 1 or Semester 2
**Language of tuition:** Both Afr and Eng
**Credits:** 16

**Module content:**
*Students will not be credited for more than one of the following modules for their degree: WTW 134, WTW 114, WTW 158. WTW 134 does not generally lead to admission to Mathematics at 200 level and is intended for students who require Mathematics at 100 level only. WTW 134 can also be taken in the second semester. Functions, derivatives, interpretation of the derivative, rules of differentiation, applications of differentiation, integration, interpretation of the definite integral, applications of integration. Discrete probability, matrices, solutions of systems of equations. Markov chains.

WTW 143 Calculus 143
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** WTW 133
**Contact time:** 4 lwp 1 ppw 1 tpw Foundation Course
Period of presentation: Semester 2
Language of tuition: English
Credits: 8

Module content:
Functions: exponential and logarithmic functions, natural exponential and logarithmic functions, exponential and logarithmic laws, exponential and logarithmic equations, compound interest.
Limits: concept of a limit, finding limits numerically and graphically, finding limits algebraically, limit laws without proofs, squeeze theorem without proof, one-sided limits, infinite limits, limits at infinity, vertical, horizontal and slant asymptotes, substitution rule, continuity, laws for continuity without proofs.
Differentiation: average and instantaneous change, definition of derivative, differentiation rules without proofs, derivatives of polynomials, chain rule for differentiation, derivatives of trigonometric, exponential and logarithmic functions, applications of differentiation: extreme values, critical numbers, monotone functions, first derivative test, optimisation.

WTW 144: Calculus 144
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 133
Contact time: 4 lw 1 ppw 1 bpw Foundation Course
Period of presentation: Semester 2
Language of tuition: English
Credits: 8

Module content:
Functions: Rate of change, exponential functions, the natural logarithm, exponential growth and decay, proportionality, power functions, fitting formulas to data.
Rates of change and the derivative: Instantaneous rate of change, the derivative function, interpretations of the derivative, the second derivative.
Differentiation: Formulas and rules, applications, extremes of a function.
Integration: Accumulated change, the definite integral, antiderivatives, definite integrals, the definite integral as an area, interpretations of the definite integral.

WTW 152 Mathematical modelling 152
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: Refer to Regulation 1.2
Contact time: 2 lw 1 tpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 8

Module content:

WTW 153 Calculus 153
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 143
Contact time: 4 lw 1 ppw 1 tpw Foundation Course
Period of presentation: Semester 1
Language of tuition: English
Credits: 8

Module content:
Rigorous treatment of limits and continuity. Differential calculus of a single variable with proofs and applications. The mean value theorem, the rule of L'Hospital. Upper and lower sums, definite and indefinite integrals, the fundamental theorem of Calculus, the mean value theorem for integrals, integration techniques, with some proofs.
WTW 154: Finite mathematics
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** WTW 144
**Contact time:** 4 lpw 1 ppw 1 tpw Foundation Course
**Period of presentation:** Semester 1
**Language of tuition:** English  
**Credits:** 8
**Module content:**
Probability theory: Set theory, basic principles and definitions, relative frequencies, probability models for finite sample spaces, experiments with equally likely outcomes, probability formulas, counting methods.
Matrices and systems of linear equations: Matrix addition and scalar multiplication, matrix multiplication, systems of linear equations.
Markov chains: Transitions matrices and state vectors, regular matrices.

WTW 158 Calculus 158
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** Refer to Regulation 1.2
**Contact time:** 4 lpw 1 tpw
**Period of presentation:** Semester 1
**Language of tuition:** Both Afr and Eng  
**Credits:** 16
**Module content:**
*This module is designed for first-year engineering students. Students will not be credited for more than one of the following modules for their degree: WTW 158, WTW 114, WTW 134.
Introduction to vector algebra. Functions, limits and continuity. Differential calculus of single variable functions, rate of change, graph sketching, applications. The mean value theorem, the rule of L'Hospital. Indefinite integrals, integration.

WTW 161 Linear algebra 161
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** Refer to Regulation 1.2
**Contact time:** 2 lpw 1 tpw
**Period of presentation:** Semester 2
**Language of tuition:** Both Afr and Eng  
**Credits:** 8
**Module content:**
*This module is designed for first-year engineering students. Students will not be credited for more than one of the following modules for their degree: WTW 161, WTW 126.
Vector algebra with applications, matrix algebra, systems of linear equations, the vector space R^n, bases, determinants. Mathematical induction. Complex numbers and factorisation of polynomials. Conic sections. This module also includes a formal technique mastering programme.

WTW 162 Dynamical processes 162
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** WTW 114 GS
**Contact time:** 2 lpw 1 tpw
**Period of presentation:** Semester 2
**Language of tuition:** English  
**Credits:** 8
**Module content:**
WTW 168 Calculus 168
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** WTW 114 GS or WTW 158 GS
**Contact time:** 2 lpw 1 t pw
**Period of presentation:** Semester 2
**Language of tuition:** Both Afr and Eng

**Module content:**
*This module is designed for first-year engineering students. Students will not be credited for more than one of the following modules for their degree: WTW 168, WTW 128, WTW 138.

WTW 183 Precalculus 183
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** As for BCom (Four-year Programme) (eg Grade 12 Mathematics level 3, etc)
**Contact time:** 5 lpw 1 ppw 1 t pw Foundation Course
**Period of presentation:** Semester 1
**Language of instruction:** English

**Module content:**
Real numbers, elementary set notation, exponents and radicals. Algebraic expressions, fractional expressions, linear and quadratic equations, inequalities. Coordinate geometry: lines and circles. Functions: definition, notation, piecewise defined functions, absolute value, domain and range, graphs of functions, increasing and decreasing functions, average rates of change, quadratic functions, minima and maxima, symmetry, transformations of functions, even and odd functions, combining functions, polynomial functions and zeros, exponential and logarithmic functions, one-to-one functions and inverses and applications. Sequences, summation notation, arithmetic, geometric sequences, infinite geometric series. Mathematics of finance: Annuities, instalments, fractions versus percentages, etc. Introduction to limits, area problem and applications. Geometry.

WTW 211 Linear algebra 211
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** WTW 126
**Contact time:** 2 lpw 1 t pw
**Period of presentation:** Semester 1
**Language of tuition:** Both Afr and Eng

**Module content:**
This is an introduction to linear algebra on $\mathbb{R}^n$. Matrices and linear equations, linear combinations and spans, linear independence, subspaces, basis and dimension, eigenvalues, eigenvectors, similarity and diagonalisation of matrices, linear transformations.

WTW 218 Calculus 218
**Academic organisation:** Mathematics and Applied Mathematics
**Prerequisite:** WTW 114, WTW 126 and WTW 128
**Contact time:** 2 lpw 1 t pw
**Period of presentation:** Semester 1
**Language of tuition:** Both Afr and Eng

**Credits:** 12
Module content: Calculus of multivariable functions, directional derivatives. Extrema and Lagrange multipliers. Multiple integrals, polar, cylindrical and spherical coordinates.

WTW 220 Analysis 220
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 114 and WTW 128
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 12

WTW 221 Linear algebra 221
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 211
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 12
Module content: Abstract vector spaces, change of basis, matrix representation of linear transformations, orthogonality, diagonalisability of symmetric matrices, some applications.

WTW 238 Mathematics 238
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 256 and WTW 258 GS
Contact time: 4 lpw 2 tpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 16
Module content: Linear algebra, eigenvalues and eigenvectors with applications to first and second order systems of differential equations. Sequences and series, convergence tests. Power series with applications to ordinary differential equations with variable coefficients. Fourier series with applications to partial differential equations such as potential, heat and wave equations.

WTW 248 Vector analysis 248
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 218
Contact time: 2 lpw 1 dpw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 12
Module content: Vectors and geometry. Calculus of vector functions with applications to differential geometry, kinematics and dynamics. Vector analysis, including vector fields, line integrals of scalar and vector fields, conservative vector fields, surfaces and surface integrals, the Theorems of Green, Gauss and Stokes with applications.
WTW 256 Differential equations 256
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 158, WTW 161 and WTW 168
Contact time: 2 lpw 1tpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng  Credits: 8
Module content:

WTW 258 Calculus 258
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 158 and WTW 168
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng  Credits: 8
Module content:

WTW 263 Numerical methods 263
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 161 and WTW 168
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng  Credits: 8
Module content:

WTW 285 Discrete structures 285
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 115
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng  Credits: 12
Module content:
Setting up and solving recurrence relations. Equivalence and partial order relations. Graphs: paths, cycles, trees, isomorphism. Graph algorithms: Kruskal, Prim, Fleury. Finite state automata.

WTW 286 Differential equations 286
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 114, WTW 126 and WTW 128
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng  Credits: 12
Module content:

WTW 310 Analysis 310
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 220
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 18

Module content:

WTW 320 Analysis 320
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 218 and WTW 310
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 18

Module content:

WTW 354 Financial engineering 354
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WST 211, WTW 211 and WTW 218
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 18

Module content:
Mean variance portfolio theory. Market equilibrium models such as the capital asset pricing model. Factor models and arbitrage pricing theory. Measures of investment risk. Efficient market hypothesis. Stochastic models of security prices.

WTW 364 Financial engineering 364
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WST 211, WTW 126, WTW 218 and WTW 286
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18

Module content:
Discrete time financial models: Arbitrage and hedging; the binomial model. Continuous time financial models: The Black-Scholes formula; pricing of options and the other derivatives; interest rate models; numerical procedures.
WTW 381 Algebra 381
**Academic organisation:** Mathematics and Applied Mathematics  
**Prerequisite:** WTW 114 and WTW 211  
**Contact time:** 2 lpw 1 tpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Double medium  
**Credits:** 18  
**Module content:**  
Group theory: Definition, examples, elementary properties, subgroups, permutation groups, isomorphism, order, cyclic groups, homomorphisms, factor groups. Ring theory: Definition, examples, elementary properties, ideals, homomorphisms, factor rings, polynomial rings, factorisation of polynomials. Field extensions, applications to straight-edge and compass constructions.

