



## Course syllabus

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

2MA105 Algebraiska strukturer I, 7,5 högskolepoäng  
Algebraic structures I, 7.5 credits

### **Main field of study**

Mathematics

### **Subject Group**

Mathematics

### **Level of classification**

First Level

### **Progression**

G2F

### **Date of Ratification**

Approved by the Board of the School of Computer Science, Physics and Mathematics  
2009-12-01

Revised 2012-12-10. Prerequisites and literature lists are revised.

The course syllabus is valid from autumn semester 2013

### **Prerequisites**

1MA162 Discrete Mathematics 7.5 credits and 1MA151 Linear algebra and Fourier series 7.5 credits or equivalent.

## Objectives

The student should be able to:

- define elementary concepts in the theory of algebraic structures
- describe and derive fundamental properties of groups, rings, fields and Boolean algebras
- use methods of abstract algebra in areas of mathematical or applied nature.

## Content

### **Group Theory:**

Groups and Subgroups. Cyclic Groups. Permutation Groups. Lagrange's Theorem. Fermat's and Euler's Theorems. Homomorphisms and Isomorphisms between Groups. Cayley's Theorem. Normal Subgroups and Factor Groups. Burnside's Lemma.

### **Ring Theory:**

Rings, Fields and Integral Domains. Homomorphisms and Isomorphisms between Rings. Ideals and Factor Rings. Polynomial Rings.

**Boolean Algebras:**

Partially Ordered Sets. Bounded, Distributive, and Complemented Lattices. Boolean Algebras.

**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. Furthermore, continuous assessment by written and/or oral representation can be used during the course. The principal assessment method for the course is determined at the beginning of the course.

**Course Evaluation**

A course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The result of the course evaluation will be filed at the department.

**Required Reading and Additional Study Material**

Svensson, P.-A. *Abstrakt algebra*, Studentlitteratur, 2001 or later. 229 (586) pages.

**Prescribed literature**

- John B. Fraleigh, *A First Course in Abstract Algebra*, Addison Wesley, 2003 or later. 191 pages (520)
- *Distributed material*, Linnæus University, present year. 35 pages