

# University of Pretoria Yearbook 2021

## BSc Geography and Environmental Science (02133363)

**Department** Geography, Geoinformatics and Meteorology

**Minimum duration of study** 3 years

**Total credits** 405

**NQF level** 07

### Admission requirements

- The closing date is an administrative admission guideline for non-selection programmes. Once a non-selection programme is full and has reached the institutional targets, then that programme will be closed for further admissions, irrespective of the closing date. However, if the institutional targets have not been met by the closing date, then that programme will remain open for admissions until the institutional targets are met.
- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required National Senior Certificate with university endorsement, candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution, and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded from the calculation of the Admission Point Score (APS).
- Grade 11 results are used for the conditional admission of prospective students. Final admission is based on Grade 12 results.
- Please note that the Faculty does not accept GED and School of Tomorrow qualifications for entry into our programmes.

### Transferring students

#### **Candidates previously registered at UP or at another university**

The faculty's Admissions Committee considers applications of candidates who have already completed the final NSC or equivalent qualification examination and/or were previously registered at UP or another university, on grounds of their final NSC or equivalent qualification results as well as academic merit.

#### **Candidates previously registered at a FET college or a university of technology**

The faculty's Admissions Committee considers the application of these candidates on the grounds of their final NSC or equivalent qualification results as well as academic merit.

### Qualifications from countries other than South Africa

- Citizens from countries other than South Africa and South African citizens with foreign qualifications must comply with all the other admission requirements and the prerequisites for subjects/modules.
- In addition to meeting the admission requirements, admission is based on the performance in the **TOEFL, IELTS or SAT**, if required.
- Candidates must have completed the National Senior Certificate with admission to degree studies or a

certificate of conditional exemption on the basis of a candidate's foreign qualifications, the so-called "Immigrant" or "Foreign Conditional Exemption". The only condition for the "Foreign Conditional Exemption" that is accepted is: 'completion of the degree course'. The exemption certificate is obtainable from Universities South Africa (USAf). Detailed information is available on the website at [click here](#).

**University of Pretoria website:** [click here](#)

### Minimum requirements

#### Achievement level

#### English Home

#### Language or

#### English First

#### Additional

#### Language

#### Mathematics

#### Physical Sciences

#### APS

NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	5	C	<b>34</b>

\* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. Students in the Cambridge system must offer both Physics AND Chemistry with performance at the level specified for NSC Physical Sciences in the table above.

\* International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission. Students in the IB system must offer both Physics AND Chemistry with performance at the level specified for NSC Physical Sciences in the table above.

Candidates who do not comply with the minimum admission requirements for BSc (Geography and Environmental Sciences), may be considered for admission to the BSc - Extended programme - Physical Sciences. This programme takes a year longer than the normal programmes to complete.

### BSc - Extended Programme - Physical Sciences

#### Minimum requirements

#### Achievement level

#### English Home

#### Language or

#### English First

#### Additional

#### Language

#### Mathematics

#### Physical Sciences

#### APS

NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
4	D	4	D	4	D	<b>28</b>

## Other programme-specific information

Students may choose elective modules based on the requirements for the specific second majors available for the programme. It remains the students' responsibility to ascertain, prior to registration, whether they comply with the prerequisites of the modules they want to register for.

Students who are already in possession of a bachelor's degree, will not receive credit for modules of which the content overlap with modules from the degree that was already conferred. Credits will not be considered for more than half the credits passed previously for an uncompleted degree. No credits will be granted at the final-year level.

## Promotion to next study year

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. 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 relevant 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.

- 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 readmission.
- Should the student be readmitted 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 readmitted to further studies by the Admissions Committee, he/she will be informed in writing.
- Students who are not readmitted by the Admissions Committee have the right to appeal to the Senior Appeals Committee.
- Any decision taken by the Senior Appeals Committee is final.

## Pass with distinction

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.

## Curriculum: Year 1

### Minimum credits: 128

Fundamental = 14

Core = 66

Elective = 48

### Additional Information

Students are advised to choose elective modules based on the requirements for a second major of interest. It is the student's responsibility to ensure that all prerequisites are taken into account. Choose electives according to the combinations below with a view to pursuing specialisation in the relevant field. Continue with the electives pertaining to the specific second major chosen, through to the second and third years of study.

- **Geoinformatics as a second major:** INF 154 (S1, 10), INF 171 (S1 & 2, 10 + 10) INF 164 (S2, 10), INF 112 (S2, 10) [20 + 30 = 50]
- **Plant Science as a second major:** MLB 111 (S1, 16), BOT 161 (S2, 8), CMY 117 (S1, 16), CMY 127 (S2, 16) [32 + 24 = 56]
- **Soil Science as a second major:** CMY 117 (S1, 16), CMY 127 (S2, 16), MLB 111 (S1, 16) [32 + 16 = 48]

Possibilities for second majors in Social Sciences (two options)

- **Anthropology as a second major:** APL 110 (S1, 12), APL 120 (S2, 12), EFK 110 (S1, 12), EFK 120 (S2, 12) [24 + 24 = 48] – towards BSocSciHons (Anthropology)
- **Heritage and Cultural Tourism as second major:** EFK 110 (S1, 12), EFK 120 (S2, 12), APL 110 (S1,12), APL 120 (S2, 12) = [24 + 24 = 48] – towards BSocSciHons (Heritage and Cultural Tourism)

## Fundamental modules

### Academic information management 111 (AIM 111)

Module credits	4.00
NQF Level	05
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities Faculty of Law Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology and Religion
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

### Module content

Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology.

