Multivariable calculus

Single subject and programme course

7.5 credits

Flervariabelanalys

764G03

Valid from: 2020 Spring semester

Determined by
The Quality Board at the Faculty of Arts and Sciences

Date determined
2007-10-15

Main field of study
Mathematics

Course level
First cycle

Advancement level
G1X

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

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 carried out in such a way that both men´s and women´s experience and knowledge is made visible and developed.

Department

Matematiska institutionen