Department of Mathematics
(incl. Math. Statistics)

Stockholm University

Syllabus

for course at first level

Mathematics III - Ordinary Differential Equations
Matematik III - Ordinära differentialekvationer

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	MM5026
Valid from:	Autumn 2021
Date of approval:	2020-08-17
Changed:	2021-04-29
Department	Department of Mathematics (incl. Math. Statistics)
Main field:	Mathematics/Applied Mathematics
Specialisation:	G1F - First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Decision

This syllabus was approved by the Board of Science at Stockholm University on 13/1/2020. It was revised 17/8/2020 and 29/4/2021.

Prerequisites and special admittance requirements

Admission to the course requires knowledge equivalent Mathematics II - Analysis, part A, 7.5 ECTS credits (MM5010), and Mathematics II - Linear algebra, 7.5 ECTS credits (MM5012.

Also required is knowledge equivalent to Swedish upper secondary course English 6.

Course structure

Examination code	Name	Higher Education Credits
PRO1	Project - theory	1
PRO2	Project - numerical computations	1
TENT	Theory	6.5

Course content

a. The course covers: Linear differential equations with constant and variable coefficients, existence and uniqueness theorems, boundary value problems, Green's function, planar autonomous systems, stability, classification of critical points, examples of second-order partial differential equations, separation of variables, transform methods, numerical solution methods. The contents of the course can be applied in modelling in a number of fields, for example in physics and economics.

b. The course consists of the following parts:
Part 1, Theory, 6.5 credits
Part 2, Project - theory, 1 credit
Part 3, Project - numerical computations, 1 credit

Part 1 is mandatory. You choose to do either part 2 and part 3.

Learning outcomes

After the course, students are expected to be able to
Part 1, theory:

* account for and prove basic theorems in the theory of ordinary differential equations,
* explain and use methods in the theory of ordinary differential equations to solve mathematical and applied problems,
* be able to solve basic partial differential equations.

Part 2, Project - theory, 1 credit:
* carry out an in-depth project in one of the areas that the course covers, and present the project in a report.

Part 3, Project - numerical computations, 1 credit:
* carry out basic numerical computations in one of the areas that the course covers, and present the project in a report.

Education

Instruction consists of lectures and exercises. The course is offered in English.

Forms of examination

a. The course is examined in the following manner:
Assessment of module 1, Theory, takes place through a written exam, and for grades A and B also oral exam.
Assessment of module 2, Project - theory, takes place through written and oral presentation.
Assessment of module 3, Project - numerical calculations, takes place through written and oral presentation.

The examination will be conducted in English.

The examiner can decide on adapted or alternative examination formats for students with disabilities.

b. The course has no compulsory instruction.

c. Grading: The course's final grade is set according to a seven-point criterion-referenced scale:
A = Excellent
B = Very good
C = Good
D = Satisfactory
E = Adequate
Fx = Failed, some additional work is required
F = Failed, much additional work is required

Grades of module 1, Theory, will be set according to a seven-point criterion-referenced scale.

Grades of module 2, Project - theory, will be set according to a two-point grading scale: fail (U) or pass (G).

Grades of module 3, Project - numerical calculations, will be set according to a two-point grading scale: fail (U) or pass (G).

A passing final grade requires at least the grade E on module 1 and the grade G on either module 2 or module 3.

d. The course's grading criteria are handed out at the start of the course.

e. Students who receive a failing grade on a regular examination are allowed to retake the examination as long as the course is still provided. The number of examination opportunities is not limited. Other mandatory course elements are equated with examinations. A student who has received a passing grade on an examination may not retake the examination to attain a higher grade. A student who has failed the same examination twice is entitled to have another examiner appointed, unless there are special reasons to the contrary. Such requests should be made to the department board. Under normal circumstances, the course includes at least three examination opportunities per module per academic year the course is offered. For the academic years that the course is not offered, at least one examination opportunity is offered.

f. There is no possibility to improve the grade Fx to a pass grade in this course.

Interim

Students may request that the examination be conducted in accordance with this course plan even after it has ceased to be valid. However, this may not take place more than three times over a two year period after course instruction has ended. Requests must be made to the departmental board. The provision also applies in the

case of revisions of the course syllabus and revisions of the required reading.

Limitations

The course may not be included in a degree together with the course Ordinary Differential Equations (MM7004).

Misc

The course is part of the Bachelor's programme in Mathematics, but may also be taken as a separate course.

Required reading

The required reading is decided by the departmental board and published on the Department of Mathematics' website at least 2 months before the start of the course.