Introductory Course in Calculus

Programme course

6 credits

Inledande matematisk analys

TATA79

Valid from:

Determined by
Board of Studies for Computer Science and Media Technology

Date determined

Main field of study

Mathematics, Applied Mathematics

Course level

First cycle

Advancement level

G1X

Course offered for

- Computer Science and Engineering, M Sc in Engineering
- Information Technology, M Sc in Engineering
- Computer Science and Software Engineering, M Sc in Engineering

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.

Intended learning outcomes

It is important that you acquire general mathematical accuracy and a stable foundation for your continued studies. After the course is completed you should be able to:

- read and comprehend mathematical texts.
- perform standard calculations with accuracy.
- handle calculations with algebraic expressions, inequalities and absolute values.
- solve polynomial equations and equations containing square roots.
- analyze how the concepts domain, range, injectivity and composition relate to particular functions.
- define and draw the graphs of the elementary functions: the natural logarithm, exponential-, power-, trigonometric- and inverse trigonometric functions.
- use and prove laws and formulas for the elementary functions.
- work with complex numbers in cartesian and polar form.
- define the complex exponential function and use and prove Euler's and deMoivre's

formulas.
- solve problems concerning straight lines and circles in the plane.
- perform logical arguments and proofs by induction.
- work with geometric and arithmetic sums.
- check results and partial results in order to verify their correctness or reasonableness.

Course content

Algebraic expessions, inequalities, modulus, complex numbers. Solving equations. Functions and graphs. Definitions and properties of the elementary functions: natural logarithm, exponential function, power function, trigonometric functions and complex exponential function, arcus functions. The Euler formulas. Basic principles of logic. Different types of proof techniques. Coordinate systems in the plane. Polar coordinates. Lines and circles. The complex plane. Complex numbers in polar form. Inverse trigonometric functions.

Teaching and working methods

Problem classes, tutorials, and a few lectures.

Examination

TEN1	Written examination	U, 3, 4, 5	1.5 credits
TEN2	Written examination	U, 3, 4, 5	3 credits
TEN3	Written examination	U, 3, 4, 5	4.5 credits
UPG1	Hand-in exercises	U, G	1.5 credits

Grades

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

Course literature

G. Forsling, M. Neymark: Matematisk analys, en variabel. Liber
Lecture notes produced by the Department of Mathematics
Material produced at the Department of Mathematics.

Department

Matematiska institutionen

Director of Studies or equivalent

Jesper Thorén

Examiner

David Rule

Course website and other links

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

Education components

Preliminary scheduled hours: 78 h
Recommended self-study hours: 82 h

Course literature

Additional literature

Books

G. Forsling, M. Neymark, *Matematisk analys, en variabel* Liber

Articles

G. Forsling, M. Neymark: Matematisk analys, en variabel. Liber
Övningsmaterial producerat vid institutionen.

Websites

Compendiums

Lecture notes produced by the Department of Mathematics
Material produced at the Department of Mathematics.

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.