

SYLLABUS

Multivariable Calculus and Learning 7.5 credits M0060M

Flervariabelanalys och lärande

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2022-02-14**

Multivariable Calculus and Learning 7.5 credits M0060M

Flervariabelanalys och lärande

First cycle, M0060M

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 Linear Algebra and Differential Equations for teaching (M0059M) 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.

Another aim is to give tools for reviewing, analysing and designing teaching of differential, integral and vector calculus in upper secondary school with the aid of didactical theories and proven experience.

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.

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 didactical module is examined through a report that is appraised also orally. Passing the course requires passing both written examination and the grade G for the report. 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 M0060M is equal to M0055M, M0049M

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Written exam	G U 3 4 5	6	Mandatory	A22	
0002	Course assignment	U G#	1.5	Mandatory	A22	

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 Niklas Lehto, Programme Director 2022-02-14

Syllabus established

by Niklas Lehto, Programme Director 2022-02-14