



# SF2524 Matrix Computations for Large-scale Systems 7.5 credits

Matrisberäkningar för storskaliga system

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) and
- Completed basic course in computer science (DD1320 or equivalent).

# Language of instruction

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

## Intended learning outcomes

The general intended objective is to obtain understanding when the algorithms of the course work well and their implementation, justification and analysis. After completing the course, the student shall be to

- implement linear algebra algorithms for topics of the blocks of the course;
- analyze when the algorithms of the course work well and their limitations, by using linear algebra tools;
- justify or derive methods of the course, using mathematical reasoning and relation to other numerical techniques.

## Course contents

In this course we will learn some of the most common numerical techniques and algorithms used to efficiently solve problems expressed using large matrices. We focus on detailed understanding about the performance of these methods when they are applied to large-scale systems and study topics such as convergence, accuracy and efficiency. The course consists of four blocks:

- Algorithms for large sparse eigenvalue problems
- Algorithms for large sparse linear systems of equations
- Algorithms for dense eigenvalue problems
- Algorithms for matrix functions

## Examination

- TEN1 - Examination, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- LABA - Laboratory, 3.5 credits, grading scale: P, 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.