LUND UNIVERSITY

Faculty of Science

GISN24, GIS: Python Programming in GIS, 5 credits
GIS: Pythonprogrammering i GIS, 5 högskolepoäng
Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2013-03-21 to be valid from 2013-03-22, autumn semester 2013.

General Information

The course is an elective course for second-cycle studies for a Degree of Master of Science (120 credits) in geographic information science.

Language of instruction: English

Main field of studies	Depth of study relative to the degree requirements
Geographical Information Science	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is that students should have acquired on completion of the course the following knowledge and skills:

Knowledge and understanding

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

- account for Python's integrated development environment,
- account for Python's embedded data types
- account at a general level and understand the execution flow and flowcharts in Python including general syntax,
- account for at a general level and understand object-oriented programming with Python
- account for modules and packages in Python,
- describe and understand concepts as iterators, generators, and decorators in Python,

- describe and understand string manipulation, testing, debuggning and documentation in Python
- have basic knowledge about Python's different packages for scientific calculations and visualisation and
- understand and account for how Python can be connected to geographic information systems especially ArcGIS, regarding both vector and raster operations.

Skills and abilities

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

- communicate orally and in writing and in a well balanced way be able to utilise the scientific language for special purposes in the area
- apply Python-programming including execution flow (general syntax, mathematical operators, if-else, for-else-while, etc) and object oriented programming,
- apply Python-programming in ArcGIS concerning standard operationer and basic scripts within both vector and raster GIS.

Judgement and approach

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

- assimilate, critically assess and discuss scientific publications on Python programming and be able to summarise the material.

Course content

The following parts are included in the course:

- Introduction to Python
- Basic Python \x{2013} embedded data types and the execution flow
- Object oriented programming with Python on basic and advanced levels
- Modules and packages
- Concept \x{2013} iterators, generators, decorators and meta classes
- String manipulation
- Input, formatting, file management, operating system, apps, testing, debuggning, adoption of a profile and documentation
- Algorithm programming with Python in GIS environment
- Script programming with Python in GIS environment

Course design

The teaching consists of lectures, exercises and seminars. Participation in exercises and seminars, and thereby integrated other teaching is compulsory, but the lectures contain information that is not included in textbooks and listed literature, so it is recommended that all lectures are attended.

The course is a distance course and is distributed on the Internet. It is flexible designed which facilitate for the student to carry out the course on full-, half- or part-time.

Assessment

Examination takes place in writing in the form of take-home examination and through approval of individual exercises. For students who have not passed the regular examination, additional examination in close connection to this is offered.

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.
To pass the entire course, approved examination, passed exercises and participation in all compulsory parts are required. The final grade are decided by the grade on the take home exam.

Entry requirements

For admission to the course, general entry requirements are required, English B and 90 credits completed courses including 30 credits courses in GIS. Equivalent knowledge in a different way acquired, give also admission to the course.

Subcourses in GISN24, GIS: Python Programming in GIS

Applies from V13

1301   Python Programming in GIS, 5,0 hp
         Grading scale: Fail, Pass, Pass with distinction