Calculus in One and Several Variables

Programme course

6 credits

En- och flervariabelanalys

TATA91

Valid from: 2020 Spring semester

Determined by
Board of Studies for Computer Science and Media Technology

Date determined
2019-09-23

Main field of study
Mathematics, Applied Mathematics

Course level
First cycle

Advancement level
G1F

Course offered for
- Master of Science in Computer Science and Software Engineering
- Master of Science in Information Technology

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

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 resonable

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 R ^ n: basic topological concepts, functions from R ^ n to 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	6 credits	U, 3, 4, 5

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 or in large parts, is taught in Swedish. Please note that although teaching language is Swedish, parts of the course could be given in English. Examination language is Swedish.
- 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).
- If teaching language is English, the course as a whole is taught in English. Examination language is English.

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.

Department

Matematiska institutionen

Director of Studies or equivalent

Jesper Thorén

Examiner

Malgorzata Wesolowska

Course website and other links

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

Education components

Preliminary scheduled hours: 36 h
Recommended self-study hours: 124 h

Course literature

Books

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