

## Geo-Programming (C003867)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits** 5.0

**Study time** 150 h

### Course offerings and teaching methods in academic year 2023-2024

A (semester 2)

Dutch, English

Gent

lecture

seminar

### Lecturers in academic year 2023-2024

Huang, Haosheng

WE12

lecturer-in-charge

### Offered in the following programmes in 2023-2024

[Bachelor of Science in Geography and Geomatics](#)

**crdts**

5

**offering**

A

[Linking Course Master of Science in Geography and Geomatics](#)

5

A

[Preparatory Course Master of Science in Geography and Geomatics](#)

5

A

### Teaching languages

English, Dutch

### Keywords

Geomatics, programming, scripting, libraries.

### Position of the course

The practical Python programming experience is elaborated within the context of geography, GIS and geomatics. Special attention is given to the use of geographical data and spatio-temporal data analysis (via geo-libraries) for addressing geographical problems and issues. Algorithms and data structures, needed to use geographical information adequately, are also demonstrated and explained.

### Contents

- Introduction to geographical data (e.g. shapefiles) and geographical databases.
- Introduction to (geo-)algorithms and complexity
- Python scripting for GIS applications: processing, analyzing and visualizing geodata (e.g. in GIS software such as ArcGIS or QGIS)
- Python scripting for remote sensing and point clouds
- Introduction to Geographic Data Science and GeoAI

### Initial competences

Experience in Python programming and Geographical Information Systems

### Final competences

- 1 The student should be able to solve a simple exercise with a geomatics background, phrased in natural language, to a proper and correct algorithm and/or program in Python.
- 2 The student should have acquired adequate practical and theoretical knowledge of the basic principles of commonly used data types and algorithms.
- 3 The student should be able to manage and process geographical data with the help of Python scripting and geo-libraries.
- 4

### Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

### Conditions for exam contract

This course unit cannot be taken via an exam contract

### Teaching methods

## **Learning materials and price**

Syllabus, slides, and other course materials are available on Ufora.

## **References**

- Tateosian L., "Python for ArcGIS", Springer, 2015.  
Zandbergen P., "Python Scripting for ArcGIS Pro", ESRI Press, 2020  
Zandbergen P., "Advanced Python Scripting for ArcGIS Pro", ESRI Press, 2020  
Xiao N., "GIS Algorithms", Sage Publications Ltd, 2015  
Chun Y., Griffith D., "Spatial Statistics and Geostatistics", Sage Publications Ltd, 2013

## **Course content-related study coaching**

Interactive support via Ufora. Students can appeal to the lecturer and exercise assistants, and to the study coaches which are provided by the geography department.

## **Assessment moments**

end-of-term and continuous assessment

## **Examination methods in case of periodic assessment during the first examination period**

## **Examination methods in case of periodic assessment during the second examination period**

## **Examination methods in case of permanent assessment**

Oral assessment, Assignment

## **Possibilities of retake in case of permanent assessment**

not applicable

## **Extra information on the examination methods**

- Assessment of the assignments.
- Assessment of the project report, supplemented by an oral presentation, in which both the report itself and the work performed will be evaluated.

## **Calculation of the examination mark**

- Assignments (40%)
- Assessment of the written project report + oral presentation/exam (60%)