# Syllabus for

Academic year 2009/2010 >

## TMV191 - Calculus in several variables

Syllabus is not yet adopted
Owner: TKDES
**7,5 Credits**
**Grading:** TH - Five, Four, Three, Not passed
**Education cycle:** First-cycle
**Major subject:** Mathematics
**Department:** 11 - MATHEMATICAL SCIENCES

**Teaching language:** Swedish

**Credit distribution**

| Course module | Sp1 | Sp2 | Sp3 | Sp4 | Summer course | Examination dates |
|---|---|---|---|---|---|---|
| 0107 Examination 7,5 c Grading: TH | | | 7,5 c | | | Tue 25/05-2010 pm V, Tue 12/01-2010 am M, Sat 28/08-2010 am V |

**In programs**
TKDES INDUSTRIAL DESIGN ENGINEERING, Year 1 (compulsory)

**Examiner:**
Professor Stig Larsson

**Replaces**
TMV190 Calculus in several variables

**Course evaluation:**
https://document.chalmers.se/doc/1043672848

Go to course homepage

***Eligibility:***
*For single subject courses within Chalmers programmes the same eligibility requirements apply, as to the programme(s) that the course is part of.*

**Course specific prerequisites**
TMV181 and TMV186 or equal.

**Aim**
The purpose of the course is to, together with the other math courses in the program, provide a general knowledge in the mathematics required in further studies as well as in the future professional career.

**Learning outcomes *(after completion of the course the student should be able to)***
- account for the basic concepts of calculus in several dimensions and of numerical analysis.

- explain the connections between these concepts and use the connections in problem solving.

- use and combine different concepts in problem solving.

- have deepend the ability to use the software MATLAB in problem solving.

**Content**
The space $R^n$, open/closed/compact sets.
Functions from $R^n$ to $R^m$, curves och surfaces.
Limits, continuity, differentiability, the chain rule.
Partial derivatives, gradient and tangent plane, directional derivative, differentials.
Jacobian matrices and determinants.

Extremal values, optimization on compact domains, optimization of constrained functions.

Double and triple integrals, improper double integrals.
Polar and spherical coordinates, change of variables.
Volume, centre of mass, surface area.

Vector analysis, line integrals and Green's theorem, surface integrals and the divergence theorem.

**Organisation**

Instruction is given in lectures and classes. More detailed information will be given on the course web page before start of the course.

**Literature**

Literature will be announced on the course web page before start of the course.

**Examination**

More detailed information of the examination will be given on the course web page before start of the course.
Examples of assessments are:
-selected exercises are to be presented to the teacher orally or in writing during the course,
-other documentation of how the student's knowledge develops,
-project work, individually or in group,
-written or oral exam during and/or at the end of the course.
-problems/exercises are to be solved with a computer and presented in writing and/or at the comput