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 2024-2025

| A (semester 2) | Dutch, English | Gent | lecture |
| | | | seminar |

Lecturers in academic year 2024-2025

| Huang, Haosheng | WE12 | lecturer-in-charge |

Offered in the following programmes in 2024-2025	**crdts**	**offering**
Bachelor of Science in Geography and Geomatics	5	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, Geographical Information Systems, and relational databases (including SQL)

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 be able to set up and perform queries in a (spatial) database.
3 The student should have acquired adequate practical and theoretical knowledge of the basic principles of commonly used data types and algorithms.
4 The student should be able to manage and process geographical data with the help of Python scripting and geo-libraries.

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

Seminar, Lecture

Study material

Type: Slides

Name: Geoprogramming with Python and Databases
Indicative price: Free or paid by faculty
Optional: no
Language : English
Number of Slides : 400
Available on Ufora : Yes
Online Available : Yes
Available in the Library : No
Available through Student Association : No

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

examination during the second examination period is possible in modified form

Extra information on the examination methods

- Assignments, supplemented by oral defenses, in which both the assignments and the oral answers will be evaluated
- The course project, supplemented by an oral presentation, in which both the project and the oral presentation will be evaluated.

Calculation of the examination mark

- Assignments (40%)
- The course project + oral presentation/exam (60%)
- Students must participate in both parts, that is, submit all assignments as well as the project, in order to pass.
- The total grade needs to be higher than 10/20. In case the total grade is lower than 10/20, during the 2nd examination period, students only need to re-take the part they failed.