Functions of Several Variables and Computer Tools 7.5 credits M0032M

Flervariabelanalys och datorverktyg

Course syllabus admitted: Autumn 2020 Sp 1 - Spring 2022 Sp 4

DECISION DATE
2019-11-08

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Flervariabelanalys och datorverktyg

First cycle, M0032M

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 M0031M or equivalent.

Selection

The selection is based on 1-165 credits.

Examiner

John Fabricius

Course Aim

To pass the course the student should be able to

- Give an account of the concepts of limit, continuity, partial derivatives, chain rule, directional derivatives, gradient and Taylor polynomial.
- Find stationary points and classify them; determine extreme values for continuous functions defined on closed bounded domains; apply the method of Lagrange multipliers in simple cases.
- Interpret and calculate multiple integrals by iterated integration and perform change of variables.
- Interpret and calculate line integrals and curve integrals.
- Interpret and apply important concepts and results from vector analysis: vector fields, divergence, rotation, Green's theorem, Stokes' theorem and Gauss' theorem.
- Use the software Matlab to solve systems of linear equations, solve ordinary differential equations, solve optimization problems, curve fitting and write scripts that perform complex tasks.
- Show ability to identify and solve problems by the methods that are taught in the course.

These skills and abilities are practiced through problem solving, hand-in assignments and computer laborations.

Contents

Functions of several variables, limits, partial derivatives, differentiability, Taylor expansions, optimisation with or without constraints, multiple integrals, line integrals and vector calculus. Solving problems using mathematical software.

Realization

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

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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. Written examination on the calculus part and written reports concerning mathematical software.

Overlap

The course M0032M is equal to M0055M, MAM284

Literature. Valid from Autumn 2014 Sp 1

R. A. Adams, Calculus: A complete course, Addison-Wesley, Toronto (the latest edition).
MATLAB, An Introduction With Applications, fourth edition, förlag: John Wiley & Sons, Inc.

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	4.5	Mandatory	A07	
0002	Mathematical models and computer tools	U G#	3	Mandatory	A07	

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 2019-11-08

Syllabus established

The syllabus is approved by the Department of Mathematics and is valid from August 2007.

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