

Syllabus

for course at first level

Quantitative Methods in Geoscience
Kvantitativa metoder i geovetenskap

7.5 Higher Education
Credits
7.5 ECTS credits

Course code:	GG4203
Valid from:	Spring 2018
Date of approval:	2017-08-18
Department	Department of Geological Sciences
Main field:	Earth Sciences
Specialisation:	G1F - First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Decision

This syllabus was approved by the Faculty of Science at Stockholm University 2017-08-15.

Prerequisites and special admittance requirements

For admission to the course, Mathematics D / Mathematics 4 is required. Knowledge equivalent to 30 credits in geology or earth sciences is required, which includes the following courses: Geology and geophysics 15 credits and Physical geography 15 credits, or the courses Tellus I - Geology, 15 credits (GG2008), Tellus I - Physical geography, 15 credits (GE2020).

Course structure

Examination code	Name	Higher Education Credits
HELA	Quantitative methods in geoscience	7.5

Course content

The course covers:

- units and unit conversions and coordinate systems, e.g., calculation of areas and distances on flat and spherical surfaces
- linear and quadratic functions, power functions, exponential functions, and logarithmic functions used in geoscience, e.g., calculation of sedimentation rates
- trigonometry and its application in geoscience, e.g., travel time curves of seismic waves
- differential calculus and its application in geoscience, e.g., hydraulic heads in groundwater flows
- integration and its application in geoscience, e.g., gravity anomalies
- matrix algebra and its application in geoscience, e.g., calculation of deformation of mountains and glaciers
- ordinary differential equations and their application in geoscience, e.g., calculation of land rise or fall from ice sheet pressure

Learning outcomes

After completing the course, the student is expected to be able to:

- use the appropriate units in geoscience problems and convert between units
- convert a descriptive geoscience problem to appropriate equations that can contain the mathematical concepts described in the course content
- manipulate and solve equations that describe geoscience problems
- visualize solutions within geoscience graphically, discuss results quantitatively, and assess whether or not

the computed solution is physically meaningful

Education

The course consists of lectures and exercises. Field work and seminars may occur. Participation in exercises and in 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.

The teaching language is English.

Forms of examination

a. Knowledge assessment and examination are in the form of written examinations.

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

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

d. In order to pass the course, students must receive the minimum passing grade E 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 has at least two examination sessions per academic year the year of tuition given. Intermediate years are given at least one examination.

f. There is no facility to improve the grade Fx to a pass grade in this course.

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 department board. The provision also applies in the case of revisions to the course plan.

Limitations

The course may not be included in a degree in combination with the courses Mathematics I (MM2001) or Mathematics for the Natural Sciences I (MM2002), or equivalent.

Misc

The course is part of the Bachelor's Programme in Geology, Geochemistry and Geophysics and the Bachelor Programme in Earth Science, but can also be read as a separate course. The course is given in collaboration with the Department of Mathematics.

Required reading

The course literature is decided by the department board and published on the Department of Geological Sciences website at least two months before the start of the course.