



# SF1544 Numerical Methods, Basic Course IV 6.0 credits

## Numeriska metoder, grundkurs IV

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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 SF1544 valid from Autumn 2019

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## 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.

- 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.

## Course contents

Numerical methods for various types of linear systems of equations (full, triangular, banded), the least squares method for inconsistent systems, nonlinear equations (scalar and system), eigenvalue problem, integration, derivation, interpolation and initial and boundary value problems for ODE. Basic technologies for numerical methods, as iteration, linearisation, discretisation and extrapolation, and theoretical concepts as order of accuracy, speed of convergence, complexity, condition and stability.

## Specific prerequisites

Completed course SF1674 Multivariable calculus.

Completed course DD1331 Fundamentals of Programming or DD1312 Programming Techniques and Matlab.

## Course literature

Announced no later than 4 weeks before the start of the course on the course web page

## Examination

- LABA - Laboration Work, 1.5 credits, grading scale: P, F
- LABB - Laboration Work, 1.5 credits, grading scale: P, F
- TEN1 - 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.

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. T

## 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.