



## Course syllabus

Faculty Board of Science and Engineering

School of Computer Science, Physics and Mathematics

1MA165 Flervariabelanalys och vektoranalys, 7,5 högskolepoäng

1MA165 Multivariable Calculus and Vector Calculus, 7.5 credits

### **Main field of study**

Mathematics

### **Subject Group**

Mathematics

### **Level of classification**

First Level

### **Progression**

G1F

### **Date of Ratification**

Approved by Organisational Committee 2009-12-01

The course syllabus is valid from autumn semester 2010

### **Prerequisites**

Analysis of functions of one variable, Calculus 1, 7,5 Higher Education Credits (1MA102), and Linear Algebra, 7,5 Higher Education Credits (1MA103), or equivalent.

## Objectives

After successfully completing the course, the student is anticipated to be able to:

- determine gradients, tangent planes, gradient fields, divergence and curl
- derive the chain rule for partial derivatives of first order as well as for partial derivatives of a higher order
- understand geometric meaning of gradient and directional derivatives and apply them
- evaluate double and triple integrals by iteration and by changing variables
- be familiar with concepts like flow, work, potential, conservative fields and independence of path
- evaluate line integrals and surface integrals
- apply Greens, Gauss and Stokes theorems.

## Content

Vector valued functions of several variables, scalar and vector fields, line, surface, double and triple integrals, partial derivatives, gradients, divergence and rotation, scalar

and vector potential, Greens, Gauss and Stokes theorems, curvilinear coordinates, technical applications.

### Type of Instruction

Lectures , exercises and laboratory lessons. Laboratory work may be individually or in group. 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).

On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

The principal assessment method is by written examination. Continuous assessment throughout the course may also be conducted in written or/and oral form. The main assessment method is to be determined at the start of the course.

### Course Evaluation

After the course a written evaluation of the course will take place according to the University guidelines.

### Other

On request, a Swedish University course certificate will be awarded upon successful completion of the course.

Upon request, a Swedish University degree will be issued upon successful completion of the full demands for that degree.

### Required Reading and Additional Study Material

#### **Required reading**

Adams, Robert A., *Calculus – A complete course*, Addison-Wesley, 2006. 400 (900) pages.