

Study Programme: Applied Mathematics (MB)		
Course Unit Title: Information and Coding Theory		
Course Unit Code: MB21		
Name of Lecturer(s): Đapić Đ. Petar, Tepavčević P. Andreja		
Type and Level of Studies: Master Academic Degree		
Course Status (compulsory/elective): obligatory for MB, module Techno-mathematics		
Semester (winter/summer): Winter		
Language of instruction: Serbian		
Mode of course unit delivery (face-to-face/distance learning): Face-to-face		
Number of ECTS Allocated: 7.5		
Prerequisites: None		
Course Aims: Learning the principles of the theory of information, coding in the channel without the interference, the principles of the algebraic theory of coding and the importance of those theories in contemporary communication.		
Learning Outcomes: Minimal: Understanding of the concept and importance of the amount of information, the system of communication, developing the ability of solving typical tasks from coding theory, understanding and implementing codes and source of information and solving optimisation problems. Understanding the principles of binary block-codes, solving problems on linear codes. Desirable: More detailed understanding of the notion and features of entropy, especially of the entropy of sources, the capacity of channels, symmetric channels. Algebraic methods in the applications of block-codes, some classes of linear codes and the capability of their usage.		
Syllabus: <i>Theory</i> Introduction to probability and analysis of the communicative system. Entropy and information. The information source and its entropy. Channel and capacity. Symmetric channels. Uniquely decoding. Optimality and corresponding codes. The algebraic principles of block-codes. The analysis of different kinds of errors and their detection and correction. Linear codes and other classes of block-codes. Examples of codes in the digital technology. <i>Practice</i> Solving problems in relation with entropy and the communication system. Constructions of particular code classes and the source of information. Problems in which different errors are being detected and corrected, using block-codes. Doing exercises of the application of linear codes. Solving problems from other classes of block-codes.		
Required Reading: 1. B. Šešelja, Teorija informacije i kodiranje, Univerzitet u Novom Sadu, PMF, 2005. 2. A. Tepavčević, B. Šešelja, Matematičke osnove informatike, Stylos, Novi Sad, 1995. 3. R. Lidl, G. Pilz, Applied Abstract Algebra, 2-nd ed., Springer, 1998.		
Weekly Contact Hours: 6	Lectures: 3	Practical work: 3
Teaching Methods: Lectures and exercises		
Knowledge Assessment (maximum of 100 points): 100		

Pre-exam obligations	points	Final exam	points
Active class participation	10	written exam	
Test I and Test II	50	oral exam	40
Preliminary exam(s)		
Seminar(s)			

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.