



SF2520 Applied Numerical Methods 7.5 credits

Tillämpade numeriska metoder

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

Establishment

The course syllabus is valid from Spring 2022 according to the school principal's decision: S-2022-0529 Decision date: 2022-02-24

Grading scale

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

Education cycle

Second cycle

Main field of study

Mathematics, Technology

Specific prerequisites

- English B / English 6
- Completed basic course in numerical analysis (SF1544, SF1545 or equivalent)
- Completed basic course in differential equations (SF1633, SF1683 or equivalent).

Language of instruction

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

Intended learning outcomes

For the mathematical models in the course contents (e.g. ordinary and partial differential equations, linear systems of equations) the student shall be able to:

- select suitable numerical algorithms,
- analyze numerical methods with respect to computational cost, accuracy and stability,
- apply and implement numerical algorithms in a suitable programming language,
- classify and characterize the mathematical models.

In addition, the student shall be able to:

- estimate the accuracy of numerical results,
- describe limitations of mathematical models and numerical methods,
- for a given numerical problem, present, discuss and summarize the problem, solution method and results in a clear way,
- work in teams to solve a numerical problem.

Course contents

The course will give you knowledge about advanced computer methods based on numerical algorithms for solving mathematical models from scientific and engineering applications, in particular about how to formulate, analyze and implement them. More specifically, the course includes:

- numerical treatment of ordinary differential equations,
- finite difference methods and basic finite element methods for, mainly linear, partial differential equations,
- numerical solution of linear systems of equations by direct and iterative methods,
- orientation about mathematical modeling.

Examination

- TEN1 - Written Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LABA - Laboratory Work, 4.5 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.

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

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.