Course syllabus

Matematiska strukturer
Mathematical Structures

FMAN65, 6 credits, A (Second Cycle)

Valid for: 2023/24
Faculty: Faculty of Engineering, LTH
Decided by: PLED F/Pi
Date of Decision: 2023-04-18

General Information

Main field: Technology.
Compulsory for: Pi3
Elective for: D4, F4
Language of instruction: The course will be given in Swedish

Aim

Besides mere knowledge imparting, the course aims to give training in theorem proving, and to bring out the possibilities of a more abstract representation of mathematical concepts and the connections between them. The intention is to give an overall view elucidating the foundations of the mathematical theories in the basic courses.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- be familiar with and in his or her own words be able to explain the concepts within analysis, algebra and geometry touched upon in the course.
- be able to give examples of how these concepts are abstractions of concepts in the basic courses, and show understanding for how the abstractions serve to simplify and clarify the theory.
- in his/her own word be able to describe the logical connections between the concepts (theorems and proofs).

Competences and skills
For a passing grade the student must

- be able to demonstrate ability to identify problems which can be modelled with the concepts introduced.
- in the context of problem solving be able to demonstrate ability to, in simple situations, develop the theory further.
- with proper terminology, in a well-structured manner, and with clear logic be able to explain the connections between various concepts in the course.
- with proper terminology, suitable notation, in a well-structured manner and with clear logic be able to explain the solution to a problem or the proof of a theorem.
- have developed his or her ability to independently read and judge mathematical text at a high level.

Contents

Sets. Real numbers. Metric spaces. Algebra (groups and linear spaces). Banach spaces and Hilbert spaces with applications.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)
Assessment: Take-home exam followed by an oral exam.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Assumed prior knowledge: FMAF01 Analytic functions and FMAF05 Systems and Transforms.
The number of participants is limited to: No
The course overlaps following course/s: FMA111, FMA110

Reading list

- Kaplansky, I: Set Theory and Metric Spaces. American Mathematical Society, 2001, ISBN: 9780821826942.

Contact and other information

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Course homepage: https://canvas.education.lu.se/courses/20374