Faculty of Science

MATM12, Mathematics: Analytic Functions, 15 credits

Matematik: Analytiska funktioner, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2012-01-16 and was last revised on 2020-03-04. The revised syllabus applies from 2020-03-04, autumn semester 2020.

General Information

The course is an elective course for second-cycle studies for a Degree of Bachelor or Master of Science in mathematics.

Language of instruction: English

Main field of studies	*Depth of study relative to the degree requirements*
Mathematics	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is to provide concepts and methods from complex analysis which are important for further studies in mathematics and other areas of science.

Knowledge and understanding

On completion of the course, the student should be able to:

- thoroughly explain the concepts, results and methods included in the course,
- give a detailed account of the theory behind the complex analytic methods used in the course,
- give an account of the proofs of the most important results in the course.

Competence and skills

On completion of the course, the student should be able to:

- integrate knowledge from the different parts of the course in connection with problem solving,
- describe the solution to a mathematical problem within the course framework in speech and writing, logically coherently and with adequate terminology.

Judgement and approach

On completion of the course, the student should be able to:

- argue for the importance of complex analysis as a tool for other areas of mathematics and science.

Course content

The course treats basic theory of analytic functions:

- The Cauchy integral theorem and power series expansions. The maximum principle.
- The argument principle, residue calculus.
- Möbius transformations.
- Normal families.
- The Riemann mapping theorem.
- Poisson integrals and harmonic functions.
- Laurent series expansions. Factorisation.

Course design

The teaching consists of seminars and lectures.

Assessment

The examination consists of a written examination followed by an oral examination at the end of the course. The oral examination may only be taken by those students who passed the written examination.

Students who fail the regular written examination are offered a resit examination shortly thereafter.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.
To pass the course it is required to pass the written examination and the oral examination. In addition, the grade Pass with distinction requires that the total number of points obtained in the written and the oral examination is at least 75% of the total maximal number of points. The maximal number of points that can be obtained in the written and the oral examination are weighted three to one.

Entry requirements

For admission to the course, at least 90 credits are required, of which at least 60 credits should be in pure mathematics.

Further information

The course may not be included in degree together with MATC11 Analytic functions, 15 credits.

Subcourses in MATM12, Mathematics: Analytic Functions

Applies from H20

2001 Written examination, 7,5 hp
Grading scale: Fail, Pass
2002 Oral examination, 7,5 hp
Grading scale: Fail, Pass

Applies from H12

1201 Examination, 15,0 hp
Grading scale: Fail, Pass, Pass with distinction