



Faculties of Humanities and Theology

ÄMAA22, Mathematics with Didactics 2, 15 credits

Matematik med ämnesdidaktik 2, 15 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2016-02-24 to be valid from 2016-02-24, spring semester 2016.

General Information

The course is included in the Master's programme in Secondary Education offered jointly by Lund and Kristianstad universities.

Language of instruction: Swedish and English

Main field of studies

Mathematics

Depth of study relative to the degree requirements

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is to enable students to acquire the following knowledge and skills on completion of the course.

Knowledge and understanding

On completion of the course, the students shall be able to

- use and account for mathematical concepts and methods within linear algebra and differential and integral calculus for functions in several variables
- account for different theories of mathematics teaching
- provide a general account of the main elements of the history of school mathematics

Competence and skills

On completion of the course, the students shall be able to

- interpret relevant information and independently identify, formulate and solve problems within linear algebra and multivariable analysis
- deal with problems within linear algebra and differential and integral calculus for functions of several variables
- identify the logical structure in mathematical arguments and produce mathematical proofs
- present and discuss mathematical arguments in speech and writing
- analyse different types of teaching from the perspective of mathematical didactics

Judgement and approach

On completion of the course, the students shall be able to

- use formal mathematics and justify the purpose of mathematical theorem proving
- critically assess different types of teaching of relevance to upper secondary school mathematics

Course content

The course consists of the modules:

- Multivariable Analysis 1 (6 credits)
- Linear Algebra 2 (6 credits)
- Subject Didactics 2 (3 credits)

Multivariable Analysis 1 (6 credits)

- Continuous functions of several variables, optimisation.
- Differentiable functions, gradient and directional derivative, extreme values.
- Multiple integrals, substitution of variables, derivation under integral signs, generalised integrals.

Linear Algebra 2 (6 credits)

- Linear spaces and images, matrix production of linear images. Euclidean spaces.
- Determinants.
- Eigenvalues and eigenvectors. Spectral theorem.
- Quadric surfaces and quadratic forms.

Subject Didactics 2 (3 credits)

- School mathematics and evaluation of mathematics teaching from a historical perspective.
- Didactic theories of the learning of mathematics and different schools of mathematics teaching.

Course design

The teaching consists of lectures, classes and calculation exercises in smaller groups, and a series of seminars on didactics. An essential feature in the small group sessions is practice in problem-solving and oral communication in mathematics. The seminar series on didactics is a part of the module Subject Didactics 2 and aims to prepare students for the work placement of the programme.

Assessment

The assessment is based on the following components of the different modules:

Multivariable Analysis 1: written exam, 6 credits,

Linear Algebra 2: written exam, 6 credits,

Subject Didactics: presentation of written assignments, in speech and writing, 3 credits.

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.

The grades awarded on all assessed components are Pass or Fail. The results of the written exams are presented as exam points, of which the total number of points per exam is proportionate to the number of credits for the relevant module. For a grade of Pass on each written exam, the student must have achieved at least 50% of the total available number of points. For a grade of Pass on the whole course, the student must have been awarded this grade on all assessed components. For a grade of Pass with Distinction, the student must have passed all assessed components and achieved at least 75% of the total available number of points.

Entry requirements

To be admitted to the course, students must have completed at least 22.5 credits of Mathematics 1 with Subject Didactics or the equivalent.

Subcourses in ÄMAA22, Mathematics with Didactics 2

Applies from V16

- 1601 Analysis in Several Variables 1, written exam, 6,0 hp
Grading scale: Fail, Pass
- 1602 Linear Algebra 2, written exam, 6,0 hp
Grading scale: Fail, Pass
- 1603 Mathematical Didactics, assignments, 3,0 hp
Grading scale: Fail, Pass