Multivariable calculus

Flervariabelanalys
7.5 credits

Single subject and programme course

764G03

Valid from: 2020 Spring semester

Determined by	**Main field of study**	
The Quality Board at the Faculty of Arts and Sciences	Mathematics	
Date determined	**Course level**	**Progressive specialisation**
2007-10-15	First cycle	G1X
Revised by	**Disciplinary domain**	
	Social sciences	
Revision date	**Subject group**	
	Mathematics	
Offered first time	**Offered for the last time**	
Autumn semester 2007		
Department	**Replaced by**	
Matematiska institutionen		

Course offered for

- Bachelor´s Programme in Statistics and Data Analysis

Entry requirements

HMAA54 Single variable calculus

Intended learning outcomes

To give the basic knowledge about concepts and methods in analysis of several variables which is used in technical courses. To pass this course students will need to be able to

* formulate and understand definitions of the following concepts: topological types of sets, a function of several variables, a limit, continuity, partial derivatives, extreme points and values, multiple integrals.
* formulate, explain and apply the following theorems: the max-min theorem for continuous functions on compact sets, the chain rule, the Taylor formula, the classifying of critical points via quadratic forms, the theorem about local extreme points under one or two conditions, the change of variables in multiple integrals.
* do calculations with limits and continuity, apply the chain rule to solve partial differential equations.
* understand the geometric meaning of gradient
* find equations of the tangent plane
* carry out investigations of local and global max and min.
* compute multiple integrals by iteration.
* compute multiple integrals with the help of change of variables (in particular, the polar and spherical coordinates).

Course content

Functions of several variables, limits, continuity. Partial derivatives, chain rule, gradient. Taylor formula, local extreme points and values, quadratic forms. Max and min values, optimization on compact and non-compact sets. Optimization under conditions, Multiple integrals. Change of variables in multiple integrals.

Teaching and working methods

Lectures and lessons

Examination

Written examination

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.

If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

Students failing an exam covering either the entire course or part of the course twice are entitled to have a new examiner appointed for the reexamination.

Students who have passed an examination may not retake it in order to improve their grades.

Grades

Three-grade scale, U, G, VG

Other information

Planning and implementation of a course must take its starting point in the wording of the syllabus. The course evaluation included in each course must therefore take up the question how well the course agrees with the syllabus.

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.