



ML1000 Engineering Mathematics 11.0 credits

Matematik för ingenjörer

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 ML1000 valid from Autumn 2011

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

General entry requirements and Mathematics D.

Language of instruction

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

Intended learning outcomes

On completion of the course, the student shall be able to

- interpret and use the sum symbol and the binomial theorem, and calculate geometric and arithmetic sums.
- discuss the properties, domains and ranges of certain elementary functions, particularly exponential functions, logarithm functions and trigonometric functions and, where appropriate, determine inverses.
- calculate with complex numbers on both rectangular and polar form, including calculating with the complex exponential function.
- simplify expressions and solve equations by means of factorisation, power and logarithm laws and trigonometric relationships.
- define and interpret the following fundamental concepts: limit, continuity, derivative, integral, infinite series, matrix, determinant, vector, inner product, cross product, triple product, straight line, plane.
- use derivative in curve studies and to analyse differences.
- approximate functions with some precision with polynomial (by means of Taylor expansion).
- calculate simple limits.
- determine primitive functions by means of substitution of variables, partial integration and partial fraction decomposition of simple rational functions.
- calculate certain definite integrals by means of primitive functions.
- use integration methods to calculate areas and volumes.
- calculate generalised integrals and indicate whether they are convergent or divergent.
- apply standard methods for solving 1st and 2nd order ordinary differential equations of a simple type.
- solve and geometrically interpret systems of linear equations.
- interpret vectors and planes in space.
- use vector algebra to calculate projections, distances, areas and volumes.
- communicate mathematics in speech and writing.
- use a numerical mathematical calculation program, for example Matlab.

Complementary aims

On completion of the course, the student shall have

- achieved a study technique as a basis for successful learning in the mathematical, scientific and technical subjects.
- an understanding of how the tools of mathematics and

Course contents

- Calculation with actual and complex numbers, absolute values, algebraic expressions, differences, equation solving.
- The binomial theorem, sums, products.
- Elementary functions: the natural logarithm function, exponential and power functions, trigonometric functions, the complex exponential function. Inverse functions.
- Differential and integral calculus in one variable with applications
- Simple ordinary differential equations
- Vectors and geometry in two and three dimensions. Matrices and determinants. Solving linear equation systems.

Course literature

Bok 1: Envariabelanalys, Lennerstad, Liber ISBN 978-91-47-05291-0

Bok 2: Linjär algebra från en geometrisk utgångspunkt, Lemurell, Studentlitteratur ISBN 978-91-44-06054-5

Examination

- DÖVN - Computer Exercises, 1.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 5.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN2 - Examination, 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.

TEN1, Examination, Algebra and Geometry, possibly can continuous examination be offered.

TEN2, Examination, Analysis, possibly can continuous examination be offered.

DÖVN, Computer Exercises, possibly can continuous examination be offered.

Other requirements for final grade

Approved exam, Algebra and Geometry,
approved exam, One Variable and
approved computer exercises.

Final grade is based on all parts of the 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.