## Academic information management 121 (AIM 121)

**Module credits** 4.00

**NQF Level** 05

### Service modules

Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Economic and Management Sciences  
Faculty of Humanities  
Faculty of Law  
Faculty of Health Sciences  
Faculty of Natural and Agricultural Sciences  
Faculty of Theology and Religion  
Faculty of Veterinary Science

**Prerequisites** No prerequisites.

**Contact time** 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Informatics

**Period of presentation** Semester 2

### 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.

## Language and study skills 110 (LST 110)

**Module credits** 6.00

**NQF Level** 05

### Service modules

Faculty of Natural and Agricultural Sciences  
Faculty of Veterinary Science

**Prerequisites** No prerequisites.

**Contact time** 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Unit for Academic Literacy

**Period of presentation** Semester 1

### Module content

The module aims to equip students with the ability to cope with the reading and writing demands of scientific disciplines.

## Academic orientation 102 (UPO 102)

<b>Module credits</b>	0.00
<b>NQF Level</b>	00
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Natural and Agricultural Sciences Deans Office
<b>Period of presentation</b>	Year

## Core modules

### Biometry 120 (BME 120)

<b>Module credits</b>	16.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences Faculty of Veterinary Science
<b>Prerequisites</b>	At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123
<b>Contact time</b>	1 practical per week, 4 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Statistics
<b>Period of presentation</b>	Semester 2

#### Module content

Simple statistical analysis: Data collection and analysis: Samples, tabulation, graphical representation, describing location, spread and skewness. Introductory probability and distribution theory. Sampling distributions and the central limit theorem. Statistical inference: Basic principles, estimation and testing in the one- and two-sample cases (parametric and non-parametric). Introduction to experimental design. One- and twoway designs, randomised blocks. Multiple statistical analysis: Bivariate data sets: Curve fitting (linear and non-linear), growth curves. Statistical inference in the simple regression case. Categorical analysis: Testing goodness of fit and contingency tables. Multiple regression and correlation: Fitting and testing of models. Residual analysis. Computer literacy: Use of computer packages in data analysis and report writing.

### Introduction to environmental sciences 101 (ENV 101)

<b>Module credits</b>	8.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 practical per week, 3 lectures per week

<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Quarter 1

#### Module content

Introducing the basic concepts and interrelationships required to understand the complexity of natural environmental problems, covering an introduction to environmental science and biogeography; including a first introduction to SDGs and Aichi targets.

### Aspects of human geography 156 (GGY 156)

<b>Module credits</b>	8.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Health Sciences

<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 tutorial per week, 3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Quarter 2

#### Module content

This module begins by fostering an understanding of human geography. Then follows with 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.

### Southern African geomorphology 166 (GGY 166)

<b>Module credits</b>	8.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Health Sciences
<b>Prerequisites</b>	A candidate must have passed Mathematics and Physical Science with at least 60% in the Grade 12 examination OR a candidate must have passed PHY 143 and WTW 143.
<b>Contact time</b>	1 tutorial per week, 3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology

**Period of presentation** Quarter 3

### Module content

*Note: Students cannot register for both GGY 166 and GGY 168.*

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.

## Cartography 110 (GMC 110)

**Module credits** 10.00

**NQF Level** 05

**Service modules** Faculty of Engineering, Built Environment and Information Technology

**Prerequisites** No prerequisites.

**Contact time** 1 practical per week, 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Geography Geoinformatics and Meteorology

**Period of presentation** Semester 2

### 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). Critique maps of indicators to measure United Nations Sustainable Development Goals in South Africa.

## Mathematics 134 (WTW 134)

**Module credits** 16.00

**NQF Level** 05

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Veterinary Science

**Prerequisites** 50% for Mathematics in Grade 12

**Contact time** 1 tutorial per week, 4 lectures per week

**Language of tuition** Module is presented in English

**Department** Mathematics and Applied Mathematics

**Period of presentation** Semester 1



## Module content

*\*Students will not be credited for more than one of the following modules for their degree: WTW 134, WTW 165, WTW 114, WTW 158. WTW 134 does not lead to admission to Mathematics at 200 level and is intended for students who require Mathematics at 100 level only. WTW 134 is offered as WTW 165 in the second semester only to students who have applied in the first semester of the current year for the approximately 65 MBChB, or the 5-6 BChD places becoming available in the second semester and who were therefore enrolled for MGW 112 in the first semester of the current year.*

Functions, derivatives, interpretation of the derivative, rules of differentiation, applications of differentiation, integration, interpretation of the definite integral, applications of integration. Matrices, solutions of systems of equations. All topics are studied in the context of applications.

