

Calculus in One and Several Variables

Programme course

6 credits

En- och flervariabelanalys

TATA91

Valid from: 2022 Spring semester

Determined by

Board of Studies for Computer Science and
Media Technology

Date determined

2021-09-01

Main field of study

Mathematics, Applied Mathematics

Course level

First cycle

Advancement level

G1X

Course offered for

- Master of Science in Information Technology
- Master of Science in Computer Science and Software Engineering

Prerequisites

Calculus in one variable 1, Linear Algebra

Intended learning outcomes

Gain familiarity with mathematical concepts, reasoning and relationships in calculus in one and several variables, and gain the calculation and problem solving skills needed for further studies. After completing this course you should be able to

- cite, explain and use the definitions and theorems of the course's key concepts
- solve problems and verify that results are correct or reasonable

Course content

Taylor's and Maclaurin's formulae: Maclaurin expansions of the elementary functions, the Ordo form of the remainder term with applications, e.g. computations of limits. Ordinary differential equations: first order linear and separable equations, higher order linear equations with constant coefficients. Improper integrals: investigation of convergence, absolute convergence. Numerical series: investigation of convergence, absolute convergence, Leibniz criterion. The space \mathbb{R}^n : basic topological concepts, functions from \mathbb{R}^n to \mathbb{R}^p , function surfaces, level surfaces and level curves. Differential

calculus: partial derivatives, the chain rule, partial differential equations, gradient, normal, tangent, tangent plane and directional

Teaching and working methods

The course consists of lectures and classes.

For the MSc programme in Information Technology, the course applies problem-based learning.

Examination

TEN1	Written exam	U, 3, 4, 5	6 credits
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Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is “Swedish”, the course as a whole could be given in Swedish, or partly in English. Examination language is Swedish, but parts of the examination can be in English.
- If teaching language is “English”, the course as a whole is taught in English. Examination language is English.
- If teaching language is “Swedish/English”, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English depending on teaching language.

Other

The course is conducted in a manner where both men's and women's experience and knowledge are made visible and developed.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the

right to take such decisions.

Department

Matematiska institutionen

Director of Studies or equivalent

Jesper Thorén

Examiner

Jesper Thorén

Course website and other links

<http://courses.mai.liu.se/Lists/html/index-amne-tm.html>

Education components

Preliminär schemalagd tid: 36 h
Rekommenderad självstudietid: 124 h

Course literature

Böcker

Forsling, G. och Neymark, N., (2011) *Matematisk analys, en variabel* LiberM. Neymark, (2016) *Matematisk analys, flera variabler*.