



# SF1521 Numerical Methods and Basic Programming, Part 2 3.0 credits

Numeriska metoder och grundläggande programmering, del 2

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

## Establishment

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## Specific prerequisites

Completed course SF1520 Numerical Methods and Basic Programming, part 1.

## 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.

- For a general formulation of a technical or scientific problem: be able to identify and classify the mathematical subproblems that need to be solved, and reformulate them to be suitable for numerical treatment.
- Be able to choose, apply and implement numerical methods to produce a solution to a given problem.
- Be able to 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.
- Be able to use basic control and data structures of the programming language used in the course to solve problems.

## Course contents

Problem-solving through division into sub problems. Using mathematical software to solve engineering mathematical problems, make numerical experiments and present solutions. Program structuring. Basic ideas and concepts within numerical methods: algorithms, computational cost, local linearisation, iteration, extrapolation, discretisation, convergence, stability. Estimation of reliability: parameter sensitivity, experimental perturbation calculation, differential equations, nonlinear systems of equations.

## Examination

- LABA - Laboratory Works, 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.

In this course, the code of honour of the school is applied, see: <http://www.sci.kth.se/institutioner/math/avd/na/utbildning/hederskodex-for-studenter-och-larare-vid-kurser-pa-avdelningen-for-numerisk-analys-1.357185>

The examiner decides, in consultation with KTHs Coordinator of students with disabilities (Funka), about any customized examination for students with documented, lasting disability.

## 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.