WTW 382 Dynamical systems 382
**Academic organisation:** Mathematics and Applied Mathematics  
**Prerequisite:** WTW 218 and WTW 286  
**Contact time:** 2 lpw 1 tpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Double medium  
**Credits:** 18  
**Module content:**  

WTW 383 Numerical analysis 383
**Academic organisation:** Mathematics and Applied Mathematics  
**Prerequisite:** WTW 114, WTW 128 and WTW 211  
**Contact time:** 2 lpw 1 tpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Double medium  
**Credits:** 18  
**Module content:**  
Direct methods for the numerical solution of systems of linear equations, pivoting strategies. Iterative methods for solving systems of linear equations and eigenvalue problems. Iterative methods for solving systems of nonlinear equations. Introduction to optimization. Algorithms for the considered numerical methods are derived and implemented in computer programmes. Complexity of computation is investigated. Error estimates and convergence results are proved.

WTW 386 Partial differential equations 386
**Academic organisation:** Mathematics and Applied Mathematics  
**Prerequisite:** WTW 248 and WTW 286  
**Contact time:** 2 lpw 1 tpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Double medium  
**Credits:** 18  
**Module content:**  
WTW 387 Continuum mechanics 387
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 248 and WTW 286
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 18

Module content:

WTW 389 Geometry 389
Academic organisation: Mathematics and Applied Mathematics
Prerequisite: WTW 211
Contact time: 2 lpw 1 tpw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 18

Module content:
Axiomatic development of neutral, Euclidean and hyperbolic geometry. Using models of geometries to show that the parallel postulate is independent of the other postulates of Euclid.

ZEN 161 Animal diversity 161
Academic organisation: Zoology and Entomology
Prerequisite: MLB 111 GS or TDH
Contact time: 2 lpw fortnightly practicals
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 8

Module content:
Animal classification, phylogeny, organisation and terminology. Evolution of the various animal phyla, morphological characteristics and life cycles of parasitic and non-parasitic animals. Structure and function of reproductive, respiratory, excretory, circulatory and digestive systems.

ZEN 251 Invertebrate biology 251
Academic organisation: Zoology and Entomology
Prerequisite: ZEN 161 GS or TDH
Contact time: 4 lpw 1 ppw
Period of presentation: Quarter 1
Language of tuition: English
Credits: 12

Module content:
Origin and extent of modern invertebrate diversity; parasites of man and domestic animals; biology and medical importance of arachnids; insect life styles; the influence of the environment on insect life histories; insect phytophagy, predation and parasitism; insect chemical, visual, and auditory communication; freshwater invertebrates and their use as biological indicators.

ZEN 261 African vertebrates 261
Academic organisation: Zoology and Entomology
Prerequisite: ZEN 161 GS or TDH
Contact time: 4 lpw 1 ppw
Period of presentation: Quarter 3
Language of tuition: English  Credits: 12
Module content:
Introduction to general vertebrate diversity; African vertebrate diversity; vertebrate structure and function; vertebrate evolution; vertebrate relationships; aquatic vertebrates; terrestrial ectotherms; terrestrial endotherms; vertebrate characteristics; classification; structural adaptations; habits; habitats; conservation problems; impact of humans on other vertebrates.

ZEN 351 Population ecology 351
Academic organisation: Zoology and Entomology
Contact time: 4 lpw 2 ppw
Period of presentation: Quarter 1
Language of tuition: English  Credits: 18
Module content:
Scientific approach to ecology; evolution and ecology; the individual and its environment; population characteristics and demography; competition; predation; plant-herbivore interactions; regulation of populations; population manipulation.

ZEN 352 Mammalogy 352
Academic organisation: Zoology and Entomology
Contact time: 4 lpw 2 ppw
Period of presentation: Quarter 1
Language of tuition: English  Credits: 18
Module content:
Mammalian origins and their characteristics: evolution of African mammals; structure and function: integument, support and movement; foods and feeding; environmental adaptations; reproduction; behaviour; ecology and biogeography; social behaviour; sexual selection; parental care and mating systems; community ecology; zoogeography. Special topics: parasites and diseases; domestication and domesticated mammals; conservation.

ZEN 353 Community ecology 353
Academic organisation: Zoology and Entomology
Contact time: 4 lpw 2 ppw
Period of presentation: Quarter 2
Language of tuition: English  Credits: 18
Module content:
The scientific approach; characteristics of the community; the community as a superorganism; community changes; competition as a factor determining community structure; disturbance as a determinant of community structure; community stability; macroecological patterns and mechanisms.

ZEN 354 Physiology 354
Academic organisation: Zoology and Entomology
Contact time: 4 lpw 2 ppw
Period of presentation: Quarter 2
Language of tuition: English  Credits: 18
Module content:
The module is designed to promote understanding of animals as integrated systems at every level of organisation. The module focuses on the function of tissues, organs and organ systems of multicellular organisms in chemical and physical terms. Animal
physiology is the study of how a living animal functions. This module adopts a systems-based approach that covers many of the subdisciplines of physiology, ranging from neural physiology and endocrinology to mechanoreception and osmoregulation.

**ZEN 355 Insect diversity 355**
**Academic organisation:** Zoology and Entomology  
**Prerequisite:** ZEN 251 GS or TDH  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 1  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  
The extent and significance of insect diversity. Functional insect morphology. The basic principles of taxonomy and the classification of taxa within the Insecta. Insect orders and economically and ecologically important southern African insect families. Identification of insect orders and families using distinguishing characteristics. General biological and behavioural characteristics of each group. Grouping of insects into similar lifestyles and habitats.

**ZEN 361 Ecophysiology 361**
**Academic organisation:** Zoology and Entomology  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 3  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  
The costs of living; factors affecting metabolic rate; limitations to the acquisition of energy and nutrients; the principles of nutritional ecology; problems associated with herbivorous diets; the effects of temperature on whole organism processes and the response of species to temperature variation; ectothermic and endothermic temperature regulation; animal responses to high and low temperatures; water balance physiology of insects and vertebrates; osmoregulation in aquatic and terrestrial environments; the importance of physiological ecology for understanding geographic variation in body size, range size, and abundance.

**ZEN 362 Evolution and phylogeny 362**
**Academic organisation:** Zoology and Entomology  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 3  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  
ZEN 363 Behavioural ecology 363  
**Academic organisation:** Zoology and Entomology  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 4  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  

ZEN 364 Conservation ecology 364  
**Academic organisation:** Zoology and Entomology  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 4  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  
This module is intended to provide students with skills to undertake field surveys that are essential for research and planning in the conservation of biodiversity. The module has a large fieldwork component. A field trip will be conducted over a ten-day period during the September vacation in the Sani Pass region of the Drakensberg (including South Africa and Lesotho). The students will be actively involved in planning and executing the field surveys, and will be responsible for analysing and presenting the results. The students will gain valuable practical experience in the field by applying a number of survey techniques and focusing on several different taxa that are relevant to conservation ecology.

ZEN 365 Applied entomology 365  
**Academic organisation:** Zoology and Entomology  
**Contact time:** 4 lpw 2 ppw  
**Period of presentation:** Quarter 4  
**Language of tuition:** English  
**Credits:** 18  
**Module content:**  
*It is strongly recommended that students first complete ZEN 355: Insect diversity 355  
Impact of insects on economies, human health and well-being. Protection of crops from insect herbivores through monitoring, forecasting and application of the principles of integrated pest management; epidemiology and modern developments in the control of insect vectors of human and animal diseases; insects as a tool in forensic investigations; ecological and economic significance of insect pollinators and current threats to their survival and health. Lectures will be complemented by practical experiences that provide students with skills in the design, conduct, analysis, interpretation and reporting of applied entomological research.

Alphabetical list of modules offered by the Faculty of Engineering, Built Environment and Information Technology

AIM 101 Academic information management 101  
**Academic organisation:** School of Information Technology  
**Contact time:** 2 lpw  
**Period of presentation:** Semester 1 or Semester 2
Language of tuition: Both Afr and Eng  

Credits: 6

Module content:
Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology. Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

AIM 111 Academic information management 111

Academic organisation: School of Information Technology

Contact time: 2 lpw

Period of presentation: Semester 1

Language of tuition: Both Afr and Eng  

Credits: 4

Module content:
Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology.

AIM 121 Academic information management 121

Academic organisation: School of Information Technology

Contact time: 2 lpw

Period of presentation: Semester 2

Language of tuition: Both Afr and Eng  

Credits: 4

Module content:
Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

CIL 122 Visual design (Autocad) 122

Academic organisation: School of Information Technology

Contact time: 1 ppw

Period of presentation: Semester 1

Language of tuition: Double Medium  

Credits: 4

Module content:
AUTOCAD 122.

COS 132 Imperative programming 132

Academic organisation: Computer Science

Prerequisite: APS of 30 and Grade 12 Mathematics level 5 (60-69%)

Contact time: 1 ppw 1 tpw 3 lpw

Period of presentation: Semester 1

Language of tuition: Both Afr and Eng  

Credits: 16

Module content:
*Note: All students registered for degrees within the School of IT, excluding the two four-year programmes, BIS (Information Science) and BIS (Publishing), need to enrol for this module.

This module introduces imperative computer programming, which is a fundamental building block of computer science. The process of constructing a program for solving a given problem, of editing it, compiling (both manually and automatically), running and debugging it, is covered from the beginning. The aim is to master the elements of a programming language and be able to put them together in order to construct programs using types, control structures, arrays, functions and libraries. An introduction to object orientation will be given. After completing this module, the student should understand the
fundamental elements of a program, the importance of good program design and user-friendly interfaces. Students should be able to conduct basic program analysis and write complete elementary programs.

