

# University of Pretoria Yearbook 2024

## BScHons (Geography) *Geography and Environmental Science* (02240416)

**Department** Geography, Geoinformatics and Meteorology

**Minimum duration of study** 1 year

**Total credits** 135

**NQF level** 08

### Admission requirements

1. Relevant BSc degree
2. A weighted average of at least 60% in relevant final-year modules
3. An admission examination may be required

### Transitional measures

Students who failed GIS 708 in 2021, may take GMA 705 as an alternative as from 2022.

## Curriculum: Final year

### Minimum credits: 135

Fundamental credits: 15  
Core credits: 105  
Elective credits: 15

**Additional information:** Students must choose one of the two geoinformatics modules, GIS 708 or GMA 705, as a core module. They may choose the other one as an elective module.

## Fundamental modules

### Geographical and environmental principles 710 (GGY 710)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 lecture per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Year

#### Module content

The module provides a critical review of the structures and paradigms in which the geographical and environmental sciences are practised. Particular reference is made to the development and impact of paradigms and the interdependence of systems within space and time.

## Core modules

### Environmental assessments 785 (ENV 785)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Service modules</b>	Faculty of Health Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	28 contact hours
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Year

## Module content

The aim of this module is to understand the principles and processes behind environmental assessments. The module will give an overview of the history of assessments, compare assessment processes internationally, evaluate the strengths and weaknesses of different approaches, provide an overview of the South African regulatory context and the environmental authorisation process.

## Research project 702 (GGY 702)

<b>Module credits</b>	35.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Year

## Module content

An approved individual research project on an environmental/geography topic within the natural sciences. The project is carried out under the guidance of a lecturer. The project culminates in a research report in the format of a research paper and presentation. The student is expected to obtain the respective skills (theoretical and practical research techniques, data analysis, communication and computer skills) necessary for the research topic.

## Applied geomorphology 718 (GGY 718)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	GGY 361 or GGY 363 or equivalent. Students who do not need this module as a core module are required to consult with the module coordinator prior to registration on the capacity in this module for extra attendees.
<b>Contact time</b>	28 contact hours
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Year

## Module content

This module focuses on processes and applications of geomorphology. Topics that may be studied include: soil erosion and conservation, weathering, geomorphic response to environmental change, slope processes and geomorphological hazards. The module includes practical fieldwork and field assessments.

## Research methods 721 (GGY 721)

<b>Module credits</b>	10.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.

<b>Contact time</b>	14 contact hours
<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

The module introduces students to research planning and design; scientific reading, writing and presentation as required for research in geography and environmental sciences.

### Environmental change 789 (GGY 789)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Service modules</b>	Faculty of Health Sciences
<b>Prerequisites</b>	Limited to BScHons students. Students who do not need this module as a core module are required to consult with the module coordinator prior to registration on the capacity in this module for extra attendees.

<b>Contact time</b>	28 contact hours
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Year

#### Module content

Study themes include past environmental change, causes and consequences of human-induced environmental change and South Africa and climate change.

### Advanced GIS 708 (GIS 708)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	GIS 310 or equivalent.
<b>Contact time</b>	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 or Semester 2

#### Module content

Advanced topics in GIS application, such as principal component analysis, multi-criteria evaluation and other geospatial analysis methods, and their application relating to the UN Sustainable Development Goals.

### Advanced remote sensing 705 (GMA 705)

<b>Module credits</b>	15.00
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<b>NQF Level</b>	08
<b>Prerequisites</b>	GMA 320 or equivalent. Students who do not need this module as a core module are required to consult with the module coordinator prior to registration on the capacity in this module for extra attendees.
<b>Contact time</b>	28 contact hours per semester
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

The aim of the module is to provide knowledge and understanding of image analysis and information extraction methods in remote sensing. The emphasis is on equipping students with knowledge and skills necessary to process imagery to extract diverse biophysical and geospatial information. The course gives insight into the possibilities and limitations of the application of modern remote sensing/image acquisition systems for Earth and atmosphere research purposes at different levels of detail.

