

# Multivariable Calculus and Differential Equations

Programme course

4 credits

Flervariabelanalys och differentialekvationer

TATA90

Valid from: 2017 Spring semester

**Determined by**

Board of Studies for Computer Science  
and Media Technology

**Date determined**

2017-01-25

## Main field of study

Mathematics, Applied Mathematics

## Course level

First cycle

## Advancement level

G1X

## Course offered for

- Computer Science and Software Engineering, M Sc in Engineering

## 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 multivariable calculus and linear differential equations in one variable, and gain the calculation and problem solving skills needed for further studies. After completing this course you should be able to

- cite and explain the definitions of the course's key concepts, such as topological fundamental concepts, functions, limits, continuity, partial derivatives, multiple integrals, functional determinants etc..
- handle differential equations (first order linear, separable and higher order linear equations with constant coefficients).
- quote, explain and use the course central theorems, such as the chain rule, change of variables in multiple integrals, the relationship between gradients and directional derivatives, theorems concerning multiple integral properties etc..
- solving some partial differential equations using the chain rule.
- verify that results are correct or reasonable.
- calculate the directional derivatives and tangent-, normal- and tangent plane equations and explain and use the concepts geometrical significance in problem solving.
- compute multiple integrals using repeated integration, change of variables (e.g. polar, spherical and linear).



## Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at [http://stydokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva](http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).