Faculty Board of Science

MMA421 Ordinary Differential Equations and Dynamical Systems

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 August 28, 2009 to be valid from September1, 2009.
Field of education: Science. Responsible department: Mathematical Sciences.

2. Position in the educational system

The course Ordinary Differential Equations and Dynamical Systems, 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 and Dynamical Systems is the equivalent of 60 higher education credits in Mathematics, including the courses MMG300 Multi-variable 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. Basic theory of discrete and continuous dynamical systems, properties of diffeomorphisms and flows.

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

- know the definitions of diffeomorphisms and flows, and their interpretations as dynamical systems

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

- be able to analyse fixed points and local properties of dynamical systems

- be familiar with the basic terminology of dynamical systems.

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.