## Elective modules

### Introduction to Social Anthropology 110 (APL 110)

<b>Module credits</b>	12.00
<b>NQF Level</b>	05
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Anthropology and Archaeology
<b>Period of presentation</b>	Semester 1

#### Module content

This introduction to social anthropology introduces basic themes of the discipline including ritual, religion, marriage and sex. It combines classic studies with recent scholarship, and asks the 'big question' about human society and human cultures that offer challenging perspectives on the world we live in.

### Advanced introduction to Social Anthropology 120 (APL 120)

<b>Module credits</b>	12.00
<b>NQF Level</b>	05
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Anthropology and Archaeology
<b>Period of presentation</b>	Semester 2



## Module content

This module builds on the ethnographic and theoretical themes introduced in APL 110, asking particular questions about how we may think about the relationship between the local and the global; indigenous and universal; public and private; the real and the possible. The module continues in the vein of APL 110, in that it explicitly encourages students to understand the society in which they live through a series of critical anthropological perspectives.

### Plants and society 161 (BOT 161)

<b>Module credits</b>	8.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
<b>Prerequisites</b>	MLB 111 GS
<b>Contact time</b>	2 lectures per week, fortnightly practicals
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

## Module content

Botanical principles of structure and function; diversity of plants; introductory plant systematics and evolution; role of plants in agriculture and food security; principles and applications of plant biotechnology; economical and valuable medicinal products derived from plants; basic principles of plant ecology and their application in conservation and biodiversity management.

This content aligns with the United Nation's Sustainable Development Goals of No Poverty, Good Health and Well-being, Climate Action, Responsible Consumption and Production, and Life on Land.

### General chemistry 117 (CMY 117)

<b>Module credits</b>	16.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
<b>Prerequisites</b>	A candidate must have Mathematics for at least 60% and 60% for Physical Sciences.
<b>Contact time</b>	1 practical per week, 4 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1



### Module content

General introduction to inorganic, analytical and physical chemistry. Atomic structure and periodicity. Molecular structure and chemical bonding using the VSEOR model. Nomenclature of inorganic ions and compounds. Classification of reactions: precipitation, acid-base, redox reactions and gas-forming reactions. Mole concept and stoichiometric calculations concerning chemical formulas and chemical reactions. Principles of reactivity: energy and chemical reactions. Physical behaviour gases, liquids, solids and solutions and the role of intermolecular forces. Rate of reactions: Introduction to chemical kinetics.

## General chemistry 127 (CMY 127)

**Module credits** 16.00

**NQF Level** 05

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Health Sciences  
Faculty of Veterinary Science

**Prerequisites** Natural and Agricultural Sciences students: CMY 117 GS or CMY 154 GS Health Sciences students: none

**Contact time** 1 practical per week, 4 lectures per week

**Language of tuition** Module is presented in English

**Department** Chemistry

**Period of presentation** Semester 2

### Module content

Theory: General physical-analytical chemistry: Chemical equilibrium, acids and bases, buffers, solubility equilibrium, 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 and aminoacids. Practical: Molecular structure (model building), synthesis and properties of simple organic compounds.

## Introduction to tourism 110 (EFK 110)

**Module credits** 12.00

**NQF Level** 07

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education

**Prerequisites** No prerequisites.

**Contact time** 1 tutorial per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Historical and Heritage Studies

**Period of presentation** Semester 1

### Module content

Overview of the origin and nature of tourism development of South African cultural, natural and adventure tourist destinations.

## Heritage tourism management 120 (EFK 120)

<b>Module credits</b>	12.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Historical and Heritage Studies
<b>Period of presentation</b>	Semester 2

### Module content

An introductory exploration of the relationship between heritage conservation and tourism.

## Informatics 112 (INF 112)

<b>Module credits</b>	10.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination; or STK 113 60%, STK 123 60% or STK 110
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Informatics
<b>Period of presentation</b>	Semester 2

### 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.

## Informatics 154 (INF 154)

<b>Module credits</b>	10.00
<b>NQF Level</b>	05



<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination
<b>Contact time</b>	1 lecture per week, 2 practicals per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Informatics
<b>Period of presentation</b>	Semester 1
<b>Module content</b>	Introduction to programming.

### Informatics 164 (INF 164)

<b>Module credits</b>	10.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	INF 154
<b>Contact time</b>	1 lecture per week, 2 practicals per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Informatics
<b>Period of presentation</b>	Semester 2
<b>Module content</b>	Programming.

### Informatics 171 (INF 171)

<b>Module credits</b>	20.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Informatics
<b>Period of presentation</b>	Year

### Module content

General systems theory, creative problem solving, soft systems methodology. The systems analyst, systems development building blocks, systems development, systems analysis methods, process modelling.

