

Study programme(s): Computer Science

Level: master

Course title: Advanced topics in Combinatorics

Lecturer: Dragan Mašulović, Maja Pech

Status: elective

ECTS: 6

Requirements: ---

Learning objectives

In this course students shall acquire advanced knowledge in one or two modern combinatorial topics and will understand corresponding combinatorial structures and methods at a deep level.

Learning outcomes

At the end of the course a successful student will be able to formulate and solve problems connected to the topics presented.

Syllabus

The course covers some of the following topics:

- Ramsey theory
- Theory of generating functions
- Theory of block designs
- Coding and Information theory
- Theory of association schemes
- etc.

Each topic will include basic definitions and results, fundamental techniques and advanced results and applications.

Literature

H. S. Wilf: "generatingfunctionology", 3rd Ed, A K Peters Ltd, 2006
 R. L.Graham, B. L. Rothschild, J.H. Spencer: „Ramsey theory", 2nd Ed, Wiley 2013
 D. R. Hughes, F.C. Piper: „ Design theory“, Cambridge University Press 1988
 G. A. Jones, J. M. Jones: “Information and Coding Theory“, Springer 2008

Weekly teaching load

Lectures: 2	Exercises: 2	Practical Exercises: 0	Student research: 0	Other: 0
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Teaching methodology

Lectures are presented using classical teaching methods supported by beamer presentations and continuous interaction with students. The ability of application of theoretical knowledge is checked through independent solving of exercises on two colloquia. The final exam is oral and a student is supposed to demonstrate general understanding of the presented theoretical material.

Grading method (maximal number of points 100)

Pre-exam obligations	points	Final exam	points
<i>Colloquium 1</i>	30	<i>Oral exam</i>	<i>40</i>

<i>Colloquium 2</i>	30		
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