



# SF1678 Groups and Rings 7.5 credits

## Grupper och ringar

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 SF1678 valid from Autumn 2016

## Grading scale

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

## Education cycle

First cycle

## Main field of study

Technology

## Specific prerequisites

SF1604 Linear algebra or a corresponding course.

## Language of instruction

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

## Intended learning outcomes

After the course, the student shall be able to pursue abstract reasoning about algebraic structures. The student shall be trained in logical thinking and in constructions of mathematical proofs. Algebraic structures appear in many disciplines within Science and Technology. The student shall be able to recognize and use such structures in his or her forthcoming work. Concretely, this means that the student shall be able to:

- Identify and describe fundamental algebraic structures such as groups, rings and fields.
- Identify algebraic substructures such as subgroups, subrings and ideals.
- Identify and describe relations between algebraic structures, such as homomorphisms and group actions.
- Define and use bijective functions between algebraic structures, with special attention to permutations.
- Use classical results in basic group theory and ring theory, such as Lagrange's theorem or Cauchy's theorem, to describe the structure of the group or the ring.
- Explain relations using mathematical proofs and logical reasoning.
- Formulate certain practical problems by means of algebraic structures.

## Course contents

Groups, permutations, homomorphisms, group actions, rings, ideals, modules, fields and field extensions.

## Course literature

Thomas W. Judson, “Abstract Algebra: theory and applications” (online book)

## Examination

- TEN1 - Exam, 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

One written exam, which can partly be replaced by homework 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.