Syllabus

for course at advanced level

Finite Element Method
Finita elementmetoden

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	BE7013
Valid from:	Autumn 2014
Date of approval:	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, August 28, 2007.

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 elements:
• 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. An 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.

Forms of examination

a. Examination for the course is in the following manner: measurement of knowledge of the element Theory takes place through written and/or oral examination, and of the element Project through written presentations.

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 pass of the practical exercises, and participation in all other compulsory education.

e. Students who fail to achieve a pass grade in an ordinary examination have the right to take at least further four examinations, as long as the course is given. The term "examination" here is used to denote also other compulsory elements of the course. Students who have achieved a pass grade on an examination may not retake this examination in order to attempt to achieve a higher grade. Students who have failed to reach a pass grade on two occasions have the right to request that a different teacher be appointed to set the grade of the course. A request for such appointment must be sent to the departmental board.

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.

Limitations

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