



**LUND**  
UNIVERSITY

Faculty of Science

## **MATP13, Mathematics: Group- and Ring Theory, 7.5 credits**

*Matematik: Grupp- och ringteori, 7,5 högskolepoäng*

Second Cycle / Avancerad nivå

---

### **Details of approval**

The syllabus was approved by Study programmes board, Faculty of Science on 2007-05-10 to be valid from 2007-07-01, autumn semester 2007.

### **General Information**

The course is an elective course for second-cycle studies for a Degree of Master of Science (120 credits) in mathematics.

*Language of instruction:* English and Swedish

*Main field of studies*

Mathematics

*Depth of study relative to the degree requirements*

A1F, Second cycle, has second-cycle course/s as entry requirements

### **Learning outcomes**

The aim of the course is that the student on completion of the course should:

- have developed the ability to communicate mathematics in speech and writing,
- be familiar with basic concepts and methods within group and ring theory,
- have acquired basic knowledge for continued studies in group and ring theory.

### **Course content**

Groups: Permutation groups. Burnside's lemma with application to Pólya arithmetic. Sylow's theorems. Symmetric and alternating groups. The structure of finitely generated Abelian groups.

Rings: Noetherian and Artinian rings and modules. Artin-Wedderburn's theorem. Finitely generated modules over a principal ideal ring with application in e.g. Jordan's

normal form.

Linear algebra: Multilinear mappings. Tensor product.

## **Course design**

The teaching consists of lectures and seminars. Compulsory assignments may occur during the course.

## **Assessment**

The examination consists of a written examination followed by an oral examination. The oral examination may only be taken by those students who passed the written examination. Students who fail the ordinary written examination are offered a resit examination shortly thereafter.

*Subcourses that are part of this course can be found in an appendix at the end of this document.*

## **Grades**

Marking scale: Fail, Pass, Pass with distinction.

## **Entry requirements**

For admission to the course, English B is required as well as at least 67.5 credits in pure mathematics including the course  
MATM11 Algebraic structures, 7.5 credits.

## **Further information**

The course may not be included in degree together with MAT413 Group and ring theory, 5 credits.

## Subcourses in MATP13, Mathematics: Group- and Ring Theory

Applies from H07

0701 Examination, 7,5 hp  
Grading scale: Fail, Pass, Pass with distinction