

**SYLLABUS**

# **Multivariable calculus 7.5 credits M0055M**

**Flervariabelanalys**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

**DECISION DATE  
2021-02-17**

# Multivariable calculus 7.5 credits M0055M

## Flervariabelanalys

### First cycle, M0055M

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Matematik	Mathematics

## Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and the course Linear Algebra and Differential Equations (M0049M) or equivalent.

## Selection

The selection is based on 1-165 credits.

## Course Aim

This course covers differential, integral and vector calculus for functions of several variables. Emphasis is placed on problem solving with and without computational tools.

## Contents

- Functions of several variables: partial derivatives, differentiability, chain rule, gradient, directional derivatives.
- Taylor polynomials, quadratic forms, critical points.
- Extreme value problems on restricted domains, Lagrange multipliers.
- Multiple integrals, iterated integration, general coordinate systems, Jacobian.
- Parametric curves and surfaces, tangent plane, arc length, surface area.
- Line integrals in two and three dimensions. Green's theorem with application.
- Surface integrals, vector fields and flux integrals. Divergence and curl. Gauss' theorem and Stokes' theorem.
- Visualization, computations and basic programming in Matlab.

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

## Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. A written exam is given at the end of the course that includes both theory and problems. The Matlab content is examined through hand-in assignments. The final grade is based solely on the result of the written exam.

## Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

## Overlap

The course M0055M is equal to M0032M, M0060M

## Course offered by

Department of Engineering Sciences and Mathematics

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Assignment report	U G#	1.5	Mandatory	A19	
0003	Written exam	G U 3 4 5	6	Mandatory	A21	

## Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

## Last revised

by Head Faculty Programme Director Niklas Lehto 2021-02-17

## Syllabus established

by Niklas Lehto 2019-02-15