# Complex Analysis, second course

Programme course

6 credits

Komplex analys fk

TATA78

Valid from: 2017 Spring semester

**Determined by**
Board of Studies for Electrical
Engineering, Physics and Mathematics

**Date determined**
2017-01-25

## Main field of study
Mathematics, Applied Mathematics

## Course level
Second cycle

## Advancement level
A1X

## Course offered for
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Mathematics, Master's programme
- Mathematics
- Applied Physics and Electrical Engineering - International, M Sc in Engineering

## Specific information
The course is only offered every second year. It will be offered during 2015.

## 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
Complex analysis or equivalent. In addition, Real analysis, honours course, or another more advanced course in mathematics is recommended.

# Intended learning outcomes

To extend and enhance the complex analysis taught in the basic complex analysis course. In the course, the student also practices his/her ability to read and write mathematical text and mathematical proofs. After completing the course, the student should

- be able to determine when a polynomial has all its zeros in the left half plane and outside the unit disk, and understand the theory behind the corresponding results,
- have a good understanding of conformal mappings, complex analysis on the Riemann sphere, analytic continuation and branches of analytic functions,
- be able to cite and explain some essential definitions and theorems about analytic continuation and Riemann surfaces,
- know the explicit Riemann surfaces for some simple multi-valued functions.

# Course content

More about the argument principle: the criteria of Routh-Hurwitz and Schur-Cohn. More about conformal mappings with applications. More about residue calculus. Complex analysis on the Riemann sphere. Analytic and meromorphic continuation. Explicit Riemann surfaces. Abstract Riemann surfaces.

# Teaching and working methods

Lectures

# Examination

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|---|---|---|---|
| UPG1 | Assignments and oral presentation | 6 credits | U, 3, 4, 5 |

# Grades

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

# Department

Matematiska institutionen

# Director of Studies or equivalent

Jesper Thorén

## Examiner

Lars Alexandersson

## 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

Jones-Singerman, Complex functions: An algebraic and geometric viewpoint. Lars Alexandersson, TATA45 Komplex analys (kompendium) eller Saff-Snider, Fundamentals of complex analysis with applications to engineering and science. Kompletterande material utgivet av institutionen.

# 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.