



SF1525 Basic Course in Numerical Methods 6.0 credits

Grundkurs i numeriska metoder

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

Establishment

Course syllabus for SF1525 valid from Spring 2022.

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Completed course SF1625 Calculus in one variable.

Language of instruction

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

Intended learning outcomes

A general aim with the course is to give the student the understanding that numerical methods and programming techniques are needed to make reliable and efficient simulations of technical and scientific processes based on mathematical models.

After the course the student should be able to

- Identify and classify the mathematical subproblems that need to be solved for a general formulation of a technical or scientific problem, and reformulate them in a form suitable for numerical treatment.
- Choose, apply and implement numerical methods to produce a solution to a given problem.
- Use concepts in numerical analysis to describe, characterize and analyze numerical methods and estimate the reliability of numerical results.
- Clearly present problem setups, solution approaches and results.

Course contents

- Use of mathematical software to solve scientific problems, run numerical experiments and present the solutions.
- Basic ideas and concepts in numerical methods: algorithms, computational cost, local linearization, iteration, discretization, stability, convergence.
- Assessment of reliability: parameter sensitivity, experimental perturbation calculation.
- Numerical methods for non-linear equations and linear systems of equations, integrals, interpolation, least squares method.
- Analytical and numerical methods for systems of ordinary differential equations.

Examination

- LABA - Laboratory work, 1.5 credits, grading scale: P, F
- LABB - Laboratory work, 1.5 credits, grading scale: P, F
- TEN1 - Written exam, 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.

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.