



# University of Pretoria Yearbook 2023

## BScHons (Soil Science) (Environmental Soil Science) (02240600)

**Department** Plant Science

**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% at final-year level
3. Introductory Soil Science and Pedology and Soil Chemistry passed at undergraduate level

### General 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 (HEQF) 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.*



## Curriculum: Final year

**Minimum credits: 135**

### Additional information:

The honours degree is awarded on the basis of formal modules passed. Students registered for the BScHons in Soil Science [Option: Environmental Soil Science] will register for all the soil science modules prescribed at honours level, as well as any other modules deemed necessary by the head of department.

## Core modules

### Crop production systems (I): Field crops 785 (AGR 785)

|                               |   |
|-------------------------------|---|
| <b>Module credits</b>         | 15.00                                     |
| <b>NQF Level</b>              | 08  |
| <b>Prerequisites</b>          | No prerequisites.                         |
| <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

Integrated agronomic, climatic, soil, botanical, economic and managerial considerations in crop production systems aimed at maximum economic yield and sustainability. The use of conservation agriculture (CA) in field crop production is becoming ever increasingly important, especially since it is directly related to Sustainable Development Goals (SDGs) 2 (food), 6 (water), 7 (energy) 13 (climate) and 15 (soil). During the semester applicable AC and SDG examples will be highlighted in case studies of specific field crops. Practicals will consist out of a trial on the experimental farm.

### 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.

## Advanced environmental soil chemistry 771 (GDK 771)

**Module credits** 15.00

**NQF Level** 08

**Prerequisites** No prerequisites.

**Contact time** 1 discussion class per week

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

**Department** Department of Plant and Soil Sciences

**Period of presentation** Year

## Module content

Advanced theoretical and experimental soil chemistry, including the organic fraction.

## Advanced environmental soil physics 772 (GDK 772)

**Module credits** 15.00

**NQF Level** 08

**Prerequisites** No prerequisites.

**Contact time** 1 discussion class per week, fortnightly practicals

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

**Department** Department of Plant and Soil Sciences

**Period of presentation** Year

## Module content

In soil physics, the principles of physics, chemistry, engineering, and meteorology are applied to address practical problems in agriculture, ecology, and engineering. This module provides an overview of the basics of soil physical properties, followed by soil water properties and the relationship between soil water content and potential. Next, the various processes in the soil are discussed, including heat flow, water flow, and solute movement. To familiarize students with the use of models for planning and as a tool for reasoning, we will use the HYDRUS model extensively in both practice and theory. This module integrates both theoretical and computational elements to enhance the overall scientific, quantitative, and computer skills so as to provide: a) a fundamental understanding of how water, solutes, and heat transfer in soils influence the physical environment for agriculture, hydrology, and the environment; b) conceptual and practical tools to deal with agricultural, hydrological, and environmental challenges.

## Soil fertility, soil microbiology and plant nutrition 773 (GDK 773)

**Module credits** 15.00



|                               |   |
|-------------------------------|---|
| <b>NQF Level</b>              | 08  |
| <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>             | Department of Plant and Soil Sciences     |
| <b>Period of presentation</b> | Semester 2                                |

### Module content

Soil ultimately controls nutrient supply to plants and organisms. The health and resilience of biota are therefore closely linked to the interaction between the pedosphere and the biosphere. This course deals with the availability and uptake of macro and micro nutrients in the plant - microbial- soil system, nutrient deficiencies and toxicities, as well as soil properties and soil environmental conditions that influence soil fertility and its suitability to act as a growth medium. Practical work includes the laboratory evaluation of soil fertility and greenhouse pot trials to investigate nutrient uptake as well as deficiencies and toxicities symptoms in plants.

## Research project in environmental soil science 775 (GDK 775)

|                               |                                       |
|-------------------------------|---------------------------------------|
| <b>Module credits</b>         | 30.00                                 |
| <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 |
| <b>Period of presentation</b> | Year                                  |

### Module content

Research project on a practical aspect of Environmental Soil Science. Literature review, formulation of a problem statement, hypotheses and aims of the research, as well as the design and execution of a laboratory or field scale trial. Project to be written up in a specific scientific format suitable for publication with an oral and visual presentation on the research.

## Environmental biophysics 750 (LKM 750)

|                               |   |
|-------------------------------|---|
| <b>Module credits</b>         | 15.00                                     |
| <b>NQF Level</b>              | 08  |
| <b>Prerequisites</b>          | No prerequisites.                         |
| <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

Environmental variables. Quantitative description and measurements of atmospheric environmental variables and water in organisms. Mass and energy fluxes. Quantitative description of energy fluxes in organisms' environments. Energy balances of animals and plant communities will be derived.

## Scientific communication 702 (PGW 702)

**Module credits** 15.00

**NQF Level** 08

**Prerequisites** No prerequisites.

**Contact time** 1 lecture per week, 2 seminars

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

**Department** Department of Plant and Soil Sciences

**Period of presentation** Year

## Module content

Principles of the scientific process. Literature accessing and article assessment. Manuscript preparation and presentation of seminars. Use of visual aids.

## Elective modules

### Plants, people and planet 789 (BOT 789)

**Module credits** 5.00

**NQF Level** 08

**Prerequisites** No prerequisites.

**Contact time** 3 lectures/tutorials (1 hour each) per week, Presentation of proposal (1 hour), Self study

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

**Department** Department of Plant and Soil Sciences

**Period of presentation** Year

## Module content

Introduction to Community Engagement (CE) in the South African and University of Pretoria context; plant blindness. Identification of community engagement topic and activities, field work and submission of report on these activities.

## Regulations and rules

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



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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.

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