

*Course syllabus*

# Linear Algebra Linjär algebra

**FMAB20, 6.0 credits, G1 (First Cycle)**

**Valid for:** 2025/26

**Faculty:** Faculty of Engineering LTH

**Decided by:** PLED F/Pi

**Date of Decision:** 2025-04-10

**Effective:** 2025-05-05

## General Information

**Main field:** Technology **Depth of study relative to the degree requirements:** First cycle, in-depth level of the course cannot be classified

**Mandatory for:** BME1, BR1, D1, E1, I1, L1, M1, MD1, N1, R2, V1, W1

**Language of instruction:** The course will be given in Swedish

## Aim

The aim of the course is to give a basic introduction to linear algebra. Particular emphasis is put on the role which this plays in applications in different areas of technology, in order to give the future engineer a good foundation for further studies in mathematics as well as other subjects. The aim is furthermore to develop the students' ability to solve problems and to assimilate mathematical text.

## Learning outcomes

### *Knowledge and understanding*

For a passing grade the student must

- with confidence be able to solve linear systems of equations and be able to demonstrate an ability to geometrically interpret the solutions of such systems.
- be able to represent, handle and compute with basic geometrical objects in three dimensions, such as points, vectors, lines and planes.

- be able to show a general understanding of the matrix concept and of its coupling to the concept of a linear transformation, and be able to carry out elementary matrix operations and to solve matrix equations.
- be able to explain the contents of some central definitions, theorems and proofs.

### *Competences and skills*

For a passing grade the student must

- be able to demonstrate a good ability to carry out algebraic calculations within in the framework of the course.
- in connection with problem solving, be able to demonstrate an ability to independently choose and use mathematical methods within linear algebra.
- in connection with problem solving, be able to demonstrate an ability to integrate concepts from the different parts of the course.
- be able to demonstrate an ability to explain mathematical reasoning in a structured and logically clear way.

## Contents

Systems of linear equations.

Vectors. Bases and coordinate systems. Equations for lines and planes in space. Scalar product with applications. Vector product with applications.

Matrices. Rank. Linear transformations. Determinants. Eigenvalues and eigenvectors. The method of least squares. Linear spaces and subspaces.

## Examination details

**Grading scale:** TH - (U, 3, 4, 5) - (Fail, Three, Four, Five)

**Assessment:** Written test comprising theory and problems.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

### **Modules**

**Code:** 0117. **Name:** Linear Algebra.

**Credits:** 6.0. **Grading scale:** TH - (U, 3, 4, 5).

## Admission

**The number of participants is limited to:** No

**Kursen överlappar följande kurser:** FMA421 FMA656 FMA425 FMAA20 FMA420 FMAA55 FMAA21 FMAB22

## Reading list

- Månsson, J & Nordbeck, P: Övningar i Linjär algebra. Studentlitteratur, 2019, ISBN: 978-91-44-13355-3.
- Månsson, J & Nordbeck, P: Linjär algebra. Studentlitteratur, 2019, ISBN: 978-91-44-12740-8.

## Contact

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