## Molecular and cell biology 111 (MLB 111)

**Module credits** 16.00

**NQF Level** 05

### Service modules

Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Health Sciences  
Faculty of Veterinary Science

### Prerequisites

A candidate who has passed Mathematics with at least 60% in the Grade 12 examination

### Contact time

1 practical/tutorial per week, 4 lectures per week

### Language of tuition

Module is presented in English

### Department

Biochemistry, Genetics and Microbiology

### Period of presentation

Semester 1

### Module content

Introduction to the molecular structure and function of the cell. Basic chemistry of the cell. Structure and composition of prokaryotic and eukaryotic cells. Ultrastructure and function of cellular organelles, membranes and the cytoskeleton. General principles of energy, enzymes and cell metabolism. Selected processes, e.g. glycolysis, respiration and/or photosynthesis. Introduction to molecular genetics: DNA structure and replication, transcription, translation. Cell growth and cell division.

## Curriculum: Year 2

### Minimum credits: 141

Core = 82

Elective = 59

### Additional information

Continue with electives pertaining to the second major chosen in the first year of study.

- **Geoinformatics as a second major:** INF 214 (S1, 14), INF 225 (S1, 14), INF 261 (S2, 7), SUR 220 (S2, 14), FIL 251 (10) [28 + 31 = 59]
- **Plant Science as a second major:** BOT 251 (S1, 12), MBY 251 (S1, 12), MBY 261 (S2, 12), GKD 250 (S1, 12), BOT 261 (S2, 12) [36 + 24 = 60]
- **Soil Science as a second major:** GKD 250 (S1, 12), SUR 220 (S2, 14), BOT 251 (S1, 12), BOT 261 (S2, 12), WKD 261 (Q1, 12) [36 + 26 = 62]

Possibilities for second majors in Social Sciences (two options)

- **Anthropology as a second major:** APL 210 (S1, 20), APL 220 (S2, 20), EFK 210 (S1, 20) or EFK 220 (S2, 20) [20 + 40 = 60]
- **Heritage and Cultural Tourism as second major:** EFK 210 (S1, 20), EFK 220 (S2, 20), APL 210 (S1, 20) or APL 220 (S2, 20) [20 + 40 = 60]

## Core modules

### Environmental sciences 201 (ENV 201)

Module credits	14.00
NQF Level	06
Prerequisites	ENV 101 or WKD 155 or BOT 161 or ZEN 161.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology
Period of presentation	Quarter 2

#### Module content

Introduces basic concepts and interrelationships required to understand our atmosphere, with a strong focus on an introduction to weather and climate. A key component of the course is an introduction to climate change, including the science of climate change, introducing climate change projections, and climate change impacts. A key focus of the second part of the course will be climate change implications for the attainment of SDGs and Aichi targets on the African continent, under a range of plausible scenarios.

### City, structure, environment and society 201 (GGY 201)

Module credits	14.00
NQF Level	06
Prerequisites	GGY 156



<b>Contact time</b>	1 practical per week, 3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Quarter 3

#### Module content

The module introduces students to urban settlement patterns, processes and structures. Using a series of case studies, it aims to develop an understanding of the challenges facing urban areas both in South Africa and globally.

### Process geomorphology 252 (GGY 252)

<b>Module credits</b>	12.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Education Faculty of Humanities
<b>Prerequisites</b>	GGY 166 or GLY 155
<b>Contact time</b>	2 practicals per week, 4 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Quarter 2

#### 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 periglacial processes. Practical laboratory exercises and assignments are based on the themes covered in the module theory component.

### Introductory geographic information systems 283 (GGY 283)

<b>Module credits</b>	14.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities
<b>Prerequisites</b>	GMC 110
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1



## Module content

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. This module provides the foundations for more advanced GIS and Geoinformatics topics. Practical assessments and a mini-project make use of South African and African examples and foster learning and application of concepts aligned to the UN Sustainable Development Goals.

### Geographic data analysis 220 (GIS 220)

<b>Module credits</b>	14.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	GMC 110 and (STK 110 OR BME 120)
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 2

## Module content

The nature of geographical data and measurement. Application of statistics in the geographical domain. 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. Examples used throughout the course are drawn from South African and African case studies and taught within the framework of the UN Sustainable Development Goals.

### Remote sensing 220 (GMA 220)

<b>Module credits</b>	14.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	GMC 110
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1

## 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, practical exercises research tasks and a project or assignments of at least 64 notional hours. In particular, the practical exercises and research tasks incorporate South African examples using satellite remotely-sensed data, as well as field spectral data measurements, to promote understanding of the state of land cover and land use types (e.g. spanning agricultural resources, water resources, urbanization) and how changes over time could impact on the changing climate in accordance with the United Nation's Sustainable Development Goals.

