

M014	Obligatory - Semester 3	Combinatorial and Discrete Mathematics	L+P+S 2+2+0	ECTS 5
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Course objectives. Make students familiar with basic structures and methods of combinatorial and discrete mathematics. The basic terms will be introduced and their applications will be shown in the lectures. In the exercises, students should accept techniques and methods of problem solving. The program is the same for all groups.

Course prerequisites. Elementary Mathematics I and II.

Syllabus.

Pigeonhole principle and generalizations. Basic enumerating rules. Permutations of sets. Combinations of sets. Permutations and combinations of multisets. Binomial and multiset coefficients. Some linear recurrence relations. Fibonacci numbers. Inclusion-exclusion principle. Generating functions. Recurrence relations and generating functions. Basic terms of graph theory. Cycles, trees and paths. Planar graphs.

Expected learning outcomes.

After completing the course, students will be able to:

- use the basic enumeration rules;
- recognize and apply the formulas for permutations and combinations of sets and multisets in real-world problems;
- solve and apply recurrence relations;
- use basics of graph theory.

Teaching methods and student assessments. Lectures and exercises are obligatory. The exam consists of a written and an oral part, and it is taken after the completion of lectures and exercises. Acceptable mid-term exam scores replace the written examination. Students may influence their final grade by doing their homework regularly.

Can the course be presented in English: Yes.

Basic literature:

1. D. Veljan, Kombinatorna i diskretna matematika, Algoritam, Zagreb, 2001.

Recommended literature:

1. D. Veljan, Kombinatorika s teorijom grafova, Školska knjiga, Zagreb, 1989.
2. J. Anderson, J. Bell, Discrete Mathematics with Combinatorics, Prentice Hall, New York, 2000.
3. J. Matoušek, J. Nešetřil, Invitation to Discrete Mathematics, Oxford University Press, 1998.
4. M. Cvitković, Kombinatorika: zbirka zadataka, Element, Zagreb, 1998.