IX1304 Calculus 7.5 credits

Matematik, analys

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 IX1304 valid from Spring 2014

Grading scale

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

Education cycle

First cycle

Main field of study

Mathematics,Technology

Specific prerequisites

Mathematics course D of the upper secondary school is recommended.

Language of instruction

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

Intended learning outcomes

GENERAL GOALS

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

The student should be able to formulate, analyse and solve problem within mathematical analysis that is of significance within the ICT-subject area: Apply and develop mathematical models within mathematical analysis by means of mathematical programming language, critically review and comment a given solution to a problem, be able to comment regions of validity, precision and stability and suggest improvements of mathematical models.

DETAILED GOALS

After completed course the student should be able to account for positional systems and to explain the difference between rational and real numbers. To devise and use models where limits, derivatives and series expansions are used. Account for the Riemann integral and it's geometrical interpretation. To solve optimization problems, in one or several variables, within geometrical or physical applications. To use iterative processes for solution of numerical problems and to perform a sensitivity analysis. To account for general properites of dynamical systems. To handle different types of metrics for mathematical objects, in particular with respect to optimization problems and numerical methods.To devise and use models, using differential equations. To master methods of solving simple differential equations. To account for how transforms can simplify the problem solving. To calculate limits, derivatives, integrals, series expansions, solve optimization problems with Lagrange multiplicators, And, to solve numerical problems with e.g. Newton-Raphsons method, solve differential equations, and to visualize the solutions in an appropriate manner.

Course contents

Positional system, real and complex numbers, limits, derivative, derivation rules, series, convergence, divergence, Taylor expansion, the Riemann integral and primitive functions in one and several variables, multiple integral, iterative processes and numerical methods, dynamic systems various types of metrics, differential equations and introduction to transforms.

Course literature

Adams: Calculus, A Complete Course, latest edition.

Examination

- PROA - Project, 2.5 credits, grading scale: P, F
- TENA - Exam, 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.