SF2706 Algebra 7.5 credits

Algebra

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

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

Establishment

Course syllabus for SF2706 valid from Autumn 2007

Grading scale

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

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

SF2703 or equivalent.

Language of instruction

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

Intended learning outcomes

The goal of the course is to make the student familiar with the basic concepts of polynomial rings, modules and field extensions.

This means in particular that the student, after completing the course, will

- Know the concepts of polynomial rings, ideals and irreducible polynomials
- Have knowledge of when polynomial rings are UFD.
- Be able to use Eisensteins irreducibility criteria
- Know the concepts of modules, submodules and quotients.
- Know the concepts of direct sum, tensor product, exact sequences,
- Recognize the concepts of projective modules, injective modules, flat modules and Hom-functors.
- Be familiar with the construction and the universal properties of tensor algebras, symmetric algebras, and exterior algebras
- Know the structure theorem for finitely generated modules over PID.
- Understand how linear algebra can be pursued over rings,
- Know the rational canonical form and the Jordan form for matrices
- Know the concepts of field extensions, algebraic extension, minimal polynom
- Know the concepts of splitting fields, closures, separable and inseparable extensions, cyclotomic polynomials.

Course contents

Polynomial rings, modules, tensor product, modules over PID, field extensions.

Course literature

Abstract Algebra by D.S. Dummit and R.M. Foote.

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.

Other requirements for final grade

Written exam, and home work assignments.

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.