SF2743 Advanced Real Analysis I 7.5 credits

Avancerad reell analys I

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for SF2743 valid from Autumn 2013

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

SF2713 Foundations of Analysis or the equivalent.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

To learn about basic concept within real analysis. These concepts include measurement theory, Lebesgue integral, certain convergence concepts and an introduction to functional analysis and Banach space. A certain application of these will be introduced among the following fields: Fourier analysis, the ergodic theory, probability theory, Sobolev space, partial differential equations.

On completion of the course, the students are expected to be able to:

- define concepts within measurement theory,
- formulate and prove theorems in measurement theory,
- define basic concepts within Banach and operator theory,
- use above-mentioned theory within applications.

Course contents

Integration and measurement theory:

- Basic measurement theory,
- Integration of measurable functions (Lebesgue integrals),
- Convergence theorems,
- Product measure, and Fubini's theorem.

Functional Analysis:

- Introduction to functional analysis,
- Banach space including Lp space,
- Basic theorems about linear operators and functionals.

Applications can be chosen among:

- Fourier analysis,
- The Ergodic theory,
- Probability theory,
- Sobolev space,
- Partial differential equations.

Course literature

Announced at the beginning of the course.

Examination

- TEN1 - Examination, 7.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH’s coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.