## Elective modules

### Sex, culture and society 210 (APL 210)

<b>Module credits</b>	20.00
<b>NQF Level</b>	06
<b>Prerequisites</b>	APL 110 GS
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Anthropology and Archaeology
<b>Period of presentation</b>	Semester 1

## Module content

Cultural constructions of sex and sexuality are the primary building blocks of social organisation. Anthropological discussions of sexuality tend to revolve around the various aspects of social organisation, such as the lifecycle, gendered identities, and personhood. These discussions are informed by the cultural meanings we impute to differences in biological sex and reproduction, and the ways in which these meanings influence social organisation, personhood, and power. In this module, we will consider cultural constructions of sex and sexuality as these inform certain aspects of social organisation such as kinship and marriage. We will attempt to develop an anthropological perspective on the interplay between sex, culture and society. To this end, we will examine the physiology of sexuality, and then consider different theoretical perspectives on human sexuality as reflected in cross-cultural ethnographic case studies.

### Anthropology 220 (APL 220)

<b>Module credits</b>	20.00
<b>NQF Level</b>	06
<b>Prerequisites</b>	APL 110, APL 120 GS
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Anthropology and Archaeology
<b>Period of presentation</b>	Semester 2

## Module content

Power and wealth

This module explores anthropological perspectives on politics, power and wealth in colonial and postcolonial contexts. Key concepts that are discussed include anthropological approaches to citizenship, cosmopolitanism, hegemony, human rights, neoliberalism, sovereignty, civil society, gender, race and class.

## Introduction to proteins and enzymes 251 (BCM 251)

**Module credits** 12.00

**NQF Level** 06

**Service modules** Faculty of Health Sciences

**Prerequisites** CMY 117 GS and CMY 127 GS and MLB 111 GS

**Contact time** 1 tutorial per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Biochemistry, Genetics and Microbiology

**Period of presentation** Semester 1

## Module content

Structural and ionic properties of amino acids. Peptides, the peptide bond, primary, secondary, tertiary and quaternary structure of proteins. Interactions that stabilise protein structure, denaturation and renaturation of proteins. Introduction to methods for the purification of proteins, amino acid composition, and sequence determinations. Enzyme kinetics and enzyme inhibition. Allosteric enzymes, regulation of enzyme activity, active centres and mechanisms of enzyme catalysis. Examples of industrial applications of enzymes and in clinical pathology as biomarkers of diseases. Online activities include introduction to practical laboratory techniques and Good Laboratory Practice; techniques for the quantitative and qualitative analysis of biological molecules; enzyme activity measurements; processing and presentation of scientific data.

## South African flora and vegetation 251 (BOT 251)

**Module credits** 12.00

**NQF Level** 06

**Service modules** Faculty of Education

**Prerequisites** BOT 161

**Contact time** 1 practical per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

## 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 and associated key ecological processes; centre of plant endemism; rare and threatened plant species; biodiversity conservation and ecosystem management; invasion biology; conservation status of South African vegetation types.

## Plant physiology and biotechnology 261 (BOT 261)

<b>Module credits</b>	12.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Education
<b>Prerequisites</b>	BOT 161 and CMY 127.
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

### 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 abiotic stress tolerant and disease resistant plants. Practicals: Basic laboratory skills in plant physiology; techniques used to investigate nitrogen metabolism, carbohydrate metabolism, pigment analysis, water transport in plant tissue and response of plants to hormone treatments.

## Tourism and representation 210 (EFK 210)

<b>Module credits</b>	20.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Education
<b>Prerequisites</b>	EFK 110
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Historical and Heritage Studies
<b>Period of presentation</b>	Semester 1

### Module content

A multidisciplinary look at notions of representation and perception as they pertain to the tourism sector.

## Community-based tourism 220 (EFK 220)

<b>Module credits</b>	20.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Education
<b>Prerequisites</b>	EFK 110, EFK 120
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English



**Department** Historical and Heritage Studies

**Period of presentation** Semester 2

**Module content**

An analysis of tourism's history and development theories, focussing on community-based tourism (CBT) and pro-poor tourism (PPT).

**Introduction to moral and political philosophy 251 (FIL 251)**

**Module credits** 10.00

**NQF Level** 06

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Economic and Management Sciences

**Prerequisites** No prerequisites.

**Contact time** 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Philosophy

**Period of presentation** Quarter 2, 3 and 4

**Module content**

In this module students are equipped with an understanding of the moral issues influencing human agency in economic and political contexts. In particular philosophy equips students with analytical reasoning skills necessary to understand and solve complex moral problems related to economic and political decision making. We demonstrate to students how the biggest questions concerning the socio-economic aspects of our lives can be broken down and illuminated through reasoned debate. Examples of themes which may be covered in the module include justice and the common good, a moral consideration of the nature and role of economic markets on society, issues concerning justice and equality, and dilemmas of loyalty. The works of philosophers covered may for instance include that of Aristotle, Locke, Bentham, Mill, Kant, Rawls, Friedman, Nozick, Bernstein, Dworkin, Sandel, Walzer, and MacIntyre.

