

University of Pretoria Yearbook 2024

BScHons *Geoinformatics* (02240414)

Department Geography, Geoinformatics and Meteorology

Minimum duration of study 1 year

Total credits 135

NQF level 08

Admission requirements

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

Note: Additional modules may be required in order to reach the desired level of competency

Additional requirements

Prospective students may be required to do additional modules to enable them to reach the desired level of study. Selection takes place before admission.

Curriculum: Final year

Minimum credits: 135

Fundamental credits: 10
Core credits: 110
Elective credits: 15

Additional information: Appropriate honours modules may be taken from the Faculty or from the School of Information Technology, as approved by the honours coordinator or Head of department.

Fundamental modules

Research methods 701 (GIS 701)

| | |
|-------------------------------|--|
| Module credits | 10.00 |
| NQF Level | 08 |
| Contact time | 14 contact hours |
| Language of tuition | Module is presented in English |
| Department | Geography Geoinformatics and Meteorology |
| Period of presentation | Quarter 1 |

Module content

The module introduces students to planning, research design, scientific reading, writing and presentation as required for geoinformatics research.

Core modules

Research project 702 (GIS 702)

| | |
|-------------------------------|--|
| Module credits | 35.00 |
| NQF Level | 08 |
| Language of tuition | Module is presented in English |
| Department | Geography Geoinformatics and Meteorology |
| Period of presentation | Year |

Module content

An approved individual Geoinformatics research project with a system design and/or spatial analysis component. The project is carried out under the guidance of a lecturer. The student is expected to obtain the respective skills necessary for the research topic. Compilation of a research proposal. Literature survey. Selecting an appropriate research method. Carrying out of the research. Preparation of a research report.

Spatial statistics and geodesy 704 (GIS 704)

| | |
|-----------------------|-------|
| Module credits | 15.00 |
| NQF Level | 08 |

| | |
|-------------------------------|--|
| Prerequisites | GMC 310 and GIS 320 or equivalent |
| Contact time | 28 contact hours per semester |
| Language of tuition | Module is presented in English |
| Department | Geography Geoinformatics and Meteorology |
| Period of presentation | Semester 1 or Semester 2 |

Module content

Principles of least squares in statistics, Spatial least squares regression, Surface interpolation using least squares and coordinate transformations. Topics in Geodesy: Space based measurement systems, sea level measurements, Determination of the geoid, earth axis orientation determination and earth dynamics.

Advanced geospatial data 705 (GIS 705)

| | |
|-------------------------------|--|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | GIS 310 or equivalent |
| Contact time | 28 contact hours per semester |
| 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 geospatial data management, such as data quality, data acquisition and management, standards, spatial data infrastructure (SDI) and legislation.

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 |
| Language of tuition | Module is presented in English |
| Department | Geography Geoinformatics and Meteorology |
| Period of presentation | 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

Environmental policy and communication 704 (ENV 704)

| | |
|----------------------------|--|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | ENV 301 |
| Contact time | 28 contact hours |
| Language of tuition | Module is presented in English |
| Department | Geography Geoinformatics and Meteorology |

Period of presentation Year

Module content

The module introduces students to contemporary debates about the role of policy, discourse and communication in achieving environmental sustainability. The outcomes of development interventions and projects on different scales (global, national and community) are used to demonstrate and reflect on the contested nature of environmental policy formulation, implementation and monitoring. Ultimately, students are encouraged to critically engage with the politics of policy formulation and implementation; and the discursive tactics used to communicate policy-related objectives, outcomes and interventions.

Environmental assessments 785 (ENV 785)

Module credits 15.00

NQF Level 08

Service modules Faculty of Health Sciences

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

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.

Geographical and environmental principles 710 (GGY 710)

Module credits 15.00

NQF Level 08

Prerequisites No prerequisites.

Contact time 1 lecture per week

Language of tuition Module is presented in English

Department Geography Geoinformatics and Meteorology

Period of presentation 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.

Environmental change 789 (GGY 789)

| | |
|-------------------------------|--|
| Module credits | 15.00 |
| NQF Level | 08 |
| Service modules | Faculty of Health Sciences |
| Prerequisites | 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. |
| Contact time | 28 contact hours |
| Language of tuition | Module is presented in English |
| Department | Geography Geoinformatics and Meteorology |
| Period of presentation | Year |

Module content

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

Special topics 707 (GIS 707)

| | |
|-------------------------------|--|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 28 contact hours per semester |
| Language of tuition | Module is presented in English |
| Department | Geography Geoinformatics and Meteorology |
| Period of presentation | 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.

Applied data science 791 (INF 791)

| | |
|-------------------------------|---|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 1 lecture per week, 1 other contact session per week, 1 web-based period per week |
| Language of tuition | Module is presented in English |
| Department | Informatics |
| Period of presentation | Semester 1 or Semester 2 |

Module content

In this information age a lot of data is captured every day and recorded in databases, but the wealth of this data is kept locked in the databases because relatively little mining is performed on this data. This module introduces you to data mining in terms of:

- The data mining process - how do you mine data?
- The data mining techniques - an overview of the data mining techniques that can be used;
- Practical data mining experience - a practical project mining real industry data to find unknown patterns; and
- Product overviews - product demonstrations by data mining vendors.

Seasonal and climate modelling 703 (WKD 703)

| | |
|-------------------------------|--|
| 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 | 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)

| | |
|-------------------------------|--|
| 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 | 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.

Atmospheric composition and air quality 723 (WKD 723)

| | |
|-------------------------------|---|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | BScHons Meteorology students or GIS 310 (or equivalent) |
| Contact time | 28 contact hours |
| Language of tuition | Module is presented in English |
| Department | Geography Geoinformatics and Meteorology |
| Period of presentation | 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)

| | |
|-------------------------------|--|
| 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 | Semester 1 or Semester 2 |

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.

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.