Linnæus University

Course syllabus

Faculty Board of Science and Engineering
School of Computer Science, Physics and Mathematics

4MA101 Analytiska funktioner, 7,5 högskolepoäng
Analytic Functions, 7.5 credits

Main field of study
Mathematics

Subject Group
Mathematics

Level of classification
Second Level

Progression
A1N

Date of Ratification
Approved by Organisational Committee 2009-12-01

The course syllabus is valid from autumn semester 2010

Prerequisites
Multi-variable analysis 7.5hec (1MA152), or the equivalent.

Expected learning outcomes
The student shall:

- understand the concept of Analytic Functions
- be able to derive the Cauchy-Riemann Equations
- have knowledge of the elementary analytic functions and their properties
- understand complex integration
- understand Cauchys Integral Theorem and it's consequencies and be able to prove some of them
- be able to represent analytic functions as Taylor Series and Laurent Series
- have knowledge of the Residue Theory and it's applications
- understand the meaning of a Conformal Mapping
- be familiar with Möbius Transformations
- be familiar with central parts of the course project.

Content
The course comprises:

- Analytic and Harmonic Functions
- Complex Integration of Analytic Functions
- Series Representation for Analytic Functions

- Residue Theory
- Conformal Mappings
- Maximum modulus principle
- theory or applied project on advanced level.

Type of Instruction
Lectures and seminars. Group assignments and Compulsary assignments may be given cduring 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 student's knowledge is assessed in the form of oral and/or written examinations. Contionous examination through written and/or oral presentations may also occur. The principal assessment method is decided at the beginning of the course.

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

Other
An example on theory project concerns a project involving Riemann's mapping theorem, Phragmen-Lindelöf's theorems and applications to (complex) interpolation theory.

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

Students who receive a passing grade in the course may download a course certificate through the Student Portal. Otherwise they may request a course certificate from the school secretary.

Required Reading and Additional Study Material
Required reading

- Rudin, W. *Real and Complex Analysis*, McGraw-Hill, 1987. 400 pages.
- Saff E.N, Snider A.D. *Fundamentals of Complex Analysis*, Prentice Hall, 2003. 400 pages.