**Introductory soil science 250 (GKD 250)**

**Module credits** 12.00

**NQF Level** 06

**Service modules** Faculty of Engineering, Built Environment and Information Technology

**Prerequisites** CMY 117 GS

**Contact time** 1 practical per week, 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

## Module content

Origin and development of soil, weathering and soil formation processes. Profile differentiation and morphology. Physical characteristics: texture, structure, soil water, atmosphere and temperature. Chemical characteristics: clay minerals, ion exchange, pH, buffer action, soil acidification and salinisation of soil. Soil fertility and fertilisation. Soil classification. Practical work: Laboratory evaluation of simple soil characteristics. Field practicals on soil formation in the Pretoria area.

## Informatics 214 (INF 214)

**Module credits** 14.00

**NQF Level** 06

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Natural and Agricultural Sciences

**Prerequisites** AIM 101 or AIM 111 and AIM 121

**Contact time** 2 lectures per week, 2 practicals per week

**Language of tuition** Module is presented in English

**Department** Informatics

**Period of presentation** Semester 1

## Module content

Database design: the relational model, structured query language (SQL), entity relationship modelling, normalisation, database development life cycle; practical introduction to database design. Databases: advanced entity relationship modelling and normalisation, object-oriented databases, database development life cycle, advanced practical database design.

## Informatics 225 (INF 225)

**Module credits** 14.00

**NQF Level** 06

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Natural and Agricultural Sciences

**Prerequisites** INF 112; AIM 101 or AIM 102 or AIM 111 and AIM 121

**Contact time** 1 lecture per week, 3 practicals per week

**Language of tuition** Module is presented in English

**Department** Informatics

**Period of presentation** Semester 2

## Module content

An overview of systems infrastructure and integration.

## Informatics 261 (INF 261)

**Module credits** 7.00

<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	INF 214
<b>Contact time</b>	1 lecture per week, 1 practical per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Informatics
<b>Period of presentation</b>	Semester 2

#### Module content

Database management: transaction management, concurrent processes, recovery, database administration: new developments: distributed databases, client-server databases: practical implementation of databases.

### Bacteriology 251 (MBY 251)

<b>Module credits</b>	12.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	MBY 161 GS
<b>Contact time</b>	2 lectures per week, fortnightly practicals
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Biochemistry, Genetics and Microbiology
<b>Period of presentation</b>	Semester 1

#### Module content

Growth, replication and survival of bacteria, Energy sources, harvesting from light versus oxidation, regulation of catabolic pathways, chemotaxis. Nitrogen metabolism, iron-scavenging. Alternative electron acceptors: denitrification, sulphate reduction, methanogenesis. Bacterial evolution, systematic and genomics. Biodiversity; bacteria occurring in the natural environment (soil, water and air), associated with humans, animals, plants, and those of importance in foods and in the water industry.

### Mycology 261 (MBY 261)

<b>Module credits</b>	12.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	MBY 161 GS
<b>Contact time</b>	2 lectures per week, Fortnightly practicals/tutorials
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Biochemistry, Genetics and Microbiology

**Period of presentation** Semester 2

### 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 saprobes 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.

## Surveying 220 (SUR 220)

**Module credits** 14.00

**NQF Level** 06

**Service modules** Faculty of Engineering, Built Environment and Information Technology

**Prerequisites** WTW 114 GS/WTW 134

**Contact time** 1 practical per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Geography Geoinformatics and Meteorology

**Period of presentation** Semester 2

### Module content

Adjustment and use of following instruments: Plane table, level, compass and theodolite. Elementary site surveying and leveling, tachometry. Definition of survey. Co-ordinate systems and bearing. Connections and polars. Methods of determining points. Elevation. Tachometry.

## Physical meteorology 261 (WKD 261)

**Module credits** 12.00

**NQF Level** 06

**Prerequisites** WTW 114 or WTW 158 or WTW 134 or WTW 165.

**Contact time** 1 tutorial per week, 4 lectures per week

**Language of tuition** Module is presented in English

**Department** Geography Geoinformatics and Meteorology

**Period of presentation** Quarter 2

### Module content

Conservative forces and conservation laws. Basic thermodynamic laws for dry and humid air. The equation of state. Adiabatic processes and temperature lapse rates. The Clausius-Clapeyron equation. Calculation of the wet adiabat. Radiative transfer. The physical basis of climate change.



## Curriculum: Final year

**Minimum credits: 136**

Core = 76

Elective = 60

### Additional information

Continue with electives pertaining to the second major chosen in the first and second years of study.

