



DEPARTMENT OF MATHEMATICAL SCIENCES

MMA400 Applied Functional Analysis, 7.5 credits

Tillämpad funktionalanalys, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Mathematical Sciences on 2017-12-01 to be valid from 2018-07-01, autumn semester of 2018.

Field of education: Science 100%

Department: Department of Mathematical Sciences

Position in the educational system

The course can be part of the following programmes: 1) Mathematical Sciences, Master's Programme (N2MAT) and 2) Bachelor's Programme in Mathematics (N1MAT)

Main field of studies

Mathematics

Specialization

A1N, Second cycle, has only first-cycle course/s as entry requirements

Entry requirements

The equivalent of the courses *MMG300 Multivariable Analysis* and *MMG400 Linear Algebra II*.

Learning outcomes

On successful completion of the course the student will be able to:

- state and explain the concepts vector space, normed space, Banach and Hilbert space,
- state and explain the theory of linear operators on Hilbert spaces, in particular for compact and self-adjoint operators,
- apply the spectral theorem for compact self-adjoint operators,

- apply fixed point theorems to differential and integral equations.

Course content

Normed spaces. Banach and Hilbert spaces. Basic facts about Lebesgue integrals. Contractions. Fixed point theorems. Compactness. Operators on Hilbert spaces. Spectral theory for compact self-adjoint operators. Fredholm's alternative. Applications to integral and differential equations. Sturm-Liouville theory.

Form of teaching

Language of instruction: English

Assessment

The examination consists of a written exam at the end. During the course, there may be optional assignments that give bonus points on the exam. Examples of such assignments are small written tests, labs, and oral or written presentations. Information about this is found on the course home page.

If a student, who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

Grades

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

Course evaluation

The course is evaluated with an anonymous questionnaire and/or a discussion with the student representatives. The results of and possible changes to the course will be shared with students who participated in the evaluation and students who are starting the course.

Additional information

For a list of course literature, see:

<https://www.chalmers.se/sv/institutioner/math/utbildning/grundutbildning-goteborgs-universitet/kurslitteratur/Sidor/Kurslitteratur-i-matematik.aspx>

The syllabus for MMA400 was originally established to take effect from 2007-07-01, when it replaced MAN670.