Level: bachelor	

Course title: Group Theory (M4-18)

Status: obligatory

ECTS: 7

Requirements: passed exams in courses Algebra 2 (M4-06) and Linear Algebra (M4-09)

Learning objectives

The goal of the course is to introduce the basic concepts of the theory groups and to emphasise its importance within the system of mathematical disciplines.

Learning outcomes

Minimal

Students should master the basic principles of abstract algebra and acquire skills of independent solving of simpler exercises related to groups and their properties.

Desirable

The ability of independent solving of more involved problems, and a comprehensive understanding of all key parts of the theoretical material, including the applications of groups in other areas of mathematics (in particular in geometry).

Syllabus

Theoretical instruction

Groups. Subgroups. Cyclic groups. Normal subgroups and congruences. Isomorphism theorems. Direct and semidirect products of groups. Permutation groups and group actions. Sylow's theorems and their application in classifying finite groups. Finitely generated Abelian groups. Normal and composition series. Soluble groups. Some classes of soluble groups. Nilpotent groups.

Practical instruction

Discovering basic properties of groups. Properties of normal subgroups. Permutation groups. Computing the Sylow subgroups of a given group. Methods for proving that a certain group is (non-)soluble.

Weekly teaching load				Other: 0
Lectures: 3	Exercises: 3	Other forms of teaching: 0	Student research: 0	