

Mathematics, second course

Programme course

6 credits

Matematik, fortsättningskurs

NMAA07

Valid from: 2017 Spring semester

Determined by

Board of Studies for Chemistry, Biology
and Biotechnology

Date determined

2017-01-25

Main field of study

Mathematics

Course level

First cycle

Advancement level

G1X

Course offered for

- Chemistry, Bachelor's Programme

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Mathematics

Intended learning outcomes

The aim of the course is to give the students basic proficiency in the single- and multivariable calculus needed for their further studies in chemistry, especially physical chemistry. After fulfilling the course the student should be able to perform elementary calculations in the areas specified below. Thus, the student should be able to

- Use standard techniques to calculate antiderivatives and definite integrals.
- Express and calculate geometrical quantities like areas of plane regions, arc length, volumes of solids of revolution and areas of solids of revolution.
- Handle first-order separable and first-order linear differential equations and integrals.
- Explain Taylor's formula
- Use Taylor expansions to approximate functions and investigate limits.
- calculate partial derivatives of elementary functions and compositions of these in several variables
- calculate the differential of a function and use it to estimate the error propagation in an approximation
- calculate extreme values of functions defined on restricted domains of simple geometry
- calculate double integrals over triangular and rectangular domains
- calculate double integrals over circle sectors by using polar coordinates
- calculate triple integrals over domains shaped as a parallelepiped when represented in either cartesian or spherical coordinates

Course content

Primitive functions. Integration and geometrical applications, including area, curve length, areas of rotation and volumes of rotation. Improper integrals. Taylor's formula. Maclaurin expansions of elementary functions with applications to the calculation of limits. Linear ordinary differential equations of first and second order, separable equations. Functions of several variables, partial derivatives, the chain rule and error propagation. Gradient, tangents and tangent planes. Extreme values. Double and triple integrals.

Teaching and working methods

Teaching is done in lectures and problem classes. Theory is followed up by problem-solving by the lecturer.

Examination

TEN1	Written examination	6 credits	U, 3, 4, 5
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Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Matematiska institutionen

Director of Studies or equivalent

Jesper Thorén

Examiner

Magnus Berggren

Course website and other links

<http://www.mai.liu.se/und/kurser/index-amne-tm.html>

Education components

Preliminary scheduled hours: 48 h

Recommended self-study hours: 112 h

Course literature

Forsling, Göran och Neymark Mats: Matematisk analys, en variabel. Liber 2011
Kompletterande material flervariabelanalys.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.