COS 133 Introduction to programming 1 133
Academic organisation: Computer Science
Prerequisite: Extended programmes only
Contact time: 2 dpw 2 lpw 2 ppw Foundation Course
Period of presentation: Semester 1
Language of tuition: English Credits: 8
Module content:
This module introduces imperative computer programming, which is a fundamental building block of computer science. The process of constructing a program for solving a given problem, of editing it, compiling (both manually and automatically), running and debugging it, is covered from the beginning. The aim is to master the elements of a programming language, and be able to put them together in order to construct programs using types, control structures and arrays.

COS 143 Introduction to programming 2 143
Academic organisation: Computer Science
Prerequisite: COS 133
Contact time: 2 dpw 2 lpw 2 ppw Foundation Course
Period of presentation: Semester 2
Language of tuition: English Credits: 8
Module content:
This module follows on from the previous module and introduces the concepts of functions, memory management and libraries in the imperative programming paradigm. An introduction to object orientation will be given. After completing this module and the module prerequisite, the student should understand the fundamental elements of a program, the importance of good program design and user-friendly interfaces. Students should be able to conduct basic program analysis and write complete elementary programs.

COS 153 Introduction to programming 3 153
Academic organisation: Computer Science
Prerequisite: COS 143
Contact time: 2 dpw 2 lpw 2 ppw Foundation Course
Period of presentation: Semester 1
Language of tuition: English Credits: 8
Module content:
The module follows a practical programming approach. It will consolidate fundamental prior problem solving and programming knowledge.

SGM 311 Soil mechanics 311
Academic organisation: Civil Engineering
Prerequisite: (SWK 210)
Contact time: 1 tpw 2 ppw 3 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng Credits: 16
Module content:

SWK 122 Mechanics 122  
Academic organisation: Civil Engineering  
Prerequisite: WTW 158  
Contact time: 2 tpw 4 lpw  
Period of presentation: Semester 2  
Language of tuition: Both Afr and Eng  
Credits: 16  
Module content:  

SWK 210 Strength of materials 210  
Academic organisation: Civil Engineering  
Prerequisite: SWK 122, WTW 168/WTW 128  
Contact time: 2 tpw 4 lpw  
Period of presentation: Semester 1  
Language of tuition: Both Afr and Eng  
Credits: 16  
Module content:  

Alphabetical list of modules offered by the Faculty of Health Sciences

ANA 121 Introduction: Human anatomy and embryology 121  
Academic organisation: Anatomy  
Prerequisite: MLB111 and CMY117  
Contact time: 1 lpw 1 ppw  
Period of presentation: Semester 2  
Language of tuition: English  
Credits: 4  
Module content:  
Terminology, musculo-skeletal system, nervous system, surface anatomy, cardiovascular system, respiratory system, urogenital system, gastro-intestinal system, endocrine system, introductory osteology and joints, introductory embryology.
ANA 122 Human osteology 122  
**Academic organisation:** Anatomy  
**Contact time:** 1 lpw 1 ppw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 4  
**Module content:**  
Introduction to osteology, bone function and classification, humerus, radius, ulna, femur, tibia, fibula, clavicle, scapula, ribs, sternum, vertebrae, pelvis, hand and foot bones, sesamoid bones, skull, mandible, joints.

ANA 126 Basic human histology 126  
**Academic organisation:** Anatomy  
**Prerequisite:** CMY117 and MLB111  
**Contact time:** 1 lpw 1 ppw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 4  
**Module content:**  
General introduction to cells and tissue, terminology, the cell and cytoplasm, organelles and inclusions, surface and glandular epithelium, general connective tissue, specialised connective tissue, namely cartilage, bone, blood and haemopoietic tissue, muscle and nervous tissue.

ANA 214 Human cell and developmental biology 214  
**Academic organisation:** Anatomy  
**Prerequisite:** ANA121 and ANA126 and CMY127  
**Contact time:** 1 ppw 2 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 12  
**Module content:**  
Functional review of the cell and cell content. Normal and abnormal cell function in relation to structure. Control of the human cell, heredity and the human genome. Cell communication, growth and development, adhesion and division. Aspects of cellular research. Techniques on how to study cells. Medical cell and molecular biology application. NOTE: This module is not open to all students and may only be taken by BSc (Medical Sciences) students.

ANA 215 Paleoanthropology 215  
**Academic organisation:** Anatomy  
**Contact time:** 1 ppw 2 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 12  
**Module content:**  
Introduction to paleoanthropology, focusing on hominid fossil record, principles of evolution, principles of heredity, human variation, introduction to primatology, hominid taxonomy, time-frames and dating methods, fossilisation and taphonomy, trends in hominid evolution, hominid sites. *Australopithecus*, *homo habilis*, *homo erectus*, *homo sapiens neanderthalensis*, the origin of anatomically modern human beings, DNA studies, palaeo-environments, hominid diets, introduction to the development of culture, South African populations, human adaptation and modernisation.

ANA 217 Human anatomy 217  
**Academic organisation:** Anatomy
Prerequisite: ANA121 and ANA122 and CMY127
Contact time: 2 lpw 2 ppw
Period of presentation: Semester 1
Language of tuition: English Credits: 16
Module content:
Regional approach to human anatomy. Cadaver dissection of the upper and lower limbs, back, thorax, abdomen, pelvis, perineum and genital area. Anatomical techniques. NOTE: This module is not open to all students and may only be taken by BSc (Medical Sciences) students.

ANA 226 Human histology 226
Academic organisation: Anatomy
Prerequisite: ANA 126#
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 2
Language of tuition: English Credits: 12
Module content:
General introduction to organ structure. Terminology. The eye, ear, skin, circulatory system, nervous system, lymphoid system, gastrointestinal tract, gastrointestinal tract glands, respiratory system, urinary system, male and female reproductive systems, endocrine system. NOTE: This module is not open to all students and may only be taken by BSc (Medical Sciences) students.

ANA 227 Human anatomy 227
Academic organisation: Anatomy
Prerequisite: ANA 217GS#
Contact time: 2 lpw 2 ppw
Period of presentation: Semester 2
Language of tuition: English Credits: 16
Module content:
Regional approach to human anatomy. Cadaver dissection of the head, neck as well as neuro-anatomy. Anatomical techniques. NOTE: This module is not open to all students and may only be taken by BSc (Medical Sciences) students.

ANA 315 Forensic anthropology 315
Academic organisation: Anatomy
Prerequisite: ANA 122, ANA 215
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 1
Language of tuition: English Credits: 18
Module content:
Introduction to forensic anthropology, detection of graves, excavation of graves, human vs. animal bone, forensic entomology, osteometry, cranial and post-cranial measurements, non-metric features of the skeleton, age determination, sex determination, race determination, ante-mortem stature, dental analysis, osteopathology, factors of individualisation, measurements of the face, introduction to face mapping and skull-photo superimposition, legal aspects. NOTE: This module is not open to all students and may only be taken by BSc (Medical Sciences) students.
ANA 316 Histology techniques 316
Academic organisation: Anatomy
Prerequisite: ANA 226
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 1
Language of tuition: English
Credits: 18
Module content:

ANA 324 Human cell and developmental biology 324
Academic organisation: Anatomy
Prerequisite: ANA 214, ANA 226
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:
Practical aspects of cell biology. Cell, tissue, organ, and organism culture. The biology of the culture environment. Cellular basic of morphogenesis, cleavage patterns and gastrulation. The early vertebrate development; neurilation, ecto-, meso- and endoderm derivatives. Cell destiny and embryonic axis including malformations. Development of the tetrapod limb and cell death. Cell interactions at a distance through hormones and metamorphosis. NOTE: This module is not open to all students and may only be taken by BSc (Medical Sciences) students.

ANA 327 Comparative anatomy 327
Academic organisation: Anatomy
Prerequisite: ANA 121, ANA 122, ANA 217, ANA 227
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:
Introduction to comparative anatomy. Introduction to comparative osteology. Comparative anatomy of the appendicular skeleton. Comparative anatomy of the axial skeleton. NOTE: This module is not open to all students and may only be taken by BSc (Medical Sciences) students.

ANA 328 Applied research techniques 328
Academic organisation: Anatomy
Prerequisite: ANA 315#, ANA 316#
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 2
Language of tuition: English
Credits: 8
Module content:
Introduction to research. Development of research project. Research skills. Completion of literature review. NOTE: This module is not open to all students and may only be taken by BSc (Medical Sciences) students.
FAR 381 Pharmacology 381
Academic organisation: Pharmacology
Prerequisite: FLG 211, FLG 212, FLG 221, FLG 222 GS
Contact time: 2 lpw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 20
Module content:
Introduction, receptors, antagonism, kinetic principles, drugs that impact upon the autonomic and central nervous system, pharmacotherapy of hypertension, angina pectoris, myocardial infarction, heart failure, arrhythmias, and epilepsy. Diuretics, glucocorticosteroids, local anaesthetics, anaesthetic drugs, analgesics, iron and vitamins, oncostatics and immuno suppressants.

FAR 382 Pharmacology 382
Academic organisation: Pharmacology
Prerequisite: FAR 381, FLG 211, FLG 212, FLG 221, FLG 222 GS
Contact time: 2 lpw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 15
Module content:
Hormones, drugs that act on the histaminergic, serotoninergic, and dopaminergic receptors. Pharmacotherapy of diabetes mellitus, schizophrenia, depression, obesity, anxiety, insomnia, gastrointestinal diseases. Anticoagulants, antimicrobial drugs.