- **Geoinformatics as a second major:** GIS 320 (S1, 22), GMC 310 (S1, 22), GMA 320 (S2, 22) [44 + 22 = 66]
- **Plant Science as a second major:** BOT 356 (S1, 18), BOT 358 (S1, 18), BOT 365 (S2, 18), BOT 366 (S2, 18) [36 + 36 = 72]
- **Soil Science as a second major:** BOT 358 (S1, 18), GKD 350 (S1, 14), GKD 320 (S2, 14), BOT 366 (S2, 18), [32 + 32 = 64]

Possibilities for second majors in Social Sciences (two options)

- **Anthropology as a second major:** APL 310 (S1, 30), APL 320 (S2, 30) [30 + 30 = 60]
- **Heritage and Cultural Tourism as a second major:** EFK 310 (S1, 30), EFK 320 (S2, 30) [30 + 30 = 60]

## Core modules

### Human environmental interactions 301 (ENV 301)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Education Faculty of Humanities
<b>Prerequisites</b>	ENV 201
<b>Contact time</b>	1 tutorial per week, 4 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Quarter 2

#### Module content

The module serves as an introduction to human-environment relations, on contemporary environmental issues in Africa.

The module begins with different theories and schools of thought in human-environment relations, followed by 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. A key focus here is future scenarios for the African continent in terms of SDGs and Aichi targets; given current and projected driving forces.

### Theories and applications of human geography 301 (GGY 301)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07

<b>Prerequisites</b>	GGY 266
<b>Contact time</b>	1 practical per week, 3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Quarter 3

#### Module content

Classic economic development theories and frameworks. Spatial development history and legacy in South Africa. Rural and agricultural reconstruction. Land reform. Urban development and strategy. Urban spatial reconstruction. National spatial development frameworks. Integration of environmental, economic, and social components of sustainable development, including challenges, actors and actions in sustainable development.

### Environmental geomorphology 361 (GGY 361)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Humanities
<b>Prerequisites</b>	GGY 252 and only for students studying BSc (Geography) or BSc (Environmental Sciences).
<b>Contact time</b>	2 practicals per week, 4 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Quarter 4

#### Module content

\*Note: The module is available for BSc (Geography) and BSc (Environmental Sciences) 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.

### Geographic information systems 310 (GIS 310)

<b>Module credits</b>	22.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	GGY 283
<b>Contact time</b>	1 practical per week, 2 lectures per week

<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1

#### Module content

Advanced theory and practice of Geographic Information Systems; GIS applications; design and implementation of GIS applications. A project or assignments of at least 64 notional hours. Diverse South African examples will be used to expose the students to various data sources, geospatial analyses, and data representation to support the UN Sustainable Development Goals.

## Elective modules

### Decoloniality, Anthropology and Africa 310 (APL 310)

<b>Module credits</b>	30.00
<b>NQF Level</b>	07
<b>Prerequisites</b>	APL 210 GS
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Anthropology and Archaeology
<b>Period of presentation</b>	Semester 1

#### Module content

This module considers the colonial histories of anthropology in Africa and their impact on traditions of knowledge production in the discipline to propose a decolonised anthropology. It does so by critically reflecting on old and contemporary ethnographies from and about the African continent and pays particular attention to ethnographic methods, politics of representation, reflexivity, power and identity as pertinent questions to establish a decolonised anthropology. Students in this module are encouraged to imagine a decolonised anthropology in and for Africa.

### Anthropology 320 (APL 320)

<b>Module credits</b>	30.00
<b>NQF Level</b>	07
<b>Prerequisites</b>	APL 210, APL 220 GS
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Anthropology and Archaeology
<b>Period of presentation</b>	Semester 2

## Module content

Fieldwork, ethnography and theory

This module reviews themes such as conducting fieldwork, writing ethnography and developing theory in anthropology. The module allows the opportunity to gain experience with ethnographic field methods in order to develop insight into the implications of methodological choices and their relationship to research questions and settings.

## Plant ecophysiology 356 (BOT 356)

**Module credits** 18.00

**NQF Level** 07

**Service modules** Faculty of Education

**Prerequisites** BOT 161

**Contact time** 1 practical per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

## Module content

The emphasis is on the efficiency of the mechanisms whereby C3-, C4 and CAM-plants bind CO<sub>2</sub> and how it 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, 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.

## Plant ecology 358 (BOT 358)

**Module credits** 18.00

**NQF Level** 07

**Prerequisites** BOT 161 and BOT 251.

**Contact time** 1 practical per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

## Module content

Theory of plant community concepts, floristic and structural composition, plant diversity, ecological succession, landscape ecology. Data processing techniques. Species interactions and an evaluation of their effects on interacting species. Fundamentals of plant population biology: life tables; plant breeding systems and pollination; population dynamics; life history strategies; intraspecific competition; interspecific competition and co-existence.

