



SF1512 Numerical Methods, basic course 6.0 credits

Numeriska metoder, grundkurs

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 SF1512 valid from Autumn 2021.

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 or SF1673 Analysis in one variable.
- Completed course DD1310 Programming Techniques or similar.

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 students shall 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 to be 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.
- Be able to clearly present problem statements, solution approaches and results in a reasonable way.

Course contents

- Basic ideas and concepts: algorithm, computational cost, local linearisation, iteration, recursion, interpolation, extrapolation, discretisation, convergence, stability, condition.
- Estimation of reliability: parameter sensitivity, perturbation calculation.
- Numerical methods: linear and non-linear systems of equations, differential equations: initial-value problems and boundary value problems, curve fitting: interpolation and the least squares method.
- Application of mathematical software for the solution of mathematical problems, make numerical experiments and present solutions.

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.

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.