FLG 211 Introductory and neurophysiology 211
Academic organisation: Physiology
Prerequisite: CMY 117, CMY 127, MLB 111 and PHY 131
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 12
Module content:
Orientation in physiology, homeostasis, cells and tissue, muscle and neurophysiology, cerebrospinal fluid and the special senses.
Practical work: Practical exercises to complement the theory.

FLG 212 Circulatory physiology 212
Academic organisation: Physiology
Prerequisite: CMY 117, CMY 127, MLB 111 and PHY 131
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 12
Module content:
Body fluids; haematology; cardiovascular physiology and the lymphatic system. Practical work: Practical exercises to complement the theory.

FLG 221 Lung and renal physiology, acid-base balance and temperature 221
Academic organisation: Physiology
Prerequisite: FLG 211, FLG 212
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 12
Module content:
Structure, gas exchange and non-respiratory functions of the lungs; structure, excretory and non-urinary functions of the kidneys, acid-base balance, as well as the skin and body temperature control. Practical work: Practical exercises to complement the theory.

FLG 222 Digestion, endocrinology and reproductive system 222
Academic organisation: Physiology
Prerequisite: FLG 211, FLG 212
Contact time: 2 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: English
Credits: 12
Module content:
Nutrition, digestion and metabolism; hormonal control of the body functions and the reproductive systems. Practical work: Practical exercises to complement the theory.

FLG 311 Applied cellular physiology 311
Academic organisation: Physiology
Prerequisite: BCM 253 GS, BCM 254 GS, BCM 255 GS, BCM 256 GS, BCM 263 GS, BCM 264 GS, BCM 265 GS, BCM 266 GS, FLG 221 and FLG 222
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 14
Module content:
This module comprises studies of the cell cycle, signal transduction pathways involved, cell cycle defects and mutations, cellular radiosensitivity and the physiological role, morphological properties and biochemical mechanisms of apoptosis and autophagy. Practical work: Exposure to applied cellular and in-vitro cell culture techniques.

FLG 312 Developmental physiology 312
Academic organisation: Physiology
Prerequisite: GS for all of BCM 253, BCM 254, BCM 255, BCM 256, BCM 263, BCM 264, BCM 265, BCM 266, FLG 221 and FLG 222
Contact time: 1 lpw
Period of presentation: Semester 1
Language of tuition: English
Credits: 9
Module content:
Study of the physiological development and adaptations from the foetus through to the aged.

FLG 313 Research methodology and literature studies 313
Academic organisation: Physiology
Prerequisite: BCM 253 GS, BCM 254 GS, BCM 255 GS, BCM 256 GS, BCM 263 GS, BCM 264 GS, BCM 265 GS, BCM 266 GS, FLG 221 and FLG 222
Contact time: 1 dpw 1 lpw 1 ppw
Period of presentation: Semester 1
Language of tuition: English
Credits: 14
Module content:
Research methodology, career planning, subject orientated literature studies and seminars. Practical work: Preparation of research protocol, gathering of information (literature), writing of seminar.
FLG 314 Immunology 314
Academic organisation: Physiology
Prerequisite: GS for all of BCM 253, BCM 254, BCM 255, BCM 256, BCM 263, BCM 264, BCM 265, BCM 266, FLG 221 and FLG 222
Contact time: 1 lwp
Period of presentation: Semester 1
Language of tuition: English
Credits: 9
Module content:
Introduction to basic, applied and integrated immunological mechanisms.

FLG 322 Industrial physiology 322
Academic organisation: Physiology
Prerequisite: BCM 253 GS, BCM 254 GS, BCM 255 GS, BCM 256 GS, BCM 263 GS, BCM 264 GS, BCM 265 GS, BCM 266 GS, FLG 221 and FLG 222
Contact time: 1 lwp 1 pwp
Period of presentation: Semester 2
Language of tuition: English
Credits: 18
Module content:
Problem-orientated module, with the emphasis on occupational health and safety in the industrial environment. Integration of different physiological systems is required. Practical work: Exposure to occupational hygiene measurement techniques.
*This module is reserved for students who intend studying the honours degree in occupational health and safety.

FLG 324 Exercise physiology 324
Academic organisation: Physiology
Prerequisite: BCM 253 GS, BCM 254 GS, BCM 255 GS, BCM 256 GS, BCM 263 GS, BCM 264 GS, BCM 265 GS, BCM 266 GS, FLG 221 and FLG 222
Contact time: 1 lwp 1 pwp
Period of presentation: Semester 2
Language of tuition: English
Credits: 14
Module content:

FLG 325 Nutrition physiology 325
Academic organisation: Physiology
Prerequisite: BCM 253 GS, BCM 254 GS, BCM 255 GS, BCM 256 GS, BCM 263 GS, BCM 264 GS, BCM 265 GS, BCM 266 GS, FLG 221 and FLG 222
Contact time: 1 lwp
Period of presentation: Semester 2
Language of tuition: English
Credits: 9
Module content:
The importance of nutrients and micro nutrients in the composition of a normal diet; the neuro-endocrine control of food intake and special aspects of function control of the digestive tract.

FLG 327 Higher neurological functions 327
Academic organisation: Physiology
Prerequisite: BCM 253 GS, BCM 254 GS, BCM 255 GS, BCM 256 GS, BCM 263 GS, BCM 264 GS, BCM 265 GS, BCM 266 GS, FLG 221 and FLG 222
Contact time: 2 lpw 1 ppw  
**Period of presentation**: Semester 1  
**Language of tuition**: English  
**Credits**: 18

**Module content:**
Overview of higher cognitive functions and the relationship between psyche, brain and Immune system.

**FLG 328 Pathophysiology 328**  
**Academic organisation**: Physiology  
**Prerequisite**: BCM 253 GS, BCM 254 GS, BCM 255 GS, BCM 256 GS, BCM 263 GS, BCM 264 GS, BCM 265 GS, BCM 266 GS, and FLG 221 and FLG 222  
**Contact time**: 1 lpw  
**Period of presentation**: Semester 2  
**Language of tuition**: English  
**Credits**: 9

**Module content:**
Human patho and applied physiology.

**FLG 329 Integrated human physiology 329**  
**Academic organisation**: Physiology  
**Prerequisite**: BCM 253 GS, BCM 254 GS, BCM 255 GS, BCM 256 GS, BCM 263 GS, BCM 264 GS, BCM 265 GS, BCM 266 GS, FLG 221 and FLG 222  
**Contact time**: 1 ppw  
**Period of presentation**: Semester 2  
**Language of tuition**: English  
**Credits**: 9

**Module content:**
Integration of all the human physiological systems.

**FLG 330 Cellular and developmental physiology 330**  
**Academic organisation**: Physiology  
**Prerequisite**: BCM253 GS and BCM254 GS and BCM255 GS and BCM256 GS and BCM263 GS and BCM264 GS and BCM265 GS and BCM266 GS and FLG221 and FLG222  
**Contact time**: 2 lpw 1 ppw  
**Period of presentation**: Semester 1  
**Language of instruction**: English  
**Credits**: 18

**Module content:**
This module comprises of studies of cell cycle regulation and signal transduction upon induction of growth or types of cell death. Study of the physiological development and adaptations from the foetus through to the aged. Practical work: Exposure to applied cellular and in vitro cell culture techniques.

**FLG 331 Exercise and nutrition science 331**  
**Academic organisation**: Physiology  
**Prerequisite**: BCM 253 GS, BCM 254 GS, BCM 255 GS, BCM 256 GS, BCM 263 GS, BCM 264 GS, BCM 265 GS, BCM 266 GS, FLG 221 and FLG 222  
**Contact time**: 2 lpw 1 ppw  
**Period of presentation**: Semester 2  
**Language of instruction**: English  
**Credits**: 18

**Module content:**
FLG 332 Applied and pathophysiology 332 (Activate 2015)  
**Academic organisation:** Physiology  
**Prerequisite:** BCM 253 GS, BCM 254 GS, BCM 255 GS, BCM 256 GS, BCM 263 GS, BCM 264 GS, BCM 265 GS, BCM 266 GS, FLG 221 and FLG 222  
**Contact time:** 2 lpw 1 ppw  
**Period of presentation:** Semester 2  
**Language of instruction:** English  
**Credits:** 18  
**Module content:**  
Integration of all the human physiological systems.  
Practical work: Applied practical work.

FSG 110 Physiology 110  
**Academic organisation:** Physiology  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 6  
**Module content:**  
Introduction (terminology and anatomical orientation); chemical principles; cytology and histology; neuro-physics and the senses; haematology and body fluids; cardiovascular system.

FSG 120 Physiology 120  
**Academic organisation:** Physiology  
**Prerequisite:** FSG 110  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 6  
**Module content:**  
Respiratory system; nutrition; digestion and metabolism; kidneys and acid-base equilibrium; endocrinology; reproduction physiology and reproduction; skin and body temperatures.

**Alphabetical list of modules offered by the Faculty of Economic and Management Sciences**

BDO 181 Industrial and organisational psychology 181  
**Academic organisation:** Human Resource Management  
**Contact time:** 3 lpw  
**Period of presentation:** Quarter 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 5  
**Module content:**  
Capita selecta  
This module will provide an introduction to personnel psychology, organisational behaviour and labour relations. It will refer to the selection of employees and the training and development of human resources in order to adapt to changing circumstances. The role of leadership in group utilisation and motivation will be treated both theoretically and practically.  
Labour relations will be studied in terms of institutional processes and the service relationship and will include practical aspects such as the handling of grievances, disciplining and dispute resolution.
BEL 220 Taxation 220
**Academic organisation:** Taxation
**Prerequisite:** FRK 111, FRK 121 or FRK 100 or FRK 101
**Contact time:** 3 lpw 1dpw
**Period of presentation:** Semester 1
**Language of tuition:** Both Afr and Eng  
**Credits:** 16
**Module content:**
Introduction to income taxation, gross income, gross income (special inclusions), exempt income, general deduction formula, special deductions for individuals, capital allowances, introduction to fringe benefits, provisional taxation and employees' taxation.

