



GÖTEBORG UNIVERSITY

Faculty Board of Science

MMA400 Applied Functional Analysis

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 July 1, 2007 to be valid from July 1, 2007.

Field of education: Science. Responsible department: Mathematical Sciences.

2. Position in the educational system

The course Applied Functional Analysis, 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 prerequisites for the course Applied Functional Analysis are the equivalent of the courses MMG300 Multi Variable Analysis and MMG400 Linear Algebra II.

4. Course content

The basic idea is to apply geometric methods from linear algebra to functions and function spaces. A function is considered as a point in a vector space of infinite dimensions. Norms, convergence and geometric objects like balls are introduced in these vector spaces. Typical examples are L^p spaces and Hilbert spaces. An important result is the spectral theorem for compact self-adjoint operators and applications e.g. Fredholm's alternative. Another type of results are fixed point theorems that will be applied to nonlinear ODEs.

5. Learning outcomes

After completing the course, the student will be able to

- work with Banach spaces
- handle bounded linear mappings
- use basic Hilbert space theory

- apply fixed point results to differential and integral equations.

6. Required reading

List of required reading enclosed.

7. Assessment

An examination will be given at the end of the course. 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 High Pass (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.