



Faculty of Science

NGEU24, Physical Geography: Programming for Applications in Geomatics, Physical Geography and Ecosystem Science, 15 credits

Naturgeografi: Programmering för tillämpningar i geomatik, naturgeografi och ekosystemvetenskap, 15 högskolepoäng
Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2019-12-04 to be valid from 2019-12-04, autumn semester 2019.

General Information

The course is offered as a commissioned education.

The course is included in the programs for Master's degree (120 credits) in geomatics (compulsory course) and physical geography and ecosystem science (elective course).

Language of instruction: English

Main field of studies

Physical Geography and Ecosystem Science

Geomatics

Depth of study relative to the degree requirements

A1N, Second cycle, has only first-cycle course/s as entry requirements

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Learning outcomes

The aim of the course is to give the student knowledge and skills to handle programming tools that are relevant to solve problems and tasks within the subjects geomatics, physical geography and ecosystem science. The aim is to increase the employability of a graduated student for different relevant professions in public and private sectors and within academic research.

Knowledge and understanding

On completion of the course the student should be able to:

- account for the most common programming languages
- describe the basics of programming and the basic principles of encoding
- explain the importance of programming within different application fields relevant to geomatics, physical geography and ecosystem science

Competence and skills

On completion of the course the student should be able to:

- apply the principles of basic programming in prescribed programming languages
- use a programming language well enough independently to be able to create or join applications
- write own programmes based on software library, e.g. create own applications based on commercial or open source libraries
- troubleshoot and correct in the programming languages that are applied in the course
- document and describe programme code orally and in writing for other versed individuals

Judgement and approach

On completion of the course the student should be able to:

- evaluate and assess prescribed applications
- suggest improvements in existing programme code
- argue for and practically demonstrate the use of programming to solve prescribed problems

Course content

The course contains theoretical basis for programming and application of programming in the fields of geomatics and physical geography and ecosystem science. The course contains a large number of different programming assignments and much independent project work, individually and in groups to solve different relevant problems by means of programming new applications. Apart from the initial programming exercises of basic nature most of the problems are from realistic and relevant applications in research or other activities. Strong emphasis is placed at adaptation and integration of own programs in existing applications to streamline a work process.

Course design

The course is carried out with different types of teaching where lectures and practical exercises dominate. The course is divided into three main modules. Module 1 focuses on basic programming for scientific applications. In this module, techniques for variable handling, input and output of data, logical operations, loops, graphics, matrix and vector handling are included as well as applications for statistics, raster-GIS, numerical methods and simple ecosystem modeling. Module 2 treats object-oriented programming. The applications are taken primarily from analysis of spatial problems with GIS. The course is completed with module 3 that contains a larger assignment that is carried out individually or in groups. The student is given the opportunity to

specialise in applications of one of the programming languages that are included in the course.

Assessment

Examination takes place through assessment of prescribed practical assignments that are presented both orally and in writing. The course also contains a written exam. The course grade is decided by combining the results of the written exam with the results of the assignment in module 3 of the course. A retake is given in close connection to regular examination.

In consultation with Disability Support Services, the exam may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equal to that of a student without a disability.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.

Passing the course requires passed on all compulsory written assignments and the written examination.

Entry requirements

Admission to the course requires general entry requirements and Mathematics D and at least 90 credits in natural sciences or technology at the basic level of which at least 15 credits GIS, e.g. NGEA11 or the equivalent.

Further information

The course may not be included in qualification together with the course GISN24 Python programming in GIS or NGEN13, Physical geography: Programming for applications in geomatics, physical geography and ecosystem sciences, 15 credits.

Subcourses in NGEU24, Physical Geography: Programming for Applications in Geomatics, Physical Geography and Ecosystem Science

Applies from H21

- 2101 Project, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction
- 2102 Matlab exercises, 3,7 hp
Grading scale: Fail, Pass
- 2103 Python exercises, 3,8 hp
Grading scale: Fail, Pass

Applies from H19

- 1901 Project, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction
- 1902 Matlab exercises, 3,7 hp
Grading scale: Fail, Pass
- 1903 Python exercises, 3,8 hp
Grading scale: Fail, Pass