Faculty of Science

GISN26, GIS: GIS and Distributed Hydrological Modelling, 7.5 credits

GIS: GIS och distribuerad hydrologisk modellering, 7,5 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 the fundamental features of runoff modeling for scales from micro to macro levels, and for different model types, from empirical to process based
- In detail be able to explain how digital elevation data is created with different technologies
- Describe how digital terrain models can be generated from raw data
- Account at a general level for how the spatial variability influence both input and output (the results) in modelling operations

- In detail account for the spatial aspects in a hydrological model
- Independently prepare, calibrate and validate a hydrological model
- Critically put models results in relation to one another from a perspective of understanding of the structure of models

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 of the subject
- Apply some of the most common methods for generation of data for models e.g. elevation data, rain fall data, evapotranspiration data and run-off data

Judgement and approach

Assimilate, assess and discuss scientific publications within the subject critically and from such material be able to summarise a current research issue.

Course content

The following parts are included in the course:

- Model theory, from empirical to process based models
- Digital terrain data, methods for data collection and treatment
- Groundwater modeling, hydrological data in black-box models
- Physical, spatially distributed hydrological models, parameters and functions from a spatial perspective in different scales
- Modelling of urban and agrarian landscapes and uncertainties in models

The course treats hydrological modelling in a spatial perspective. General aim is to give theoretical and practical knowledge of possibilities and problems related to use digital geographic data to model hydrological factors in both space and time. Both clean scientific and technical aspects that the benefit of modelling and the use of results from a societal perspective are included in the course. The course contains theoretical and practical (computer exercises) parts relevant to spatial hydrological modelling. Individual work and training different presentation techniques are also included. The course is characterised by an interdisciplinary approach.

Course design

The teaching consists of lectures, computer exercises, digital seminars and individual written assignments. Participation in computer exercises and seminars and thereby integrated other teaching is compulsory, but since the lectures are integrated with other teaching and contain information that is not included directly in the textbook or other included literature it is strongly recommended that all lectures are attended. All written assignments are compulsory.

The course is a distance course and is distributed on the Internet. It is flexible designed which facilitate that the student can 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 exercises and individual written assignments. 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 written assignments and participation in all compulsory parts are required. The final grade are decided through 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 acquired in a different way, also give admission to the course.

Further information

The course can not be counted in a higher education qualification together with NGEN05, GIS and Remote sensing for distributed environmental modelling, 7.5 credits.

Subcourses in GISN26, GIS: GIS and Distributed Hydrological Modelling

Applies from V13

1301 GIS and Distributed Hydrological Modelling, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction