SF1675 Applied Linear Algebra 13.5 credits

Tillämpad linjär algebra

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

Establishment

The Head of School at the SCI School has decided on 2020-06-22 to establish this syllabus as from HT 2020 (file number S-2020-0892).

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Basic requirements.

Language of instruction

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

Intended learning outcomes

After the course the student should be able to

- use concepts. theorems and methods to solve and present solutions to problems within the parts of linear algebra described by the course content,
- use Matlab to solve problems within the parts of linear algebra and numerical analysis described by the course content,
- read and comprehend mathematical text.
- use basic control and data structures in Matlab for problem solving

in order to

- develop a good understading for basic mathematical concepts within linear algebra and to use these for mathematical modeling of engineering and scientific problems,
- develop a skill, with the help of computers, to illustrate key concepts and solve applied problems with Matlab as well as to visualize and present the results in a clear manner.

Course contents

Basic ideas and concepts in linear algebra: vectors, matrices, systems of linear equations, Gaussian elimination, matrix factorization, complexity, vector geometry with scalar product and vector product, determinants, vector spaces, linear independence, bases, change of basis, linear mappings, eigenvalue, eigenvector, the least squares methods, orthogonality, Gram-Schmidt's method.

Calculation and programming technical aspects: MATLAB programming with control and data structures, file management, functions, visualization, numerical solution of systems of linear equations with Gaussian elimination and LU factorization, experimental determination of complexity in solving linear equation systems, numerical calculation of condition numbers, assessment of accuracy, graphical illustration of results.

Examination

- PRO1 - Project, 1.0 credits, grading scale: P, F
- TEN2 - Examination, 7.5 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 1.5 credits, grading scale: P, F
- LAB2 - Laboratory Sessions, 2.0 credits, grading scale: P, F
- LAB1 - Laboratory Sessions, 1.5 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.

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

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.