Study programme(s): Applied Mathematics (MAP)

Course title: DISCRETE MATHEMATICS 1 (P102)

Lecturer(s): Petar Đapić, Boriša Kuzeljević, Nebojša Mudrinski

Course status: compulsory

ECTS points: 5

Requirements:

Learning Objectives

Introduction to the basic notions of mathematical logic, naïve set theory, propositional and predicate logic. Introduction to basic examples of groups, rings, and fields. Forming the concept of a mathematical proof.

Learning Outcomes

Upon completion of the course, students have acquired a basic knowledge of mathematical logic. They understand notions such as: sets, relations, functions, countability, statement, tautology, term, formula. Students are able to recognize the fundamental laws of valid logical reasoning. They understand the concept of groups, rings and fields, as well as basic examples of these structures. Students are capable of solving tasks in these subject areas, and to follow more advanced courses in mathematical topics that require the mastering of these concepts and techniques.

Syllabus

Theoretical instructions

Propositional logic and the basics of predicate logic. The structure of mathematical proofs - direct proofs, contraposition, contradiction, counterexample. Sets, relations and functions. Groups, rings, fields through examples – the ring of integers, the field of rational, real and complex numbers, finite examples.

Practical instructions

Solving and understanding suitably selected exercises that illustrate the abstract concepts and theorems presented at theoretical instructions on concrete examples.

Literature

1. R. S. Madaras, **Matematička logika**, e-materijal (2012)
2. S. Milić, **Elementi matematičke logike i teorije skupova**, Institut za matematiku, Novi Sad, 1990.
3. S. Prešić, **Elementi matematičke logike**, Zavod za udžbenike i nastavna sredstva, Beograd 1983;
4. B. Šešelja, A. Tepavčević, **Algebra 1,** Univerzitet u Novom Sadu, Novi Sad, 2000.
5. E. Mendelson, **Introduction to Mathematical Logic**, D.van Nostrand, 1964.

Number of active classes	**Lectures: 2**	**Exercises: 3**

Teaching methods

Lectures are conducted using classical teaching methods, as well as interaction with the students present. The exercises focus onto typical problems that contribute to the understanding of these areas and practice the techniques for solving them. Students' knowledge is first examined through a written test, in order to assess both the degree of acquired theoretical knowledge and the skills of their applications. At the final oral exam, a comprehensive understanding of the presented material is evaluated.

Grading (maximum number of points 100)

Pre-exam obligations	Points	**Final exam**	Points
First colloquium	**30**	oral exam	**40**
Second colloquium	**30**		