



GÖTEBORG UNIVERSITY

Faculty Board of Science

MMG510 Mathematical Modelling

7.5 higher education credits

First Cycle

This syllabus is a translation of the binding document in Swedish.

1. Confirmation

The syllabus was confirmed by the Department of Mathematical Sciences on December 1, 2007 to be valid from December 1, 2007. The syllabus was revised on December 8, 2009 to be valid from July 1, 2010. Field of education: Science. Responsible department: Mathematical Sciences.

2. Position in the educational system

The course Mathematical Modelling, 7.5 higher education credits, is taken during the fourth semester in the Bachelor Program in Mathematics. It is also open for eligible students outside the program. The course is considered advanced according to the requirements for the Degree of Bachelor in Mathematics.

3. Entrance qualifications

The prerequisites for the course Mathematical Modelling 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

Modelling with, and theory for, ordinary differential equations (ODE). Stochastic models of chemical reactions and transport processes. General aspects of modelling: dimensional analysis, examples of modelling in physics, biology, chemistry.

5. Learning outcomes

After completing the course, the student will be able to

- formulate mathematical models in terms of ODE
- make analytical analysis of qualitative properties: stability and bifurcations of solutions to models formulated in terms of ODE

- formulate mathematical models in terms of stochastic processes
- implement in Matlab and to make a complete numerical analysis of a mathematical model
- interpret the results of a mathematical model.

6. Required reading

List of required reading enclosed.

7. Assessment

The examination consists of a written exam at the end of the course, and of both a written report and an oral presentation of a modelling project.

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 grades are Fail (U), Pass (G), and 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

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