



UNIVERSITEIT VAN PRETORIA  
UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA

## DEPARTMENT OF GEOGRAPHY, GEOINFORMATICS AND METEOROLOGY

### BSc (Hons) Geoinformatics

2014

#### 1. GEOINFORMATICS

Geoinformatics concerns the nature and function 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 on a daily basis in a wide range of applications from utilities to environmental management.

The postgraduate programme in Geoinformatics offers a pathway to an interesting career: either as a registered Geoinformatics 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. ACCREDITATION

The BSc Geoinformatics and BSc (Hons) Geoinformatics programmes have been accredited by the South African Council for Professional and Technical Surveyors (PLATO). Upon successful completion of the BSc Geoinformatics and BSc (Hons) Geoinformatics degrees, you can register as a Professional GISc Practitioner. If you only complete the BSc (Hons) Geoinformatics degrees, you will have to take additional undergraduate modules for registration. Consult the PLATO website at [www.plato.org.za](http://www.plato.org.za) for more information.

#### 3. APPLICATION, SELECTION AND ADMISSION REQUIREMENTS

The admission requirement for the BSc (Hons) Geoinformatics is a BSc Geoinformatics or applicable BSc degree with relevant experience in computer programming, data management, remote sensing, geodesy and spatial analysis. In the latter case prospective students will be required to do additional modules to enable them to reach the desired level of study (see below). A prospective student must have an average of 60% or more in the major relevant subjects in the final year of the bachelor's degree. Selection takes place before admission and the number of places is limited. The prospective student's academic record is evaluated and one of four selection outcomes is possible:

1. Accepted to BSc (Hons) Geoinformatics.
2. Accepted to BSc (Hons) Geoinformatics on the condition that a number of prescribed modules are completed simultaneously with the Honours programme.
3. Not accepted to BSc (Hons) Geoinformatics. Accepted to BSc Natural Sciences Undergraduate Special. The student has to successfully complete a number of prescribed modules in a bridging year. If the student achieves an average of 60% in these modules, he/she may re-apply for BSc (Hons) Geoinformatics in the following year.
4. Not accepted. The applicant does not comply with the admission requirements.

Amongst others, the following additional modules may be prescribed:

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

Online application is available on [www.up.ac.za](http://www.up.ac.za).

**Applications close on 31 October. Late applications will be accepted only if places are still available.**

**The first meeting for Honours students is usually toward the end of January. The final date is determined and published by the Faculty. Lectures usually commence a week after the first meeting.**

#### 4. MODULES AND CREDITS

Depending on the required number of modules this programme can be completed over one or two years. It is advisable for part-time students to do the programme over two years. The timetable is announced at the beginning of the year. Classes are usually scheduled from 16:30 onwards. In addition a number of 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 |
|-------------------------------------------------------------------------------------------------------|------------------------------------|---------|--------|
| COS 787                                                                                               | Spatial databases                  | 15      | S1     |
| ENV 703                                                                                               | Research and presentation skills   | 10      | Y      |
| GMA 705                                                                                               | Advanced remote sensing            | 20      | S2     |
| UNI 763                                                                                               | Internet GIS                       | 20      | S2     |
| UNI 766                                                                                               | Spatial statistics and geodesy     | 20      | S2     |
| UNI 787                                                                                               | GIS logistics and data acquisition | 20      | S1     |
| UNI 791                                                                                               | GIS professional practice          | 20      | S1     |
| UNI 792                                                                                               | GIS project                        | 30      | Y      |
| Modules offered by other Departments can also be selected in consultation with the programme manager. |                                    |         |        |

**Minimum credits: 155**

#### 5. MODULE DESCRIPTIONS

##### 5.1. COS 787, Spatial databases

This module covers the major themes of spatial databases with application to geographic information systems (GIS), i.e. systems concerning data with an implicit or explicit reference to a location relative to the earth. Topics covered include an introduction to spatial databases and spatial data management systems, representation of geographic data, spatial data modelling, computational geometry, spatial data indexing, query processing and spatial data standards. For Computer Science students the module is an introduction to the ever increasing application field of geographic information systems (GIS), and for Geoinformatics students the module provides insight into the Computer Science foundations of the field.

**Prior knowledge: INF 214, Informatics (Relational databases), or equivalent.**

## **5.2. ENV 703, Research and presentation skills**

A module zooming in on research methodologies, data-capturing techniques as well as visual and oral presentation skills. A significant part of the module assessment is constituted by the final presentation of the honours project contents.

**Admission to Bsc (Hons) Geoinformatics.**

## **5.3. 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.

**Prior knowledge: GMA 220, Remote sensing (Theory) and GMA 320, Remote sensing (Application), or equivalent.**

## **5.4. UNI 763, Internet GIS**

This module aims to explore the Internet as a platform for accessing and delivering geospatial data and services. Students will be exposed to the theory and practice of technologies and technology approaches that make Internet GIS a reality. From the basic building blocks of Internet GIS, to advanced Spatial Data Infrastructure concepts, this module covers current and emerging issues in bringing geospatial data and processes to the wider world. Students will be required to reflect on the implications of using such technologies. A significant portion of the module will involve 'hands-on' work in designing and building Internet GIS applications and accessing Internet-based data and services. This module also includes consideration of a number of case studies within different problem domains.

Students should leave the module with an understanding of the building blocks that make Internet GIS possible and be able to consider what are good practices in the development of Internet GIS applications and services.

**Prior knowledge: INF 154, Informatics (Introduction to programming) and INF 164, Informatics (Programming), or equivalent.**

## **5.5. UNI 766, Spatial statistics and geodesy**

Principles of least squares in statistics, spatial least squares regression, surface inter-polation 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.

**Prior knowledge: GMC 110, Cartography, and GMC310, Geometrical and space geodesy, or equivalent.**

## **5.6. UNI 787, GIS logistics and data acquisition**

The aim of this module is the application of logistical processes to improve the GIS unit's response to satisfy a customer's need. The focus will be on supply chains, supply chain management with special emphasis on data acquisition and quality. Supply chains have a minimum of three entities, namely suppliers, the manufacturer and customers. The manufacturer in the context of Geographic Information Systems (GIS) is the GIS unit. The GIS unit plans the supply chain, sources material, including data, from suppliers; produces a GIS product; delivers the product to the customer; and deals with the return of faulty products.

**Prior knowledge: Admission to Bsc (Hons) Geoinformatics.**

## **5.7. UNI 791, GIS professional practice**

The module introduces the organisational aspects of GIS (how it fits into an organisation, critical success factors and people issues), GIS project management and GIS professional issues (GIS profession, professional registration, business practice, and ethics).

**Prior knowledge: Admission to Bsc (Hons) Geoinformatics.**

### **5.8. UNI 792, GIS 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.

**Prior knowledge: Admission to Bsc (Hons) Geoinformatics.**

### **6. CONTACT DETAILS**

Please e-mail any queries to:

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Website: [www.up.ac.za/ggm](http://www.up.ac.za/ggm), click on 'Degrees offered'