## Elective modules

### Statistics for biological sciences 780 (BME 780)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Service modules</b>	Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 Block weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Statistics
<b>Period of presentation</b>	Semester 1

#### Module content

The principles of experimental design as required for the selection of an appropriate research design. Identification of the design limitations and the impact thereof on the research hypotheses and the statistical methods. Identification and application of the appropriate statistical methods needed. Interpreting of statistical results and translating these results to the biological context.

### Natural woodland and forests: Ecology and management 700 (BOT 700)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences

**Period of presentation** Semester 2

### Module content

Definitions of woodlands and forests and vegetation and forest resources in southern Africa; Classification of forest and woodland in southern Africa; Woodland dynamics including disturbance, recruitment, growth and mortality, recovery after disturbance; Ecosystem services (microclimate and nutrient cycling, carbon sequestration etc); Sustainable forest resource management (resource assessment, socio-economic assessment e.g. wood and non-forest products, participatory resource management processes); Forest health; Monitoring of resource-use impacts and adaptive management; Development of a framework for sustainable conservation and use of non-timber forest products; Climate change and resilience. Forest disease and pathology.

### Basis in environmental health 772 (EHM 772)

**Module credits** 5.00

**NQF Level** 08

**Prerequisites** No prerequisites.

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

**Department** School of Health System and Public Health

**Period of presentation** Year

### Introduction to environmental and occupational health 775 (EOH 775)

**Module credits** 10.00

**NQF Level** 08

**Prerequisites** No prerequisites.

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

**Department** School of Health System and Public Health

**Period of presentation** Year

### Selected theme 701 (GGY 701)

**Module credits** 15.00

**NQF Level** 08

**Prerequisites** No prerequisites.

**Contact time** 28 contact hours

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

**Department** Geography Geoinformatics and Meteorology

**Period of presentation** Year

### Module content

A self-study module on an aspect or aspects of geographical or environmental science selected in consultation with the head of the department from: (a) themes not covered in existing options; or (b) educational subjects.

## Urban geography 780 (GGY 780)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	GGY 301 or equivalent.
<b>Contact time</b>	28 contact hours
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Year

### Module content

The main themes of the module include: overview of global urbanisation theories and processes; urban morphology and change; the administrative structure and functions of African cities and; the quality of urban life in the developing world.

## Advanced geospatial data 705 (GIS 705)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	GIS 310 or equivalent
<b>Contact time</b>	28 contact hours per semester
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1 or Semester 2

### Module content

Advanced topics in geospatial data management, such as data quality, data acquisition and management, standards, spatial data infrastructure (SDI) and legislation.

## Special topics 707 (GIS 707)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	28 contact hours per semester
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1 or Semester 2

## Module content

A special topic in Geoinformatics linked to research specialisation in the department and/or visiting lecturers. For example, research trends and advances in a specific topic or field of specialisation in Geoinformatics. The module is presented in the form of guided advanced readings, seminars and/or discussion sessions.

### Advanced GIS 708 (GIS 708)

**Module credits** 15.00

**NQF Level** 08

**Prerequisites** GIS 310 or equivalent.

**Contact time** 2 lectures per week

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

**Department** Geography Geoinformatics and Meteorology

**Period of presentation** Semester 1 or Semester 2

## Module content

Advanced topics in GIS application, such as principal component analysis, multi-criteria evaluation and other geospatial analysis methods, and their application relating to the UN Sustainable Development Goals.

### Geospatial data and services 709 (GIS 709)

**Module credits** 15.00

**NQF Level** 08

**Prerequisites** (INF 164, INF 214, GIS 311) or equivalent.

**Contact time** 2 lectures per week

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

**Department** Geography Geoinformatics and Meteorology

**Period of presentation** Semester 1 or Semester 2

## Module content

Advanced topics in spatial databases, such as computational geometry, spatial data indexing and query processing, and using the web and mobile technologies for accessing, delivering and presenting geospatial data and services.

### Advanced remote sensing 705 (GMA 705)

**Module credits** 15.00

**NQF Level** 08

**Prerequisites** GMA 320 or equivalent. Students who do not need this module as a core module are required to consult with the module coordinator prior to registration on the capacity in this module for extra attendees.

