



UNIVERSITY OF GOTHENBURG

FACULTY OF SCIENCE

MMG511, Ordinary Differential Equations and Mathematical Modelling, 7,5 higher education credits

Ordinära differentialekvationer och Matematisk modellering, 7.5 högskolepoäng

First Cycle

1. Confirmation

The course syllabus is a tentative version.

Field of education: Science 100 %

Department: Department of Mathematical Sciences

2. Position in the educational system

The course is taken during the fourth semester in the Bachelor's Programme in Mathematics. It is also open for eligible students outside the programme.

The course is considered advanced according to the requirements for the Degree of Bachelor in Mathematics.

Main field of studies

Mathematics

Specialization

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

3. Entry requirements

The prerequisites for the course are the equivalent of 60 higher education credits in Mathematics, including the courses MMG300 Multivariable Analysis and MMG400 Linear Algebra II, and a course in programming.

4. Course content

General theory for ordinary differential equations (ODE) such as existence and uniqueness of solutions to ODE, theory of linear systems of ODE, and stability properties of nonlinear ODE using Lyapunov's functions.

Examples of mathematical modeling in physics, chemistry and environment.

5. Learning outcomes

After completing the course, the student will be able to

- describe and explain the main concepts and theories for ODEs covered in the course
- formulate mathematical models in terms of ODE
- make analytical analysis of models formulated in terms of ODE
- make numerical analysis of a mathematical model and to implement it in Matlab
- interpret the results of a mathematical model.

6. Literature

Se <http://www.chalmers.se/math/SV/utbildning/grundutbildning/kurslitteratur/kurslitteratur-matematik>

7. Assessment

The examination consists of a written exam at the end of the course, and of both written reports and oral presentations of mandatory modeling assignments.

A student who has failed a test twice has the right to change examiner, unless weighty arguments can be invoked. For this, the student must send a written request to the board of the department.

8. Grading scale

The grading scale comprises Fail (U), Pass (G), Pass with Distinction (VG).

Students who are contractually entitled to ECTS grades should inform the examiner about this no later than one week after the start of the course.

Students without such entitlement will not be awarded ECTS grades. Grades will be converted into ECTS terminology according to a standard model approved by the University President.

9. Course evaluation

Oral and/or written course evaluation will be performed. The results of the evaluation will be communicated to the students and will serve as a guide for the development of the course.

10. Additional information

Language of instruction: Swedish and English.

The language of instruction is English unless all involved are Swedish speakers.

The course *MMG511 Ordinary Differential Equations and Mathematical Modelling* has partially the same content as the course *MMG510 Mathematical Modelling*. It is not allowed to be registered and/or examined in more than one of these courses.