BEM 110 Marketing management 110
**Academic organisation:** Marketing Management
**Period of presentation:** Semester 1
**Contact time:** 3 lpw
**Language of tuition:** Both Afr and Eng  
**Credits:** 10
**Module content:**
Principles of marketing management and marketing instruments, customer centricity, the process of marketing management, market segmentation, positioning and marketing information systems, environmental analysis, identification of target markets, value creation, positioning strategies, consumer behaviour, relationship marketing, relationship intention, application of product, price, marketing communication and distribution strategies.

BEM 122 Marketing applications 122
**Academic organisation:** Marketing Management
**Prerequisite:** BEM 110 GS
**Contact time:** 3 lpw
**Period of presentation:** Semester 2
**Language of tuition:** Both Afr and Eng  
**Credits:** 10
**Module content:**
E-marketing, services marketing, not-for-profit marketing, business-to-business marketing, retailing, global marketing.

BEM 211 Marketing management 211
**Academic organisation:** Marketing Management
**Prerequisite:** BEM 110 or BEM 121/122 with a GS in the other
**Contact time:** 3 lpw
**Period of presentation:** Semester 1
**Language of tuition:** Double medium  
**Credits:** 16
**Module content:**
Product decisions
Problem statement and concept determination of product decisions, management strategies of the organisation, organisational and product strategy, implementation of the product strategy, product and market development strategy and the product life cycle.
Distribution decisions
The development and management of distribution channels – strategic aims, conventional marketing systems, the main role players, the integration of distribution with the other marketing instruments and relationship marketing; the influence of the external environment on channel design and management; the management of horizontal and vertical marketing systems and the forming of strategic alliances.
BEM 212 Consumer behaviour 212  
**Academic organisation:** Marketing and Communication Management  
**Prerequisite:** BEM 110 GS  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 16  
**Module content:**  
Internal and external influencing factors of consumer behaviour, the consumer’s decision process and application fields of consumer behaviour, consumerism and social responsibility, buying behaviour of consumers in both product and service related industries, consumer psychology and the influence thereof on buying behaviour, psychology of pricing, influencing factors in consumer buying behaviour, the impact of various forms of marketing communication on buying behaviour.

BEM 221 Marketing management 221  
**Academic organisation:** Marketing Management  
**Prerequisite:** BEM 110 or BEM 121/122 with a GS in the other, BEM 211 GS  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 16  
**Module content:**  
Product decisions  
Problem statement and concept determination of product decisions, management strategies of the organisation, organisational and product strategy, implementation of the product strategy, product and market development strategy and the product life cycle.  
Distribution decisions  
The development and management of distribution channels – strategic aims, conventional marketing systems, the main role players, the integration of distribution with the other marketing instruments and relationship marketing; the influence of the external environment on channel design and management; the management of horizontal and vertical marketing systems and the forming of strategic alliances.

BEM 224 Integrated brand communication 224  
**Academic organisation:** Marketing Management  
**Prerequisite:** BEM 110 or BEM 121/122 with a GS in the other, BEM 211 GS  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 16  
**Module content:**  
Integrated brand communications approach, marketing communication planning, objectives and budgets for integrated marketing communications, principles and strategising of marketing communication elements, new media, the brand name communication process, marketing metrics and evaluation for marketing communication effectiveness.

BEM 311 Marketing management 311  
**Academic organisation:** Marketing Management  
**Prerequisite:** BEM 211 or BEM 221 with a GS in the other  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 20
Module content:
Brand management
The scope of brand awareness, brand name associations and customer-brand relationships. The development of brand name concept management, brand name extensions and co-branding. Exploring direct marketing and brand name management, brand name architecture and brand name custodianship. The brand name communication process, brand name decisions, brand name identity, brand name loyalty and brand name equity. The design of marketing strategies to establish and extend brand name equity.
Marketing research
The use of marketing research in marketing decision making; the process of marketing research, research designs, random tests, consumer surveys, questionnaires, experimentation, observation, data analysis and analyses of marketing models. Scientific approach to marketing information, the influence of modern trends (computers, Internet). Integrated application of marketing research principles are assessed.

BEM 321 Strategic marketing 321
Academic organisation: Marketing Management
Prerequisite: BEM 211 or BEM 221 with a GS in the other, BEM 311 GS
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 20
Module content:
Strategic issues in marketing
Multilevel marketing; relationship marketing; e-marketing; brand loyalty; generation segmentation; knowledge management and ethics in marketing. Case studies, group discussions, seminars, and visits to/ by organisations for meaningful integration of the theory and practice.
Strategic marketing
Strategic analysis; customer management; market strategies; globalisation; strategy implementation; marketing planning and strategy evaluation and control. Case studies, group discussions, seminars, and visits to/ by organisations for meaningful integration of the theory and practice.

BME 120 Biometry 120
Academic organisation: Statistics
Prerequisite: At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123
Contact time: 1 ppw 4 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 16
Module content:
BME 210 Biometry 210
**Academic organisation:** Statistics
**Prerequisite:** BME 120
**Contact time:** 1 ppw 4 lpw
**Period of presentation:** Semester 1
**Language of tuition:** English  
**Credits:** 24

**Module content:**

EKN 110 Economics 110
**Academic organisation:** Economics
**Contact time:** 1 dpw 2 lpw
**Period of presentation:** Semester 1
**Language of tuition:** Both Afr and Eng  
**Credits:** 10

**Module content:**
Conceptualise the interrelationships of the different sectors in South African economy. The functioning of international trade and policy, government economics and policy, the labour market, monetary economics, economic development and environmental economics with specific reference to the South African context. The impact of national and international decisions and events on the South African economy.

EKN 113 Economics 113
**Academic organisation:** Economics
**Prerequisite:** At least 6 (70-79%) in Mathematics in the Grade 12 examination or STK 113 (60%) and STK 123 (60%)
**Contact time:** 3 lpw
**Period of presentation:** Semester 1
**Language of tuition:** Both Afr and Eng  
**Credits:** 15

**Module content:**
Introduction to economics and principles of microeconomics. The scope of economics; the basic theory of demand and supply; price, income and cross elasticity of demand; consumer utility, the utility function and case studies in terms of the utility function; the theory of the firm in the short and long run; market structures, namely the perfect market, monopoly, oligopoly and monopolistic competition; public sector finances; microeconomics versus macroeconomics and economic statistics.

EKN 120 Economics 120
**Academic organisation:** Economics
**Prerequisite:** At least 4 (50-59%) in Mathematics in the Grade 12 examination or STK 113 (60%) and STK 123 (60%) and EKN 110 GS or EKN113 GS
**Contact time:** 2 lpw 1 dpw
**Period of presentation:** Semester 2
**Language of tuition:** Both Afr and Eng  
**Credits:** 10

**Module content:**
The economic environment and problem: working and course of the South African economy; functioning and interrelationships of the different economic sectors. Macroeconomic theory and analysis. Analyse and interpret economic performance
criteria: economic growth, inflation, job creation, balance of payments and exchange rate stability, income distribution. Calculate and interpret core economic indicators. Basic microeconomic principles: demand analysis (consumer theory); supply analysis (producer theory). Market analysis: market equilibrium; price determination; market forms; market failure; calculate and interpret price, income and cross elasticities.

EKN 123 Economics 123
Academic organisation: Economics
Prerequisite: EKN 113 GS and at least 6 (70-79%) in Mathematics in the Grade 12 examination of STK 113 (60%) and STK 123 (60%)
Contact time: 3 lpw
Language of tuition: Both Afr and Eng  
Credits: 15
Module content:
National income and principles of macroeconomics
The mechanics of national income accounts, the Keynesian macroeconomic model, the money market, demand for money and money supply, money and credit creation and the role of the monetary authorities. The IS-LM model of macroeconomic equilibrium and monetary and fiscal policy applications. The aggregate demand and supply models with the debate between the classical school, the monetarists and the Keynesian school. The problems of inflation and unemployment. Macroeconomic issues, namely macroeconomic policy, international trade, the balance of payments and economic growth.

EKN 214 Economics 214
Academic organisation: Economics
Prerequisite: EKN 110 GS and EKN 120 or EKN 113 GS and EKN 123 and STK 110 GS and STK 120 GS
Contact time: 3 lpw
Language of tuition: Both Afr and Eng  
Credits: 16
Module content:
Macroeconomics
From Wall and Bay Street to Diagonal Street: a thorough understanding of the mechanisms and theories explaining the workings of the economy is essential. Macroeconomic insight is provided on the real market, the money market, two market equilibrium, monetarism, growth theory, cyclical analysis, inflation, Keynesian general equilibrium analysis and fiscal and monetary policy issues. Mathematics for economics and econometric analysis of macroeconomic issues.

EKN 215 Economics 215
Academic organisation: Economics
Prerequisite: EKN 110 GS and EKN 120 or EKN 113 GS and EKN 123, STK 110 GS and STK 120 GS
Contact time: 1 dpw 2 lpw
Language of tuition: Both Afr and Eng  
Credits: 16
Module content:
Monetary economics
The role and elements of the financial system in the economy, economic description, functions, historic development, legal framework and asset and liability structures of financial institutions in South Africa. Financial instruments in the money market, financial instruments in the capital market, fixed interest securities market, variable interest
securities market, stock market (shares), capital market instruments, foreign exchange market and instruments, futures market and contracts, options market and contracts. The meaning and functions of money, understanding interest rates, portfolio choice, the behaviour of interest rates, risk and term structure of interest rates, an economic analysis of the financial structure, multiple deposit creation and the money supply process, determinants of the money supply, the demand for money (different schools of thought) transmission mechanisms of monetary policy, money and inflation, theory of rational expectations and efficient capital markets, rational expectations and implications for policy.

