Faculty Board of Science

MMA420 Ordinary Differential Equations

7.5 higher education credits

Second Cycle

This syllabus is the binding document.

1. Confirmation

The syllabus was confirmed by the Department of Mathematical Sciences on June 1, 2008 to be valid from June 1, 2008.
Field of education: Science. Responsible department: Mathematical Sciences.

2. Position in the educational system

The course Ordinary Differential Equations, 7.5 higher education credits, is one of several single subject courses included in the two-year Masters Program in Mathematical Sciences. The course is also open for eligible students outside the program.

3. Entrance qualifications

The prerequisite for the course Ordinary Differential Equations is the equivalent of 60 higher education credits in Mathematics, including the courses MMG300 Multivariable Analysis and MMG400 Linear Algebra II.

4. Course content

Existence and uniqueness theorems for ordinary differential equations. Solution of linear systems using the matrix exponential function. Phase portraits of autonomous systems. Investigation of equilibrium points by Liapunov's method and by linearization. Solution of boundary value problems using Green's function. Brief introduction to mathematical software and numerical methods for ordinary differential equations.

5. Learning outcomes

After completing the course, the student will

- know the basic existence and uniqueness theorems for initial value problems

- be able to solve linear systems using the complex exponential functions

- be able to sketch and interpret phase portraits of two-dimensional autonomous systems

- be able to find equilibrium points of autonomous systems, and investigate their stability

- be familiar with Green's functions and their application to boundary value problems

6. Required reading

List of required reading enclosed.

7. Assessment

An examination will be given at the end of the course. There is also a compulsory computer based assignment.

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.