### Phytomedicine 365 (BOT 365)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Education
<b>Prerequisites</b>	BOT 161
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

## Module content

The module will include a review on the discovery and use of plant medicines and phyto-therapeutically important molecules obtained from plants. Certain aspects of natural product chemistry i.e. 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 is presented. The role of these natural products in defense against microorganisms and herbivores is reviewed during the module. The importance of ethnobotany and phylogenetics in modern drug discovery from biodiversity will be presented along with legal and ethical considerations surrounding bioprospecting. This will follow on with modern theories and practices regarding sustainable utilisation and conservation of medicinal plants. The basics of alternative medicines, with an emphasis on traditional African and Chinese medicines, are also discussed as well as current evidence-based research and product development derived from these. Biotechnological approaches to medicinal natural product production, 'farmer to pharma', will be covered, including plant cell culture and bioreactors. Practical sessions on drug discovery approaches using chromatographic techniques for phytochemical analysis of secondary metabolites such as tannins, alkaloids, 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.

### Plant diversity 366 (BOT 366)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Education
<b>Prerequisites</b>	BOT 161
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English



**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 2

**Module content**

Basic principles and methods of plant classification. Sources of plant variation. Modern methods to ascertain evolutionary relationships among plants. The extent and significance of vascular plant diversity. General structural and biological characteristics of evolutionary and ecologically important plant groups. Botanical nomenclature. Plant identification in practice; identification methods, keys, herbaria and botanical gardens. Diagnostic characters for the field identification of trees, wild flowers and grasses. Family recognition of southern African plants. Available literature for plant identification. Methods to conduct floristic surveys. Nature and significance of voucher specimens.

**The South African tourism product 310 (EFK 310)**

**Module credits** 30.00

**NQF Level** 07

**Service modules** Faculty of Education

**Prerequisites** EFK 110, EFK 120; EFK 210, EFK 220

**Contact time** 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Historical and Heritage Studies

**Period of presentation** Semester 2

**Module content**

An evaluation of South African cultural activities and heritage sites, with a specific focus on tourism in practice.

**Current discourses in tourism 320 (EFK 320)**

**Module credits** 30.00

**NQF Level** 07

**Service modules** Faculty of Education

**Prerequisites** EFK 110, EFK 120; EFK 210, EFK 220

**Contact time** 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Historical and Heritage Studies

**Period of presentation** Semester 1

**Module content**

A selection of themes in tourism innovation, research and industry.

**Spatial analysis 320 (GIS 320)**

**Module credits** 22.00



<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	GIS 220 and GGY 283
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 2

#### Module content

Construction of Raster Geovisualisations, spatial model construction and use, multi-criteria decision analysis. Factor analysis: Principle component analysis. Geostatistics: Spatial dependence modelling, ordinary kriging. Markov chains and cellular Automata, combined models. Examples using data from South Africa are implemented. A project or assignment of at least 64 notional hours.

### Soil chemistry 320 (GKD 320)

<b>Module credits</b>	14.00
<b>NQF Level</b>	07
<b>Prerequisites</b>	GKD 250
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

#### 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.

### Soil classification and surveying 350 (GKD 350)

<b>Module credits</b>	14.00
<b>NQF Level</b>	07
<b>Prerequisites</b>	GKD 250 GS
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1

## Module content

A taxonomic system for South Africa. USDA's Soil Taxonomy. Land suitability evaluation. Optimal resource utilization. The conservation component. Ecological aspects. Ecotype, land types. Soil maps. Practical work: Field practicals and compulsory excursion. Identification of soil horizons, forms and families. Land suitability evaluation. Elementary mapping exercise.

## Remote sensing 320 (GMA 320)

<b>Module credits</b>	22.00
<b>NQF Level</b>	07
<b>Prerequisites</b>	GMA 220
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 2

## 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, practical exercises research tasks and a project or assignments of at least 64 notional hours. In particular, the practical exercises and research tasks incorporate South African examples using satellite remotely-sensed data, as well as field spectral data measurements, to promote understanding of the state of land cover and land use types (e.g. spanning agricultural resources, water resources, urbanization) and how changes over time could impact on the changing climate in accordance with the United Nation's Sustainable Development Goals.

## Geometrical and space geodesy 310 (GMC 310)

<b>Module credits</b>	22.00
<b>NQF Level</b>	07
<b>Prerequisites</b>	GMC 110 and WTW 114/WTW 134
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1



## Module content

Spherical trigonometry. Geometrical Geodesy: Datum surfaces and coordinate systems in Geodesy, Calculations on the ellipsoid, Datum transformations. Map projections: Projection principles, distortion determination, construction of conformal, equivalent and equidistant projections, the Transverse Mercator projection and UTM projection of an ellipsoidal earth, projection transformations. Space Geodesy: Time systems, Celestial and observer coordinate systems, Global Navigation Satellite Systems (GNSS), Satellite orbits and orbital parameters, 3-D positioning. A project or assignments of at least 64 notional hours. Examples using data from South Africa are implemented.

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The information published here is subject to change and may be amended after the publication of this information. The [General Regulations \(G Regulations\)](#) apply to all faculties of the University of Pretoria. It is expected of students to familiarise themselves well with these regulations as well as with the information contained in the [General Rules](#) section. Ignorance concerning these regulations and rules will not be accepted as an excuse for any transgression.