Global finance and the world economic environment, international monetary system, Eurocurrency market and offshore banking, overview of the global financial markets, the current monetary policy framework and policy process in South Africa, possible future developments (including inflationary targets and modern central banking trends), bank regulation: the key role banks must play in the financial system and the basic reason for bank regulation and electronic banking.

**EKN 224 Economics 224**

**Academic organisation:** Economics  
**Prerequisite:** EKN 110 or EKN113, STK 110, EKN 214 GS  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 16

**Module content:**  
Microeconomics  
Microeconomic insight is provided into: consumer and producer theory, general microeconomic equilibrium, Pareto-optimality and optimality of the price mechanism, welfare economics, market forms and the production structure of South Africa. Statistic and econometric analysis of microeconomic issues.

**EKN 314 Economics 314**

**Academic organisation:** Economics  
**Prerequisite:** EKN 214, EKN 224 and STK 120  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 20

**Module content:**  
International trade/finance  
International economic insight is provided into international economic relations and history, theory of international trade, international capital movements, international trade politics, economic and customs unions and other forms or regional cooperation and integration, international monetary relations, foreign exchange markets, exchange rate issues and the balance of payments, as well as open economy macroeconomic issues.

**FBS 110 Financial management 110**

**Academic organisation:** Financial Management  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 10

**Module content:**  
Purpose and functioning of financial management. Basic financial management concepts. Accounting concepts and the use of the basic accounting equation to describe the financial position of a business. Recording of financial transactions. Relationship between

**FBS 112 Financial management 112**

**Academic organisation:** Financial Management  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 10

**Module content:**  

**FBS 120 Financial management 120**

**Academic organisation:** Financial Management  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 10

**Module content:**  
Analysis of financial statements. Budgeting and budgetary control. Tax principles and normal income tax for individuals. Time value of money and its use for financial and investment decisions. Calculating the cost of capital and the financing of a business to maintain the optimal capital structure. Capital investment decisions and a study of the financial selection criteria in the evaluation of capital investment projects. The dividend decision and an overview of financial risk management.

**FBS 122 Financial management 122**

**Academic organisation:** Financial Management  
**Contact time:** 3 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 10

**Module content:**  

**FRK 111 Financial accounting 111**

**Academic organisation:** Accounting  
**Contact time:** 4 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 10

**Module content:**  
The nature and function of accounting; the development of accounting; financial position; financial result: the recording process; processing of accounting data; treatment of VAT; elementary income statement and balance sheet; flow of documents; accounting systems; introduction to internal control and internal control measures; bank reconciliations; control accounts; adjustments; financial statements of a sole proprietorship; the accounting framework.
FRK 121 Financial accounting 121
Academic organisation: Accounting
Prerequisite: FRK 111 GS
Contact time: 4 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Module content:
Property, plant and equipment; intangible assets; inventories; liabilities; presentation of financial statements; enterprises without profit motive; partnerships; companies; close corporations; cashflow statements; analysis and interpretation of financial statements.

INF 112 Informatics 112
Academic organisation: Informatics
Prerequisite: Refer to Regulation 1.2(e); or 60% for both STK 113, STK 123 or STK 110
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Module content:
Introduction to information systems, information systems in organisations, hardware: input, processing, output, software: systems and application software, organisation of data and information, telecommunications and networks, the Internet and Intranet. Transaction processing systems, management information systems, decision support systems, information systems in business and society, systems analysis, systems design, implementation, maintenance and revision.

INF 153 Informatics 153
Academic organisation: Informatics
Prerequisite: Refer to Regulation 1.2(f)
Contact time: 2 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Module content:
General systems theory, creative problem solving, soft systems methodology.

INF 154 Informatics 154
Academic organisation: Informatics
Prerequisite: Refer to Regulation 1.2(f)
Contact time: 1 lpw 2 ppw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Module content:
Introduction to programming.

INF 163 Informatics 163
Academic organisation: Informatics
Prerequisite: INF 153; Regulation 1.2(f)
Contact time: 2 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Module content:
The systems analyst, systems development building blocks, systems development, systems analysis methods, process modelling.
INF 164 Informatics 164
Academic organisation: Informatics
Prerequisite: INF 154; Regulation1.2(f)
Contact time: 1 lpw 2 ppw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng  
Credits: 5
Module content:
Advanced programming, use of a computer-aided software engineering tool.

INF 214 Informatics 214
Academic organisation: Informatics
Prerequisite: CIL 111 and CIL 121
Contact time: 2 ppw 3 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng  
Credits: 14
Module content:

INF 225 Informatics 225
Academic organisation: Informatics
Prerequisite: CIL 111, CIL 121, INF 163 and INF 164
Contact time: 1 lpw 1 ppw 2 dpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng  
Credits: 14
Module content:
An overview of systems infrastructure and integration.

INF 261 Informatics 261
Academic organisation: Informatics
Prerequisite: INF 214
Contact time: 1 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng  
Credits: 7
Module content:

INF 281 Informatics 281
Academic organisation: Informatics
Prerequisite: FRK 121 or FRK 100 or FRK 101
Period of presentation: Semester 1 or Semester 2
Language of tuition: Both Afr and Eng  
Credits: 3
Module content:
Computer processing of accounting information.
KOB 183 Communication management 183

Academic organisation: Marketing and Communication Management
Contact time: 3 lpw
Period of presentation: Quarter 3
Language of tuition: Both Afr and Eng

Credits: 5

Module content:
*Module content will be adapted in accordance with the appropriate degree programme. Only one of KOB 181-184 may be taken as a module where necessary for a programme.

Applied business communication skills. Acquiring basic business communication skills will enhance the capabilities of employees, managers and leaders in the business environment. An overview of applied skills on the intrapersonal, dyadic, interpersonal, group (team), organisational, public and mass communication contexts is provided. The practical part of the module (for example, the writing of business reports and presentation skills) concentrates on the performance dimensions of these skills as applied to particular professions.

OBS 114 Business management 114

Academic organisation: Business Management
Contact time: 3 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng

Credits: 10

Module content:
Introduction to business management as a science; the environment in which the enterprise operates; the field of business, the mission and goals of an enterprise; management and entrepreneurship. The choice of a form of enterprise; the choice of products and/or services; profit and cost planning for different sizes of operating units; the choice of location; the nature of production processes and the layout of the plant or operating unit.

Introduction to and overview of general management, especially regarding the five management tasks: strategic management; contemporary developments and management issues; financial management; marketing and public relations. Introduction to and overview of the value chain model; management of the input; management of the purchasing function; management of the transformation process with specific reference to production and operations management; human resources management and information management; corporate governance and black economic empowerment (BEE).

OBS 124 Business management 124

Academic organisation: Business Management
Prerequisite: Admission to the examination in OBS 114
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng

Credits: 10

Module content:
The nature and development of entrepreneurship; the individual entrepreneur and characteristics of South African entrepreneurs. Looking at the window of opportunity. Getting started (business start up). Exploring different routes to entrepreneurship: entering a family business, buying a franchise, home-based business and the business buyout. This semester also covers how entrepreneurs can network and find support in their environments. Case studies of successful entrepreneurs – also South African entrepreneurs – are studied.
OBS 210 Business management 210
Academic organisation: Business Management
Prerequisite: OBS 114 or 124 with admission to the examination in the other
Contact time: 3 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 16
Module content:
Logistics management
The role of logistics in an enterprise; definition and scope of customer service; electronic
and other logistics information systems; inventory management; materials management
with special reference to Japanese systems; management of the supply chain. Methods
of transport and transport costs; types and costs of warehousing; electronic aids in
materials handling; cost and price determination of purchases; organising for logistics
management; methods for improving logistics performance.

OBS 220 Business management 220
Academic organisation: Business Management
Prerequisite: OBS 114 or 124 with admission to the examination in the other
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 16
Module content:
Project management: Introduction
Project management concepts; needs identification; the project, the project manager and
the project team; types of project organisations; project communication and
documentation.
Planning and control: planning, scheduling and schedule control of projects; resource
considerations and allocations; cost planning and performance evaluation.

OBS 321 Entrepreneurship 321
Academic organisation: Business Management
Prerequisite: Admission to the examination in OBS 311
Contact time: 3 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 20
Module content:
*General service module available as elective module for other degree programmes.
Performance motivation: development of positive motives; role models; determining of the
level of achievement motivation; reinforcement of the need for performance motivation;
strategies and action plans. Creativity, innovation, need for achievement, entrepreneurial
role models and the development of risk propensity.

STK 110 Statistics 110
Academic organisation: Statistics
Prerequisite: At least 5 (60-69%) in Mathematics in the Grade 12 examination.
Candidates who do not qualify for STK 110 must register for STK 113 and STK 123
Contact time: 1 ppw 3 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 13
Module content:
Descriptive statistics:
Sampling and the collection of data; frequency distributions and graphical representa-
tions. Descriptive measures of location and dispersion.
Probability and inference:
Introductory probability theory and theoretical distributions. Sampling distributions. Estimation theory and hypothesis testing of sampling averages and proportions (one and two-sample cases). Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques. This module is also presented as an anti-semester bilingual module.

STK 113 Statistics 113
Academic organisation: Statistics
Contact time: 1 ppw (during the last 7 weeks) 3 lpw 1 tpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng Credits: 11
Module content:
*On its own, STK 113 and 123 will not be recognised for degree purposes, but exemption will be granted from STK 110.
Data operations and transformations:
Introductory concepts, the role of statistic, various types of data and the number system. Concepts underlying linear, quadratic, exponential, hyperbolic, logarithmic transformations of quantitative data, graphical representations, solving of equations, interpretations. Determining linear equations in practical situations. Characteristics of logarithmic functions. The relationship between the exponential and logarithmic functions in economic and related problems. Systems of equations in equilibrium. Additional concepts relating to data processing, functions and inverse functions, sigma notation, factorial notation, sequences and series, inequalities (strong, weak, absolute, conditional, double) and absolute values.
Descriptive statistics – Univariate:
Sampling and the collection of data, frequency distributions and graphical representations. Descriptive measures of location and dispersion. Introductory probability theory. Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques. The weekly one hour practical is presented during the last seven weeks of the semester. This module is also presented as an anti-semester bilingual module.

