



LUND
UNIVERSITY

Faculty of Science

MATC12, Mathematics: Ordinary Differential Equations 1, 7.5 credits

Matematik: Ordinära differentialekvationer 1, 7,5 högskolepoäng
First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2013-10-29 and was last revised on 2019-06-04. The revised syllabus applies from 2019-06-04, autumn semester 2019.

General Information

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

Language of instruction: English

Main field of studies

Mathematics

Depth of study relative to the degree requirements

G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The main goal of the course is that the student shall become familiar with basic concepts and methods in the theory of ordinary differential equations.

Knowledge and understanding

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

- give an account of the concepts, theorems and methods that are included in the course and illustrate them with examples,
- reason about the benefits and limitations of explicit solution formulas, numerical solution methods, as well as of general existence and uniqueness theorems.

Competence and skills

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

- use the theories and methods included in the course to solve relevant mathematical problems,
- independently select appropriate methods for solving or analyzing different differential equations,
- identify the logical structure of mathematical reasoning and carry out mathematical proofs,
- communicate mathematical arguments in speech and writing,

Judgement and approach

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

- argue for the importance of differential equations as tools for other subject areas.

Course content

The course covers:

- Some solution methods for first order equations
- Linear equations of higher order with constant and variable coefficients
- Power series solutions and Frobenius' method
- Linear systems with constant and variable coefficients
- Existence and uniqueness of solutions
- Introduction to numerical methods for initial-value problems.

Course design

The teaching consists of lectures, seminars and computer exercises. Compulsory written assignments occur during the course.

Assessment

The examination consists of a written exam followed by an oral exam. The oral exam may only be taken by those students who pass on the written exam. Students who fail the regular 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.

The final grade is decided by combining the results of the oral and written exams, and the assignments.

Entry requirements

For admission to the course, at least 60 credits in mathematics are required.

Further information

The course may not be included in a degree together with MATM14 Ordinary Differential Equations, 7.5 credits.

Subcourses in MATC12, Mathematics: Ordinary Differential Equations 1

Applies from H13

1301 Examination, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction