

# Syllabus

for course at advanced level

**Information and Modelling Systems for Land and Water Resources**  
**Informations- och modelleringsystem för mark- och vattenresurser**

**15.0 Higher Education**  
**Credits**  
**15.0 ECTS credits**

<b>Course code:</b>	GE8029
<b>Valid from:</b>	Autumn 2018
<b>Date of approval:</b>	2018-01-15
<b>Department</b>	Department of Physical Geography
<b>Main field:</b>	Physical Geography and Quaternary Geology
<b>Specialisation:</b>	A1F - Second cycle, has second-cycle course/s as entry requirements

## Decision

This syllabus has been approved by the Board of Science at Stockholm University 2018-01-15.

## Prerequisites and special admittance requirements

Admission to the course requires knowledge equivalent to Local to Global Water Vulnerability and Resilience, 15 credits (GE7025). Also required is knowledge equivalent to Swedish upper secondary school course English B/English 6.

## Course structure

Examination code	Name	Higher Education Credits
DEL1	Hydrological Modelling Methods	6
DEL2	Exercises	4
DEL3	Project	5

## Course content

The course covers information and modeling systems for water resources as well as numerical methods for studying hydrological, hydrogeological and aquatic environmental problems. The course provides an overview of different types of models, modeling approaches and how these are used. This also includes basic mathematical equations, which are used in the models to describe water flow and contaminant transport processes, and their numerical solution. Furthermore, the course covers methods for time series analyses and management of spatial data. The latter includes geographic information systems (GIS), geostatistics and the use of topographic data.

b. The course consists of the following course units:

Unit 1. Hydrological Modelling Methods 6 credits

Unit 2. Exercises 4 credits

Unit 3. Project 5 credits

## Learning outcomes

Upon completion of the course, students are expected to be able to:

- describe different types of models and modeling approaches in hydrology, hydrogeology and aquatic environments (Course unit 1)
- perform hydrological, hydrogeological and aquatic environmental calculations using mathematical and numerical methods (Course unit 2, 3)

- independently choose and apply suitable modeling methods for a given problem in hydrology, hydrogeology or aquatic environmental sciences (Course unit 3)
- apply hydrological, hydrogeological and aquatic environmental models and critically discuss model results (Course unit 1, 2, 3)

### **Education**

Instruction consists of lectures, seminars, exercises (including computer exercises), project work and laboratory work.

Participation in seminars, project work, exercises and laboratory work and any associated integrated instruction is compulsory. In the event of special circumstances, the examiner may, after consultation with the teacher concerned, grant a student exemption from the obligation to participate in certain compulsory instruction.

Instructions are in English.

### **Forms of examination**

a. The course is examined as follows: Knowledge assessment takes the form of:

- Written and oral examination (Course unit 1)
- Written presentation of laboratory work (Course unit 2)
- Written and oral presentations of project work (Course unit 3).

Examination is in English.

b. Grades will be set according to a seven-point scale related to the learning objectives of the course:

A = Excellent

B = Very good

C = Good

D = Satisfactory

E = Adequate

Fx = Fail, some additional work required

F = Fail, much additional work required

The course unit 2 will be graded according to a two-point scale: Pass (G) or Fail (U).

c. The grading criteria will be distributed at the beginning of the course.

d. In order to pass the course, students must receive a passing grade on all course units and participate in all mandatory instruction.

e. Students who receive a failing grade on a regular examination are allowed to retake the examination as long as the course is still provided. The number of examination opportunities is not limited. Other mandatory course elements are equated with examinations. A student who has received a passing grade on an examination may not retake the examination to attain a higher grade. A student who has failed the same examination twice is entitled to have another examiner appointed, unless there are special reasons to the contrary. Such requests should be made to the department board.

The course includes at least two examination opportunities per year when the course is given. At least one examination opportunity will be offered during a year when the course is not given.

f. Students awarded the grade Fx are given the opportunity to improve their grade to E. The examiner decides the supplementary assignments to be performed and the pass mark criteria. The supplementary assignments will take place before the next examination session.

### **Interim**

Students may request that the examination be conducted in accordance with this course plan even after it has ceased to be valid. However, this may not take place more than three times over a two year period after course instruction has ended. Requests must be made to the departmental board. The provision also applies in the case of revisions to the course plan and the revisions of the course literature.

### **Limitations**

The course may not be included in examinations in combination with courses Geoscience Application of Numerical Methods (GE7029) and Hydrological Modelling Methods in Geoscience (GE7028) and Information and Modelling Systems for Land and Water Resources (GE7006) or equivalent.

**Misc**

The course is part of the Master's Programme in Hydrology, Hydrogeology and Water Resources but can also be read as a separate course.

**Required reading**

The course literature is decided by the department board and published on the Department of Physical Geography's website at least two months before the start of the course.