STK 120 Statistics 120
Academic organisation: Statistics
Prerequisite: STK 110 GS or both STK 113 GS and STK 123 GS or WST 133 and WST 143
Contact time: 3 lpw 1 ppw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng Credits: 13
Module content:
Multivariate statistics:
Analysis of variance, categorical data analysis, distribution-free methods, curve fitting, regression and correlation, the analysis of time series and indices. Statistical and economic applications of quantitative techniques:
Systems of linear equations: drafting, matrices, solving, application. Optimisation; linear functions (two and more independent variables), non-linear functions (one and two independent variables). Marginal and total functions. Stochastic and deterministic variables in statistical and economic context: producers’ and consumers’ surplus, distribution functions, probability distributions, probability density functions. Identification, use, evaluation, interpretation of statistical computer packages and statistical techniques. This module is also presented as an anti-semester bilingual module.
STK 123 Statistics 123  
**Academic organisation:** Statistics  
**Prerequisite:** STK 113 GS  
**Contact time:** 1 ppw (during the last 7 weeks) 3 lpw 1 tpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 12  
**Module content:**  
*On its own, STK 113 and 123 will not be recognized for degree purposes, but exemption will be granted from STK 110.*  
Optimisation techniques with economic applications:  
Data transformations and relationships with economic applications, operations and rules, linear, quadratic, exponential, hyperbolic and logarithmic functions; systems of equations in equilibrium, system of linear inequalities, solving of linear programming problems by means of the graphical and extreme point methods. Applications of differentiation and integration in statistic and economic related problems: the limit of a function, continuity, rate of change, the derivative of a function, differentiation rules, higher order derivatives, optimisation techniques, the area under a curve and applications of definite integrals.  
Probability and inference:  
Theoretical distributions. Sampling distributions. Estimation theory and hypothesis testing of sampling averages and proportions (one-sample and two-sample cases). Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques. The weekly one hour practical is presented during the last seven weeks of the semester.  
This module is also presented as an anti-semester bilingual module.

STK 161 Statistics 161  
**Academic organisation:** Statistics  
**Prerequisite:** STK110 GS or both STK 113 GS and STK 123 GS  
**Contact time:** 1 ppw 3 lpw  
**Period of presentation:** Quarter 3  
**Language of tuition:** Both Afr and Eng  
**Credits:** 6  
**Module content:**  
*Offered by the Department of Statistics*  
Multivariate statistics analysis of variance; categorical data analysis; distribution-free methods; curve fitting, regression and correlation; the analysis of time series and indices. Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques.  
This module is also presented as an anti-semester bilingual module.

STK 162 Statistics 162  
**Academic organisation:** Statistics  
**Prerequisite:** STK110 GS or both STK 113 GS and STK 123 GS  
**Contact time:** 1 ppw 3 lpw  
**Period of presentation:** Quarter 4  
**Language of tuition:** Both Afr and Eng  
**Credits:** 7  
**Module content:**  
Statistical and economic applications of quantitative techniques Systems of linear equations: Drafting, matrices, solving, application. Optimization: Linear functions (two and more independent variables), non-linear functions (one and two independent variables). Marginal and total functions. Stochastic and deterministic variables in statistical and economic context: Producer and consumer surplus, distribution functions, probability distributions, probability density functions. Identification, use, evaluation, interpretation of
statistical computer packages and statistical techniques. This module is also presented as an anti-semester (quarter 2) bilingual module.

**STK 210 Statistics 210**

**Academic organisation:** Statistics  
**Prerequisite:** STK 110, STK 120  
**Contact time:** 1 ppw 3 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Double medium  
**Credits:** 20  
**Module content:**  
Probability theory. Univariate probability distributions, expected values and moments. Special probability distributions: binomial, hypergeometric, poison, exponential, gamma, beta and normal distribution. Probability distributions and moments in the bivariate case. The bivariate normal distribution. Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques. This module is also presented in English as an anti-semester module.

**STK 220 Statistics 220**

**Academic organisation:** Statistics  
**Prerequisite:** STK 210 GS  
**Contact time:** 1 ppw 3 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Double medium  
**Credits:** 20  
**Module content:**  
Probability distributions and moments in the multivariate case. Multinomial distribution. Probability distributions of functions of random variables. Sampling procedures. Sampling distributions. Statistical inference concerning means, variances and proportions in the one-sample and two-sample cases. Identification, use, evaluation and interpretation of statistical computer packages and techniques in the simulation of sampling distributions and the execution of statistical inference. This module is also presented in English as an anti-semester module.

**STK 281 Statistics 281**

**Academic organisation:** Statistics  
**Prerequisite:** STK 110, STK 120  
**Contact time:** 1 ppw 2 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** English  
**Credits:** 10  
**Module content:**  
Applied regression analysis: simple and multiple regression, nonlinear regression, correlation, the use of dummy variables, heteroscedasticity, serial correlation and lag structures. Applied time-series analysis. Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques.

**STK 310 Statistics 310**

**Academic organisation:** Statistics  
**Prerequisite:** STK 210, STK 220  
**Contact time:** 1 ppw 3 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** English  
**Credits:** 25  
**Module content:**  
Regression analysis: simple and multiple regression; nonlinear regression; correlation
and the use of dummy variables. Multivariate distributions: normal, multinomial and
poisson distribution. Linear combinations of normal variables. Analysis of variance and
covariance. Categorical data analysis. Identification, use, evaluation and interpretation of
statistical computer packages and statistical techniques.

STK 320 Statistics 320
Academic organisation: Statistics
Prerequisite: STK 310 GS
Contact time: 1 ppw 3 lpw
Period of presentation: Semester 2
Language of tuition: English Credits: 25

Module content:
Regression analysis extensions: heteroscedasticity, serial correlation and lag structures.
Time-series analysis. Applications of matrices, differentiation and integration in the
economic and management sciences. Evaluation of simple economic models. Theory and
applications of time-series models: univariate time series. Stationary and non-stationary
time series. ARMA and ARIMA models. Regression models. Model identification and
Identification, use, evaluation and interpretation of statistical computer packages and
statistical techniques. Student seminars.

TBE 210 Tourism management 210
Academic organisation: Tourism Management
Contact time: 4 lpw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 16

Module content:
Tourism policy, product development and impacts
In this section the processes and policy issues pertaining to tourism product development
are addressed. Specific emphasis is placed on the importance of appropriate product and
destination development. Planning concepts at difference scales, development processes
as well as the principles and policies that should be followed in the planning of tourism
are addressed. This section concludes with a balanced perspective on the social,
economic and environmental impacts of tourism.
Tourism focus areas
This section investigates key growth sectors in the tourism industry such as ecotourism,
adventure tourism and cultural tourism. Specific attention is given to the nature and
extent of these growth sectors and focus areas, their interrelationships, importance and
the numerous opportunities they create for entrepreneurs and destinations in general.

TBE 220 Tourism management 220
Academic organisation: Tourism Management
Prerequisite: TBE 210 GS
Contact time: 4 lpw
Period of presentation: Semester 2
Language of tuition: Double medium Credits: 16

Module content:
The management of tourism attractions
In this section visitor attractions, which are at the core of successful tourism, will be
addressed at three levels. Firstly, the key role of visitor attractions in the tourism industry
will be outlined, after which the overall development process (feasibility studies, financial
and design aspects, etc.) relating to visitor attractions will receive attention. The last part
of this section focuses on the strategic management and operational aspects of visitor attractions.

Strategic destination marketing
This section firstly explores the unique characteristics of and approaches to strategic destination marketing, with particular emphasis on global best practices in this regard. It then provides a management and operational framework for destination marketing. Within this framework new developments, trends, practices and case studies in destination marketing are also addressed.

**TBE 310 Tourism management 310**

**Academic organisation:** Tourism Management  
**Prerequisite:** TBE 210 or TBE 220 with a GS in the other  
**Contact time:** 4 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Double medium  
**Credits:** 20

**Module content:**  
Hospitality management 1  
This section covers the “guest cycle” and addresses the process and procedures, from the moment a potential guest contacts an accommodation establishment to the time that he or she departs. All the operational and management functions of this process as well as key supportive aspects such as hospitality, social skills and customer care are covered in detail. A distinction is drawn between revenue centres and support centres. All the key support centres such as housekeeping, maintenance and security are covered. This section concludes with a well-rounded overview of the operational and management aspects of the front office and its support units.  
Hospitality management 2  
This section firstly covers the key operational and management aspects of food and beverage management, which forms a vital part of hospitality management. Industry exposure and practical involvement is an essential ingredient of this section. As financial management and costing is critical to the success of any hospitality organisation, the second part of this section covers all the policies, principles and procedures pertaining to financial operations and financial management in such establishments.

**WST 111 Mathematical statistics 111**

**Academic organisation:** Statistics  
**Prerequisite:** At least 5 (60-69%) in Mathematics in the Grade 12 examination  
**Contact time:** 1 ppw 4 lpw  
**Period of presentation:** Semester 1  
**Language of tuition:** Both Afr and Eng  
**Credits:** 16

**Module content:**  

**WST 121 Mathematical statistics 121**

**Academic organisation:** Statistics  
**Prerequisite:** WST 111 GS  
**Contact time:** 1 ppw 4 lpw  
**Period of presentation:** Semester 2  
**Language of tuition:** Both Afr and Eng  
**Credits:** 16

**Module content:**  
Sampling distributions and the central limit theorem. Statistical inference: Point and
interval estimation. Hypothesis testing with applications in one and two-sample cases. Introductory methods for: Linear regression and correlation, analysis of variance, categorical data analysis and non-parametric statistics. Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques.

