SF2520 Applied Numerical Methods 7.5 credits

Tillämpade numeriska metoder

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for SF2520 valid from Autumn 2013

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mathematics,Technology

Specific prerequisites

Single course students: 90 university credits including 45 university credits in Mathematic-sor Information Technology. English B, or equivalent

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The overall goal of the course is to give you knowledge and tools about how to formulate, analyze and implement advanced computer methods based on numerical algorithms for solving mathematical models from scientific and engineering applications.
After completing the course you should be able to

- for a given mathematical model, identify the problem type and suggest a suitable algorithm for the numerical solution;
- implement an algorithm in a programming language suitable for numerical solution of a mathematical model;
- identify suitable software for numerical solution of problems from scientific and engineering applications;
- utilise computer tools for simulation and visualization of mathematical models in science and engineering;
- recognize and construct simple model problems for the analysis of stability and accuracy of a numerical model;
- among several possble numerical methods choose a method that is is efficient;

Course contents

- numerical treatment of ordinary and partial differential equations;
- numerical solution of large linear systems of algebraic equations;
- solution of differential equations with discretization by difference methods and finite element methods;
- solution of linear systems of equations by direct and iterative methods;
- orientation about mathematical modeling;
- orientation about software for scientific computing

Course literature

Lennart Edsberg: Introduction to computation and modeling for differential equations, Wiley 2008, ISBN 978-0-470-27085-1
Lecture notes about numerical algebra.

Examination

- LAB2 - Laboratory Work, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- TEN2 - Written Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

- LAB1 - Laboratory Work, 4.5 credits, grade scale: A,B,C,D,E,FX,F
- TEN1 - Written Exam, 3 credits grade scale: A,B,C,D,E,FX,F

Other requirements for final grade

- Labs completed (LAB1)
- Written Exam completed (TEN1)

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.