IX1303 Algebra and Geometry 7.5 credits

Algebra och geometri

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

Establishment

Course syllabus for IX1303 valid from Autumn 2008

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

GENERAL OBJECTIVES

After course completion the student should be able to- formulate, analyze and solve problems in algebra and geometry significant to the ICT sphere- apply and develop mathematical models with the aid of mathematical programming language- review and comment a given solution to a problem- implement sensitivity analysis

DETAILED OBJECTIVES

After course completion the student should be able to- in problem solving use logical symbols and formalism in a correct manner- explain and motivate the extension of real to complex numbers- use different forms of complex numbers, e.g. cartesian, polar- model and solve problems in R2 with complex numbers- make mathematical models and solve problems involving linear systems of equations, matrices and determinants- model geometric vectors and vector algebra in R2 and R3, e.g. in computer graphics- perform change of basis in order to simplify a model- explain the relevance of eigenvalues and eigenvectors in certain applications, e.g. rotations- with the aid of computers . solve problems involving complex numbers . solve linear systems of equations (also overdetermined, underdetermined and sparse) . use vectors, matrices and determinants . solve eigenvalue problems . manage graphical objects with linear algebra, especially with affine mappings

Course contents

Basic logic and set theory__number domains, complex numbers__linear systems of equations__matrices and matrix algebra__determinants and inverse matrix__vectors and vector algebra in R2 and R3__coordinate systems and change of basis__scalar product and vector product with geometric applications__affine transformations__solution to overdetermined, underdetermined and sparse systems__eigenvalues__applications in computer graphics and image processing

Disposition

The teaching method is problem oriented and computer aided. The education time is evenly distributed among the three main topics- conceptual understanding and modelling- algorithms- conclusions and synthesis.

Examination

- INL1 - Assignments, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 3.5 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.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

Written exam (TEN2; 3.5hp)**Problem assignments (INL1; 4hp)**

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.