



Course syllabus

Faculty Board of Science and Engineering

School of Computer Science, Physics and Mathematics

1MA153 Vektoranalys, 7,5 högskolepoäng

1MA153 Vector analysis, 7.5 credits

Main field of study

Mathematics

Subject Group

Mathematics

Level of classification

First Level

Progression

G1F

Date of Ratification

Approved 2009-08-11

Revised 2010-04-23 by School of Computer Science, Physics and Mathematics.

The course syllabus is valid from spring semester 2011

Prerequisites

Analysis of several variables, 7,5 hp or the equivalent

Objectives

Upon completion of the course, the student should be able to:

- Calculate the arc length of continuously differentiable curves
- describe and use Taylor's formula for local investigations of functions
- determine tangent planes for implicitly given functions
- calculate derivatives (on matrix form) and understand the concept differentiability for vector valued functions and its importance for linearization
- calculate elementary triple- and multiple integrals
- calculate generalized integrals and perform convergence tests on those
- calculate curve integrals by parameterization
- calculate areas and curve integrals with Green's formula
- use Gauss' and Stokes' theorems in two and three dimensions
- definitions and relations in the theory for Vector analysis and to use these in problem solving
- interpret, communicate and argue using the language of mathematics.

Content

- continuous curves and arc lengths
- Taylor's formula
- Local investigations of functions
- Triple integrals, multiple integrals, change of variables
- Integrals with one parameter
- Differential calculus for vector valued functions
- Functional matrices and functional determinants
- Line integrals
- Gauss theorem in two dimensions and Green's formula
- Double integrals
- Gauss' theorem in three dimensions
- Stokes' theorem

Type of Instruction

Lectures and seminars. Compulsory assignments may be given during the course.

Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

The student's knowledge is assessed in the form of oral and/or written examinations. The main examination is conducted with a written exam. Part of the examination can also be done in a different way. There could also be a continuous examination in the form of oral and/or written reports throughout the course. The principal assessment method for the course is determined at the beginning of the course. Students who do not pass the regular examination will be offered retrials close to the regular examination. On request, students may have their credits translated to ECTSmarks. Such a request must be sent to the examiner before the grading process starts.

Course Evaluation

A written course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The result of the course evaluation will be filed at the department.

Required Reading and Additional Study Material

Required reading

Robert. A Adams, *Calculus. A complete course*. 6th edition. Addison Wesley.

Lars-Christer Böiers, Arne Persson. *Analys i flera variabler*. Studentlitteratur. 392 pages.

Matematikcentrum i Lund

Övningar i Analys i flera variabler. Studentlitteratur.