SF1618 Analytical Methods and Linear Algebra I 12.0 credits

Analytiska metoder och linjär algebra I

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 SF1618 valid from Autumn 2008

Grading scale

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

Education cycle

First cycle

Main field of study

Mathematics,Technology

Language of instruction

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

Intended learning outcomes

After passing the course, the students should be able to

Fundamental concepts

use the fundamental concepts of calculus, linear algebra and geometry: integers, real number, function, limit, continuity, derivative, integral, complex number, matrix, determinant, vector, line, plane.

Usage of language

write mathematical text using notation for variables, parameters, sum, limit, derivative and integral.

Reasoning

perform mathematical reasoning using: implications, equivalences, proof by contradiction and proof by induction.

Mathematical modelling

set up mathematical models and problems expressed in the terms of the fundamental concepts.

Problem solving

use classical solution methods of calculus, linear algebra and vector geometry.

Complementary aims

After the course the student should have

- Achieved a study technique that lays as basis for prosperous learning of the mathematical, scientific and technical subjects.
- Insights on how mathematical tools and thinking can be used in the further education and future professional life.

Course contents

After the course, the students should be able to

- Define and interpret the fundamental concepts: elementary functions, limit, continuity, derivative, integral, infinite series, complex number, matrix, determinant, vector, dot product, cross product, triple product, line, plane.
- Investigate curves and analyze inequalities by using derivatives.
- Solve and geometrically interpret systems of linear equations.
- Use vector algebra to evaluate projections, distance, areas and volumes.
- Use Taylor polynomials to approximate functions.
- Evaluate limits using Taylor expansion and l'Hospital's Rule.
- Solve first or second order linear differential equation with constant coefficients.
- Evaluate some definite integrals using antiderivatives.
- Use the methods of integration to evaluate areas and volumes.

- Determine whether or not an improper integral converges.
- Determine whether a series converges or diverges
- Derive some formulas and theorems.

Specific prerequisites

To be able to profit by the course, the student should have the previous knowledge corresponding to ”general and specific eligibility for the Master of Science in Engineering programme”.

Course literature

E. Petermann, Linjär geometri och algebra. ISBN 91-44-02119-4.
E. Petermann, Analytiska metoder I, 4:e upplagan. ISBN 91-44-01456-2.
E. Petermann, Analytiska metoder I, Övningsbok, 2:a upplagan. ISBN 91-44-01494-5

Examination

- TEN1 - Examination, 12.0 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.

Other requirements for final grade

The course objectives are written with intent to satisfy a grade of E or higher and will be examined through continuous examination and a written exam (TEN1; 12 credits). It will be up to the coordinating teacher to decide the forms of the continuous examination.

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.