



Course syllabus

Faculty Board of Science and Engineering
School of Computer Science, Physics and Mathematics

4MA121 Algebraiska strukturer II, 7,5 högskolepoäng
Algebraic structures II, 7.5 credits

Main field of study

Mathematics

Subject Group

Mathematics

Level of classification

Second Level

Progression

A1N

Date of Ratification

Approved by Organisational Committee 2009-08-11

The course syllabus is valid from spring semester 2010

Prerequisites

Three year of full-time study in Mathematics (equivalent to 180 higher education credits), including a course in algebraic structures (2MA105) or equivalent.

Expected learning outcomes

The student should be able to:

- derive simple structural properties of finite groups of low order
- describe how the concept of unique factorization can be generalized from the ring of integers to general integral domains
- use the fundamental theory of field extensions for solving problems
- derive simple structural properties within the fundamental theory of field extensions.

Content

Group Theory: The First, Second, and Third Isomorphism Theorem for Groups. Simple Groups. The Centre and the Commutator Subgroup. Composition Series. The Jordan-Hölder Theorem. Solvable Groups. Conjugacy Classes. Finite Groups; The Fundamental Theorem of Finite Abelian Groups and Sylow's Theorems.

Ring Theory: The First, Second, and Third Isomorphism Theorem for Rings. Unique Factorization Domains. Principal Ideal Domains. Euclidian Domains. Gaussian Integers.

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

Finite Fields.

Type of Instruction

Lectures and seminars. Compulsory assignments may be given during the course.

Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the

examiner before the grading process starts.

The student's knowledge is assessed in the form of oral and/or written examinations. The principal assessment method for the course is determined at the beginning of the course.

Course Evaluation

After the course a written evaluation of the course will take place according to the University guidelines.

Required Reading and Additional Study Material

Svensson, P.-A. *Abstrakt algebra*, Studentlitteratur, 2001 or later. 195 (586) pages.