**WST 133 Mathematical statistics 133**

**Academic organisation:** Statistics

**Prerequisite:** BSc and BCom numeric stream students: At least 3 (40-49%) in Mathematics in the Grade 12 examination and must be taken concurrently with WTW133, or BCom non-numeric stream students: At least 3 (40-49%) in Mathematics in the Grade 12 examination and must be taken concurrently with WTW183.

**Contact time:** 1 ppw 1 bpw 4 lpw

**Period of presentation:** Semester 1

**Language of tuition:** English

**Credits:** 8

**Module content:**
Descriptive statistics – Univariate:
The role of Statistics, various types of data. Sampling, probability and non-probability sampling techniques and the collection of data. Frequency, relative and cumulative distributions and graphical representations. Additional concepts relating to data processing: sigma notation, factorial notation. Descriptive measures of location, dispersion and symmetry. Exploratory data analysis.

Probability:
Introductory probability theory and applications. Set theory and probability laws. Introduction to random variables. Assigning probabilities, probability distributions, expected value and variance in general. Specific discrete probability distributions (Uniform, Binomial).

Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques.

**WST 143 Mathematical statistics 143**

**Academic organisation:** Statistics

**Prerequisite** BSc and BCom numeric stream students: WTW 133 and WST133 and must be taken concurrently with WTW143, or BCom non-numeric stream students: WTW 183 and WST133.

**Contact time:** 1 ppw 1 bpw 4 lpw

**Period of presentation:** Semester 2

**Language of tuition:** English

**Credits:** 8

**Module content:**
Probability and inference:
Probability theory and theoretical distributions for continuous random variables (Uniform, Normal and t). Sampling distributions (means and proportions). Estimation theory and hypothesis testing of sampling averages and proportions (one- and two-sample cases).

Optimisation techniques with economic applications:
Differentiation of Applications in statistic and economic-related problems. Integration. Applications of integration in statistic and economic-related problems. Systems of equations in equilibrium. The area under a curve and applications of definite integrals in Statistics and Economics.

Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques.
WST 153 Mathematical statistics 153
Academic organisation: Statistics
Prerequisite: WST 133 and WST143 and WTW143. Must be taken concurrently with WTW153
Contact time: 1 ppw 1 dpw 4 lpw
Period of presentation: Semester 1
Language of tuition: English
Credits: 8
Module content:
Probability distributions:
Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques.

WST 211 Mathematical statistics 211
Academic organisation: Statistics
Prerequisite: WST 111, WST 121, WTW 114 GS, WTW 126 GS and WTW 128 GS
Contact time: 2 ppw 4 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 24
Module content:

WST 221 Mathematical statistics 221
Academic organisation: Statistics
Prerequisite: WST 211 GS
Contact time: 2 ppw 4 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 24
Module content:
WST 311 Multivariate analysis 311
Academic organisation: Statistics
Prerequisite: WST 211, WST 221, WTW 211 GS and WTW 218 GS
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 18
Module content:

WST 312 Stochastic processes 312
Academic organisation: Statistics
Prerequisite: WST 211, WST 221, WTW 211GS and WTW 218 GS
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 1
Language of tuition: Double medium
Credits: 18
Module content:

WST 321 Time-series analysis 321
Academic organisation: Statistics
Prerequisite: WST 211, WST 221, WST 311 GS, WTW 211GS and WTW 218 GS
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 18
Module content:

WST 322 Actuarial statistics 322
Academic organisation: Statistics
Prerequisite: WST 211, WST 221, WTW 211GS and WTW 218 GS
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 2
Language of tuition: Double medium
Credits: 18
Module content:

WST 362 Mathematical statistics 362
Academic organisation: Statistics
Prerequisite: WST 211, WST 221, WTW 211 GS and WTW 218 GS
Contact time: 1 ppw 2 lpw
Period of presentation: Semester 1
Language of tuition: Double medium Credits: 18
Module content:

Alphabetical list of modules offered by the Faculty of Law

BER 210 Business law 210
Academic organisation: Mercantile Law
Contact time: 1 dpw 2 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng Credits: 16
Module content:
Basic principles of law of contract. Law of sales, credit agreements, lease.

BER 220 Business law 220
Academic organisation: Mercantile Law
Prerequisite: Examination entrance for BER 210
Contact time: 1 dpw 2 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng Credits: 16
Module content:

Alphabetical list of modules offered by the Faculty of Humanities

FIL 155 Science and world views 155
Academic organisation: Philosophy
Contact time: 1 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng Credits: 6
Module content:

LST 110 Language and study skills 110
Academic organisation: Unit for Academic Literacy
Contact time: 1 web-based period per week 2 lpw
Period of presentation: Semester 1
Language of tuition: English Credits: 6
Module content:
The module will aim to equip students with the ability to cope with the reading and writing demands of mainstream modules.

MTL 181 Medical terminology 181
Academic organisation: Ancient Languages
Contact time: 2 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng Credits: 12
Module content:
The module entails the acquisition of a basic medical orientated vocabulary compiled from Latin and Greek stem forms combined with prefixes and suffixes derived from these languages. The manner in which the meanings of medical terms can be determined by analyzing the terms into their recognizable meaningful constituent parts is taught and exercised. The functional application of medical terms in context as practical outcome of terminological application is continually attended to.

RES 210 Social research: Introductory methodology 210
Academic organisation: Psychology
Contact time: 2 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng Credits: 20
Module content:
The module introduces methods of inquiry in the social sciences and humanities. The purpose of this module is to introduce students to the research process in order to equip them with the necessary competence to:

- identify social problems, formulate research questions and hypotheses;
- have a basic understanding of writing the literature review and research proposal;
- know and select relevant methods of inquiry;
- be aware of the necessity of conducting ethically sound research; and
- interpret and present data graphically.

RES 320 Social research: Methodological thinking 320
Academic organisation: Sociology
Contact time: 2 lpw
Period of presentation: Semester 2
Language of tuition: English Credits: 30
Module content:
The module introduces methods of inquiry in the social sciences and humanities. The purpose of this module is to introduce students to the research process in order to equip them with the necessary competence to:
identify social problems, formulate research questions and hypotheses;
have a basic understanding of writing the literature review and research proposal;
know and select relevant methods of inquiry;
be aware of the necessity of conducting ethically sound research; and
interpret and present data graphically.

SLK 110 Psychology 110
Academic organisation: Psychology
Contact time: 2 lpw 1dpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng Credits: 12
Module content:
This module is a general orientation to psychology. An introduction is given to various theoretical approaches in psychology, and the development of psychology as a science is discussed. Selected themes from everyday life are explored and integrated with psychological principles. This module focuses on major personality theories. An introduction is given to various paradigmatic approaches in Psychology.

SLK 120 Psychology 120
Academic organisation: Psychology
Contact time: 2 lpw 1 dpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng Credits: 12
Module content:
This module introduces the student to a basic knowledge and understanding of the biological basis of human behaviour. The module addresses the key concepts and terminology related to the biological subsystem, the rules and principles guiding biological psychology, and identification of the interrelatedness of different biological systems and subsystems. In this module various cognitive processes are studied, including perception, memory, thinking, intelligence and creativity. Illustrations are given of various thinking processes, such as problem solving, critical, analytic and integrative thinking.

SLK 210 Psychology 210
Academic organisation: Psychology
Prerequisite: SLK 110, SLK 120(GS)
Contact time: 2 lpw
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng Credits: 20
Module content:
In this module human development from conception through adolescence to adulthood is discussed with reference to various psychological theories. Incorporated are the developmental changes related to cognitive, physical, emotional and social functioning of the individual and the context of work in adulthood. Traditional and contemporary theories of human development explaining and describing these stages are studied in order to address the key issues related to both childhood and adulthood.

SLK 220 Psychology 220
Academic organisation: Psychology
Prerequisite: SLK 110, SLK 120(GS)
Contact time: 2 lpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng Credits: 20
Module content:
This module is a social-psychological perspective on interpersonal and group processes. Themes that are covered include communication, pro-social behaviour, social influence and persuasion, political transformation, violence, and group behaviour.

SLK 310 Psychology 310
Academic organisation: Psychology
Contact time: 2 dpw
Prerequisite: SLK 210(GS), SLK 220(GS)
Period of presentation: Semester 1
Language of tuition: Both Afr and Eng
Credits: 30

Module content:
Identification of abnormal behaviour in children based on knowledge of normal childhood development; introduction to the study of various models pertaining to abnormal behaviour; understanding and application of basic concepts in child psychopathology. This module also provides an introduction to psychopathology and symptomatology of adult abnormal behaviour. Terminology, definitions of abnormal behaviour, problems in diagnosis, labelling, and myths regarding abnormal behaviour are discussed. Neurosis as a specific mental disorder is studied critically from a multidimensional perspective, including intrapsychic, interpersonal and social-cultural explanations.

SLK 320 Psychology 320
Academic organisation: Psychology
Prerequisite: SLK 310(GS)
Contact time: 2 lpw 2 dpw
Period of presentation: Semester 2
Language of tuition: Both Afr and Eng
Credits: 30

Module content:
This module deals with a community psychological perspective on human behaviour and psychological interventions and also critically explores the contribution of various perspectives in psychology. The module focuses on themes such as definitions of key concepts, principles and aims of community psychology, and the role of the community psychologist as well as the impact of earlier thought frameworks on contemporary perspectives. The implications of these ideas for practical initiatives focussed on mental health in communities, are discussed.

E&OE