



LUND
UNIVERSITY

Faculty of Science

MATB23, Mathematics: Analysis in Several Variables 2, 7.5 credits

Matematik: Flervariabelanalys 2, 7,5 högskolepoäng
First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2015-12-23 to be valid from 2016-01-01, spring semester 2016.

General Information

The course is a compulsory course for first-cycle studies for a Bachelor of Science degree in mathematics.

Language of instruction: English and Swedish

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 student should be able to:

- give an account of basic mathematical concepts and methods within multivariable analysis and vector calculus,
- identify the logical structure in mathematical arguments,
- give an account of basic applications of concepts and methods within vector calculus and their physical implication.

Competence and skills

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

- carry out mathematical proofs within the frame of the course and express mathematical arguments in a structured and logical coherent way,
- interpret relevant information, independently identify, state and solve problems that concern real-valued functions of several variables and basic vector calculus,
- integrate concepts from different parts of the course in connection with problem solving,
- present and discuss mathematical arguments in speech and writing.

Judgement and approach

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

- use formal treatment of mathematics and argue for the purpose of mathematical proofs.

Course content

The course is an introduction to vector calculus and a specialisation of differential and integral calculus of functions of several variables.

- Line and surface integrals;
- Green's formula, Gauss divergence theorem, Stokes theorem;
- Basic potential theory.

Course design

The teaching consists of lectures and seminars. An essential element of the seminars is training in problem solving and oral mathematical communication.

Assessment

The examination consists of a written examination, possibly together with an oral examination. The oral examination is required to achieve the grade Pass with distinction and is offered only to students who passed the corresponding written examination.

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

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 achieve a Pass grade, a student is required to pass the project/assignments and the written examination. To achieve Pass with distinction it is also required to pass the oral examination. Whether the grade Pass with distinction should be given is decided by combining the results of the included examination parts.

Entry requirements

To be eligible for the course, 45 credits in courses in mathematics equivalent to MATA21 Analysis in One Variable (15 credits), MATA22 Linear Algebra 1 (7.5 credits), MATA21 Analysis in Several Variables 1 (7.5 credits), MATB22 Linear Algebra 2 (7.5 credits) and one of the courses NUMA01 Computational Programming with Python (7.5 credits) and MATA23 Foundations of Algebra, (7.5 credits) are required.

Further information

The course may not be included in a degree together with the course MATB15 Multivariable analysis, 15 credits.

Subcourses in MATB23, Mathematics: Analysis in Several Variables 2

Applies from V16

- 1501 Written exam, 7,5 hp
Grading scale: Fail, Pass
- 1502 Oral exam, 0,0 hp
Grading scale: Fail, Pass