Faculties of Humanities and Theology

ÄMAD02, 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 2017-01-16 and was last revised on 2020-07-07. The revised syllabus applies from 2020-07-07, spring semester 2021.

General Information

The course is a component of the teacher education programme at Lund University.

Language of instruction: Swedish and English
Modules Analysis in Several Variables 1 and Linear Algebra 2 are taught in English, while Subject Didactics is taught in Swedish.

Main field of studies	*Depth of study relative to the degree requirements*
Mathematics	G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The general aim of the course is for students to acquire basic knowledge of differential and integral calculus for functions of several variables, advanced knowledge of linear algebra and familiarity with subject didactic theories. Through the subject didactic content of the course, the students are prepared for the placement component of the programme.

Knowledge and understanding

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

- use and account for mathematical concepts and methods in linear algebra and differential and integral calculus for functions of several variables
- account for different didactic theories in mathematics
- account for qualitative research methods including how qualitative data can be processed and analysed

- describe how pupils with mathematical difficulties or needs for special support. can be taught.

Competence and skills

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

- interpret relevant information, independently identify, formulate and solve problems concerning linear algebra and multivariable analysis
- handle problems in linear algebra and differential and integral calculus for functions of several variables
- identify the logical structure in mathematical arguments and produce mathematical proof
- present and discuss mathematical arguments in speech and in writing,
- analyse different forms of teaching from a mathematical didactics perspective
- observe, communicate and establish a gender equality perspective in educational activities.

Judgement and approach

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

- use a formal approach to mathematics and defend the purpose of mathematical proof
- critically assess different forms of teaching of relevance to teaching mathematics in upper-secondary schools.

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)

- Mathematics as a school subject including assessment in the teaching of mathematics.
- Didactic theories on the learning of mathematics and different schools of mathematical didactics as well as qualitative research methods in mathematical didactics.

Course design

The teaching consists of lectures, classes and calculation exercises in smaller groups, and a series of seminars on didactics. An essential feature of the small group sessions is practice in problem-solving and oral communication in mathematics. The seminar series on didactics is part of the module Subject Didactics 2 and aims to prepare students for the placement component of the programme. At least one compulsory field trip is included in this module during which the student observes mathematics classes at an upper-secondary school.

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 and observations, written and oral, 3 credits.

Students who do not pass an assessment will be offered another opportunity for assessment soon 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.
The grades awarded on all assessed components are Pass or Fail. The results of written exams are given as exam credits, where the total number of credits per exam is proportional to the number of credits for the respective modules. For a grade of Pass on each written exam, the student must have achieved at least 50% of the total available number of credits.

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 components and the total number of exam credits awarded for the written exams must total at least 75%.

Entry requirements

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

Further information

The course may not be included in degree together with ÄMAA2 Mathematics with Didactics 2, 15 credits, MATB21 Mathematics: Analysis in Several Variables 1 7.5 credits or MATB22 Mathematics: Linear Algebra 2 7.5 credits.

Subcourses in ÄMAD02, Mathematics with Didactics 2

Applies from V17

1701 Linear Algebra 2: Written Examination, 6,0 hp
Grading scale: Fail, Pass
1702 Analysis in Several Variables 1: Written Examination, 6,0 hp
Grading scale: Fail, Pass
1703 Ämnesdidaktik: Assignments, 3,0 hp
Grading scale: Fail, Pass