

Syllabus

for course at advanced level

Finite Element Method
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7.5 Higher Education
Credits
7.5 ECTS credits

Course code:	BE7013
Valid from:	Autumn 2019
Date of approval:	2013-10-07
Changed:	2013-10-07
Department	Department of Mathematics (incl. Math. Statistics)
Main field:	Scientific Computing
Specialisation:	A1N - Second cycle, has only first-cycle course/s as entry requirements

Decision

This syllabus has been approved by the Board of the Faculty of Science at Stockholm University, October 7, 2013.

Prerequisites and special admittance requirements

For course admission knowledge equivalent to Applied Numerical Methods, FL, 9 HECs (BE3009) and English B/English 6 from Upper Secondary level, is required.

Course structure

Examination code	Name	Higher Education Credits
SAKU	All Course Items	7.5

Course content

a. The course covers FEM-formulation of linear and non-linear partial differential equations. Element types and their implementation. Grid generation. Adaption. Error control. Efficient solution algorithms (e.g. by a multigrid method).

Applications to stationary and transient diffusion processes, elasticity, convection-diffusion, Navier-Stokes equation, quantum mechanics etc.

b. The course includes the following items:

- Theory, 3 HECs
- Project, 3 HECs

Learning outcomes

It is expected that the student after taking the course will be able to:

- use, analyse and implement modern methods for computations, especially the finite element method, for solving differential equations
- analyse computational efficiency and accuracy
- use basic partial differential equations in applications

Education

The education consists of lectures and practical exercises.

Participation in practical exercises is compulsory. The examiner may rule that a student is not obliged to participate in certain compulsory education, if there are special grounds for this, after consultation with the relevant teacher.

The course is given in English.

Forms of examination

a. Examination for the course is in the following manner: measurement of knowledge takes place through written examination.

b. Grading is carried out according to a 7-point scale related to learning objectives:

A = Excellent

B = Very Good

C = Good

D = Satisfactory

E = Sufficient

Fx = Fail

F = Fail

c. Grading criteria for the course will be distributed at the start of the course.

d. A minimum grade of E is required to pass the course, together with participation in all compulsory education.

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 departmental board. The course has at least two examinations for each academic year in the years in which instruction is provided. Intervening years include at least one examination.

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 is carried out in accordance with this syllabus even after it has ceased to apply. This right is limited, however, to a maximum of three occasions during a two-year-period after the end of giving the course. A request for such examination must be sent to the departmental board. The provision also applies in the case of revisions to the course plan.

Limitations

The course may not be included in a degree together with the course Finite Element Method, Intermediate Course (BT2000), Finite Element Method, SL (BE7007), or the equivalents.

Misc

The course is given as an individual course.

Required reading

Course literature is decided by the departmental board and is described in an appendix to the syllabus.