IX1303 Algebra and Geometry 7.5 credits

Algebra och geometri

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

On 2020-10-13, the Head of School of EECS has decided to establish this official course syllabus to apply from the spring semester 2021 (registration number J-2020-2156).

Grading scale

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

Education cycle

First cycle

Main field of study

Mathematics,Technology

Specific prerequisites

Language of instruction

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

Intended learning outcomes

Aim that the student should have achieved on completion of the course:

The student should be able to formulate, analyse and solve problems within algebra and geometry that are of significance within the ICT-subject area; apply and develop mathematical models within algebra and geometry by means of a mathematical programming language; critically review and comment on a given solution to a problem ; analyse how sensitive a solution is for variations in input.

On completion of the course, the student should be able to use logical symbols and formalism in set theory in a correct way in problem-solving; formulate mathematical models and solve problems where linear equation systems, matrices and determinants are included; model geometric vectors and vector algebra in R2 and R3, for example within computer graphics; carry out change of basis in orders to simplify a model; explain the relevance of eigenvalues and eigenvectors at certain applications for example rotations; solve linear equation systems (also over determined, under determined and sparse); handle vectors, matrices and determinants; solve eigenvalue problems; handle graphical objects with linear algebra especially with affine reproductions; explain how and explain why the number system is expanded to complex numbers; count with complex numbers written in different forms; model and solve problem in R2 with complex numbers.

Course contents

Basic logic and set theory; different number fields; complex numbers; linear equation systems; matrices and matrix algebra; determinants; the matrix, vectors and vector algebra in R2 of inverse and R3; coordinate system and change of basis; inner product and cross product with geometric applications; affine reproductions; solution to over determined, under determined and sparse systems; eigenvalue problem; applications to computer graphics and image processing.

Examination

- PRO1 - Project work, 1.5 credits, grading scale: P, F
- TENB - Exam, 6.0 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.