



Course syllabus

Faculty of Technology
Department of Mathematics

4MA421 Algebraiska strukturer II, 7,5 högskolepoäng
Algebraic structures II, 7.5 credits

Main field of study

Mathematics

Subject

Mathematics

Level

Second cycle

Progression

A1N

Date of Ratification

Approved 2014-10-03.

Revised 2024-09-09. Examination is revised.

The course syllabus is valid from autumn semester 2025.

Prerequisites

60 credits including Algebraic structures I (2MA405) 7.5 credits or equivalent.

Objectives

After completing the course, the student should be able to

- independently and with adequate techniques solve problems, perform calculations, and conduct lines of reasoning within the part of mathematics that is covered by the course, and to clearly communicate these solutions, calculations, and reasonings in writing
- orally describe terminology and definitions, along with formulating, proving and

analyzing theorems that are central to the course.

Content

Group Theory: The Isomorphism Theorems for Groups. Simple Groups. Solvable Groups. Finite Groups; The Fundamental Theorem of Finite Abelian Groups and Sylow's Theorems.

Ring Theory: The Isomorphism Theorems for Rings. Unique Factorization Domains. Principal Ideal Domains. Euclidian Domains. Rings of Quadratic Integers.

Field Theory: Field Extensions. Finite, Algebraic, Normal, and Separable Extensions. Finite Fields.

Type of Instruction

Lectures and seminars.

Examination

The course is assessed with the grades A, B, C, D, E or F.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

The student's knowledge is assessed in the form of a written exam (4.5 credits, grade A-F) and an oral theory examination (3 credits, grade U/G), both individual. Bonus marks for the written exam may be gained by voluntary doing individual written assignments. These marks can be approved for the regular exam and the subsequent re-exam.

Resit examination is offered in accordance with Linnaeus University's Local regulations for courses and examination at the first- and second-cycle levels. In the event that a student with a disability is entitled to special study support, the examiner will decide on adapted or alternative examination arrangements.

Course Evaluation

A course evaluation should be conducted during the course or in connection with its conclusion. The results and analysis of the completed course evaluation should be promptly communicated to students who have completed the course. Students participating in the next course instance should be informed of the results of the previous course evaluation and any improvements that have been made, no later than at the start of the course.

Overlap

The course cannot be included in a degree along with the following course/courses of which the content fully, or partly, corresponds to the content of this course:
4MA121 Algebraic structures II, 7.5 credits

Other Information

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the

start of the course at the latest.

Required Reading and Additional Study Material

Beachy, John A. & Blair, William D. *Abstract Algebra*, 3rd Ed., Waveland Press, 2006 or later. 120 pages (484)