HF1904 Linear Algebra 5.0 credits

Linjär algebra

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 HF1904 valid from Autumn 2018

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Basic and specific requirements for bachelor's program in engineering.

Language of instruction

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

Intended learning outcomes

After completing the course, students should for a passing grade be able to:

- Define and interpret the fundamental concepts of linear algebra and calculus: vector, dot product, cross product, triple product, line, plane, matrix, determinant, limit, continuity, derivative, integral.
- Do calculations with complex numbers in polar, rectangular and exponential form
- Solve and geometrically interpret systems of linear equations.
- Use vector algebra to evaluate projections, distance, areas and volumes.
- Find eigenvalues and eigenvectors.
- Apply the method of least squares in data fitting.
- Set up simple mathematical models where the fundamental concepts in linear algebra are used.
- Use suitable software (Maple or Matlab) for symbolic as well as numerical solving mathematical problems and applications.

For higher grades, the student in addition should be able to:

- Derive important relations in linear algebra.
- Generalize and adapt the methods to use in somewhat new contexts.
- Solve problems that require synthesis of material and ideas from all over the course.

Course contents

- Euler´s and de Moivre´s theorems. Binomial equations. Algebraic equations.
- Systems of linear equations. Gauss elimination method.
- Vectors. Linear independent vectors.
- Dot product, vector cross product, scalar triple product.
- Equations of lines in 3D. Equations of planes in 3D.
- Determinant.
- Matrices, matrix operations. Matrix equations.
- Eigenvalues, eigenvectors.
- The method of least squares.
- Complex numbers: The complex plane. Modulus and argument. Polar, rectangular and exponential form.

Course literature

MATEMATIK FÖR INGENJÖRER, Staffan Rodhe, Håkan Sollervall, Studentlitteratur. Upplaga 6 (eller nyare), ISBN13: 9789144067964.

Examination

- TEN1 - Examination, 5.0 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.