Faculty of Science

GISN36, 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 2021-05-05 to be valid from 2021-05-05, spring semester 2022.

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 acquire knowledge and skills related to how GIS can be used in distributed hydrological modelling. The course covers hydrological modelling in a spatial perspective and general aims are to provide theoretical and practical knowledge of possibilities and problems related to the use of digital geographic data to model hydrological factors in space and time. The course includes pure scientific and technical aspects as well as the societal benefit of modelling and the use of results.

Knowledge and understanding
On completion of the course, the student shall be able to:

- give an account of the fundamental features of runoff modeling for scales from micro to macro levels, and for different type of models, ranging from empirical to

process based,
- in detail explain how digital elevation data are created with different technologies
- describe how digital terrain models can be generated from raw data
- give an account of how the spatial variability influence at a general level on input and output (the results) from modelling activities,
- give a detailed account of the spatial aspects in a given hydrological model
- independently prepare, calibrate and validate a hydrological model
- critically compare results from different models based on an understanding of the structure of models.

Competence and skills

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

- demonstrate skill to communicate in writing and orally and in a well balanced way be able to utilise relevant scientific vocabulary of the field,
- apply some of the most common methods for generation of model input data, e.g. elevation, precipitation, evapotranspiration and run-off.

Judgement and approach

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

- critically assess and discuss scientific publications and based on such material be able to summarise a given current research issue.

Course content

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.

The course consists of the following practical and theoretical components:

- 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, distributed hydrological models, parameters and functions from a spatial perspective in different scales
- Modelling of hydrology in urban and agrarian landscapes and uncertainties in models.

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 flexibly designed, and it is possible to attend the course at full-time or half-time study tempo.

Assessment

Examination takes place in writing in the form of a take-home examination at the end of the course and continuously during the course through exercises and individual written assignments. Students who do not pass an assessment will be offered another opportunity for assessment soon thereafter.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent 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.
To pass the entire course, approved examination, passed written assignments and participation in all compulsory parts are required.

Entry requirements

Entry to the course requires general entry requirements, English B/6 and 90 credits scientific studies, including 30 credits in GIS. Equivalent knowledge acquired in a different way, also gives admission to the course.

Further information

The course cannot be counted in qualification together with GISN26 GIS and distributed hydrological modelling 7.5 credits.

Subcourses in GISN36, GIS: GIS and Distributed Hydrological Modelling

Applies from V22

2201   Exam and exercises, 7,5 hp
         Grading scale: Fail, Pass