UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

DEPARTMENT OF GEOGRAPHY, GEOINFORMATICS AND METEOROLOGY

BScHons Geoinformatics
2023

This information brochure is a guide only. For the latest on the chosen degree please visit the UP website at www.up.ac.za.

1. GEOINFORMATICS

Geoinformatics concerns the nature of geographic information including its collection, storage, analysis, visualization, interpretation, and distribution. Geographic information is information with implicit or explicit reference to a location relative to the Earth. Geoinformatics provides the scientific foundation for geographic information systems (GIS), *i.e.* the software, hardware, data, and people for collecting, processing, managing, analysing, and visualizing geographic information. The volumes of geographic information and the use of GIS are rapidly on the increase. New applications are being developed daily in a wide range of applications from utilities to environmental management.

The postgraduate program in geoinformatics offers a pathway to an interesting career: either as a registered GISc Professional, or the Honours in Geoinformatics could be a complementary qualification to a career in another discipline such as environmental science, geology or geography.

2. JOB OPPORTUNITIES

Graduates with a BScHons (Geoinformatics) readily find work at organisations such as Geographic Information System (GIS) vendors (*e.g.* ESRI or Intergraph), the Council for Scientific and Industrial Research (CSIR), GIS consultants (*e.g.* AfriGIS, GeoTerraImage, GISCOE), civil engineering consultants (Aurecon, SSI), the South African National Space Agency (SANSA), South Africa's National Mapping and National Geospatial Information (NGI), or any municipality in the country. Many government departments (e.g. Forestry, Fisheries and the Environment (DFFE), Science and Innovation (DSI), Statistics South Africa, Agriculture, Land Reform and Rural Development (DALRRD), and Water and Sanitation (DWS)) also employ GISc Professionals.

3. ACCREDITATION

The BSc Geoinformatics and BScHons Geoinformatics programs have been accredited by the South African Geomatics Council (SAGC). Upon successful completion of the BSc Geoinformatics and BScHons Geoinformatics degrees, you can register as a GISc Candidate Professional. If you have a different first degree and complete the BScHons Geoinformatics degree at UP, you may have to take additional undergraduate modules to meet registration requirements. Consult the SAGC website at http://sagc.org.za for more information.

4. APPLICATION, SELECTION AND ADMISSION REQUIREMENTS

Admission into BScHons Geoinformatics is a BSc in Geoinformatics or equivalent BSc degree that meets the prerequisites of the Honours modules. Prospective students may be required to do additional modules to enable them to reach the desired level of study.

A prospective student must have an average of 60% or more in the final year of the bachelor's degree. Selection takes place before admission and the number of places is limited. Acceptance is conditional on the

final marks obtained for the undergraduate bachelor's degree. The prospective student's academic record is evaluated, and one of four selection outcomes is possible:

1. Accepted to BScHons Geoinformatics.
2. Accepted to BScHons Geoinformatics on the condition that several prescribed modules are completed simultaneously with the Honours programme.
3. Not accepted to BScHons Geoinformatics. Accepted to BSc Natural Sciences Undergraduate Special. The student must successfully complete several prescribed undergraduate modules in a bridging year. **Note that undergraduate lectures and practicals are presented during the day on weekdays on the Hatfield campus.** If the student achieves an average of 60% in these modules, he/she may re-apply for BScHons Geoinformatics in the following year. Note that the bridging modules cannot be completed over more than one year.
4. Not accepted. The applicant does not comply with the admission requirements.

Amongst others, the following additional modules may be prescribed:

- GIS 310, Geographic information systems
- GIS 311, Geoinformatics
- GIS 320, Spatial analysis
- GMA 220, Remote sensing
- GMA 320, Remote sensing
- GMC 310, Geometrical and space geodesy
- INF 154, Informatics
- INF 164, Informatics
- INF 214, Informatics

Online application is available on www.up.ac.za, click on '*Study* > *Apply*' in the top menu.

Applications for BScHons Geoinformatics close on 30 September.

The first meeting for Honours students is usually towards the end of January. The final date will be announced early in January via email by the Honours coordinator. Lectures usually commence a week after the first meeting.

The Honours program is designed for full-time study and classes are presented during the day. If you are working, it is advisable to do the program over two years and in this case, you have to inform the academic advisor of this at the start of the year.

The University of Pretoria is a residential university, meaning that students should live close by to be able to attend classes and practicals on campus. Although we changed to online and hybrid contact sessions during the COVID-19 pandemic, from 2023 onwards, we expect that students will have to regularly attend classes and write examinations on campus in person.

5. MODULES AND CREDITS

The timetable is announced at the beginning of the year. Classes are usually scheduled during the week from 16:30 onwards or on Saturdays. In addition, several workshops and/or practical sessions, some on Saturdays, may be scheduled. The timetable varies from year to year, depending on staff availability and student numbers.

Code	Module Name	Credits	Period
Fundamental modules (compulsory):			
GIS 701	Research methods 701	10	Q1
Core modules (compulsory):			
GIS 702	Research project 702	35	Y
GIS 704	Spatial statistics and geodesy 704	15	S1 or S2

GIS 705	Advanced geospatial data 705	15	S1 or S2
GIS 708	Advanced GIS 708	15	S1 or S2
GIS 709	Geospatial data and services 709	15	S1 or S2
GMA 705	Advanced remote sensing 705	15	S1 or S2
Elective modules (15 credits):			
ENV 704	Environmental policy and communication 704	15	Y
ENV 785	Environmental assessments 785	15	Y
GGY 710	Geographical and environmental principles 710	25	Y
GIS 707	Special topics 707	15	S1 or S2
INF 791	Applied data science (*pending approval*)	15	S1 or S2

Appropriate Honours modules from the faculty or from the School of Information Technology, approved by the Honours coordinator or Head of Department, may be taken.

Minimum credits: 135

For detailed module descriptions, please consult the University's website *Study* > *Yearbooks*. Select *Faculty of Natural and Agricultural Sciences* on the left, click on *Honours* and then *BSc Geoinformatics* on the right.

6. MODULE DESCRIPTIONS

ENV 704, Environmental assessments 704
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.

ENV 785, Environmental assessments 785
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.

GGY 710, Geographical and environmental principles 710
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.

GIS 701, Research methods
The module introduces students to planning, research design, scientific reading, writing and presentation as required for geoinformatics research.

GIS 702, Research project
An approved individual research project 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.

GIS 704, Spatial statistics and geodesy
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.
Prerequisites: GIS 320 *Spatial analysis* and GMC 310 *Geometrical and space geodesy*, or equivalent.

GIS 705, Advanced geospatial data
Advanced topics in geospatial data management, such as data quality, data acquisition and management, standards, spatial data infrastructure (SDI) and legislation.
Prerequisites: GIS 310 *Geographic Information Systems* or equivalent.

GIS 707, Special topics
A special topic in Geoinformatics linked to research specialization in the department and/or visiting lecturers. For example, research trends and advances in a specific topic or field of specialization in Geoinformatics. The module is presented in the form of guided advanced readings, seminars and/or discussion sessions.

GIS 708, Advanced GIS
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.
Prerequisites: GIS 310 *Geographic Information Systems* or equivalent.

GIS 709, Geospatial data and services
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.
Prerequisites: INF *164 Informatics (Programming)*, INF 214 *Informatics (Relational databases)*, GIS 311 *Geoinformatics*, or equivalent.

GMA 705, Advanced Remote Sensing
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 module 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.
Prerequisites: GMA 320 *Remote sensing*, or equivalent.

INF 791, Applied data science
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.

7. FEES, FUNDING AND BURSARIES OPPORTUNITIES

For information about fees and funding (including scholarships and bursaries, visit the UP website, www.up.ac.za, click '*Study'*, then '*Fees and Funding'*.

External bursaries and studentships are also available. For example, by the South African Geomatics Council (www.sagc.org.za, click on '*Studying'* then '*Bursaries'*) and the CSIR (www.csir.co.za, click on *'Menu'* > '*Careers'* in the top menu).

8. INFORMATION FOR INTERNATIONAL STUDENTS

The first step for international students is to have their existing academic qualifications evaluated by the South African Qualifications Authority (www.saqa.org.za). It is essential to attach the SAQA certificate to your online application.

Additional information for international students is available on the UP website, www.up.ac.za, click on '*Study'* in the top menu, then on '*International Students'*.

9. FREQUENTLY ASKED QUESTIONS

The weighted average for my final year was below 60%, will I still be considered for the BScHons Geoinformatics program?
The weighted average on a transcript is calculated for all the modules completed in that year. For admission to BScHons Geoinformatics, a prospective student must have an average of 60% or in the final year of the bachelor's degree. The overall mark achieved for the bachelor's degree must also be above 60%. The overall mark achieved for the bachelor's degree must also be above 60%.

I am currently completing my final year undergraduate studies, therefore the weighted average for my final year modules is not yet available. Can I still apply for next year?
Yes. Please provide your semester marks when you apply. The selection panel will consider those marks and if applicable, you will be accepted on the condition that your final weighted average is 60% or more.

I completed my B.Tech, will I be considered for the BScHons Geoinformatics program?
Unfortunately, admission to an Honours degree in the Faculty of Natural and Agricultural Sciences requires that you hold a BSc degree. You may consider applying for the BScHons Geoinformatics program to get into the bridging program. Alternatively, you could apply for the BSc Geoinformatics degree. The BSc Geoinformatics and BScHons Geoinformatics are accredited by the SAGC and if you complete both, you meet the academic requirements for registration as a GISc Professional with the SAGC.

I completed my BA degree, will I be considered for the BScHons Geoinformatics program?
Unfortunately, admission to an Honours degree in the Faculty of Natural and Agricultural Sciences requires that you hold a BSc degree. You may consider applying for the BScHons Geoinformatics program to get into the bridging program. Alternatively, you could apply for the BSc Geoinformatics degree. The BSc Geoinformatics and BScHons Geoinformatics are accredited by the SAGC and if you complete both, you meet the academic requirements for registration as a GISc Professional with the SAGC.

I completed a BSc degree in a related field (not geoinformatics) and received a weighted average of above 60%. Will I qualify for the BScHons Geoinformatics program immediately?
Your selection for the programme will depend on the geoinformatics-related modules that you completed during your undergraduate degree. The undergraduate modules must meet the admission requirements for the Honours modules listed in Section 5. Remember to attach your full transcripts and yearbook when you apply. The selection panel will then review your transcripts and determine if you meet the admission requirements or if you need to complete additional modules. Refer to Section 4.

How do I know whether the undergraduate modules that I completed meet the admission requirements for the Honours modules?
The prerequisite modules for Honours modules are listed in Section 6. Search for the code of a prerequisite module in the yearbook at http://www.up.ac.za/yearbooks/home to find its description. Compare this to the modules that you completed. However, the final decision lies with the selection panel.

10. CONTACT DETAILS

Please email any enquiries to:

Dr Victoria Rautenbach (academic advisor), victoria.rautenbach@up.ac.za

Website: https://www.up.ac.za/ggm, click on '*Study' > 'Our Programmes'*.