**Contact time** 28 contact hours per semester



<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

The aim of the module is to provide knowledge and understanding of image analysis and information extraction methods in remote sensing. The emphasis is on equipping students with knowledge and skills necessary to process imagery to extract diverse biophysical and geospatial information. The course gives insight into the possibilities and limitations of the application of modern remote sensing/image acquisition systems for Earth and atmosphere research purposes at different levels of detail.

### Seasonal and climate modelling 703 (WKD 703)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	28 contact hours
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

Fundamentals of seasonal forecasting. The El Niño/Southern Oscillation. Empirical orthogonal functions. Canonical correlation analysis. Empirical forecast models practical. Sea-surface temperature models. Fully coupled and two-tiered general circulation modelling. Dynamical and empirical downscaling techniques. Significance testing using Monte Carlo techniques. Modelling pitfalls. User application forecasting. Projections of decadal and multi decadal climate anomalies.

### Numerical modelling: applications 704 (WKD 704)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	28 contact hours
<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

Initial atmospheric state, observation network, data assimilation, initialization, parameterisation, post-processing. Ensemble methods, probability forecasting, forecast verification. Global circulation models, limited-area and mesoscale models, variable resolution models, dispersion models. Seamless prediction. Practical applications.

## Radar and mesoscale meteorology 721 (WKD 721)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	WKD 265, 315 and 316
<b>Contact time</b>	28 contact hours
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1 or Semester 2

### Module content

Basic principles and characteristics of weather radar including doppler and dual-polarization radars. Weather radar equation. Interpretation of radar reflectivity and velocity data. Introduction to mesoscale meteorology. Surface mesoscale features, atmospheric instability and severe storm classification. Analysis of convective storms and associated hazards.

## Atmospheric composition and air quality 723 (WKD 723)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	BScHons Meteorology students or GIS 310 (or equivalent)
<b>Contact time</b>	28 contact hours
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1 or Semester 2

### Module content

Tropospheric atmospheric composition in southern Africa, with a particular focus on air quality. Specific topics are: air pollution and atmospheric chemistry; linkages between meteorology and air pollution; impacts of air pollution on health and ecosystems; links of atmospheric composition to biogeochemical processes. Modelling and measuring atmospheric composition. Linkages between air pollution and climate change.

## Climate change 724 (WKD 724)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	28 contact hours
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Geography Geoinformatics and Meteorology
<b>Period of presentation</b>	Semester 1 or Semester 2

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## Module content

Concepts related to climate and climate change. Definitions, classification and factors influencing climate. Causes and impacts of climate change. Perceptions of climate change and climate change communication. Basic principles of climate modelling.

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### General Academic Regulations and Student Rules

The [General Academic Regulations \(G Regulations\)](#) and [General Student Rules](#) apply to all faculties and registered students of the University, as well as all prospective students who have accepted an offer of a place at the University of Pretoria. On registering for a programme, the student bears the responsibility of ensuring that they familiarise themselves with the General Academic Regulations applicable to their registration, as well as the relevant faculty-specific and programme-specific regulations and information as stipulated in the relevant yearbook. Ignorance concerning these regulations will not be accepted as an excuse for any transgression, or basis for an exception to any of the aforementioned regulations. The G Regulations are updated annually and may be amended after the publication of this information.

### Regulations, degree requirements and information

The faculty regulations, information on and requirements for the degrees published here are subject to change and may be amended after the publication of this information.

### University of Pretoria Programme Qualification Mix (PQM) verification project

The higher education sector has undergone an extensive alignment to the Higher Education Qualification Sub-Framework (HEQSF) across all institutions in South Africa. In order to comply with the HEQSF, all institutions are legally required to participate in a national initiative led by regulatory bodies such as the Department of Higher Education and Training (DHET), the Council on Higher Education (CHE), and the South African Qualifications Authority (SAQA). The University of Pretoria is presently engaged in an ongoing effort to align its qualifications and programmes with the HEQSF criteria. Current and prospective students should take note that changes to UP qualification and programme names, may occur as a result of the HEQSF initiative. Students are advised to contact their faculties if they have any questions.