

Study programme(s): Applied Mathematics (MB)				
Level: master				
Course title: Information and Coding Theory (MB-09)				
Lecturer: Đapić Đ. Petar, Tepavčević P. Andreja				
Status: obligatory for MB, module Techno-mathematics				
ECTS: 7				
Requirements: none				
Learning objectives 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>Theoretical instruction</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>Practical instruction</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.				
Literature 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 teaching load				Other: 0
Lectures: 3	Exercises: 3	Other forms of teaching: 0	Student research: 0	
Teaching methodology Material is presented by video beam presentation, in combination with traditional methods and interaction with students. Typical examples of problems and their solutions are practised and analysed during exercises. The knowledge gained is checked through two colloquia. At the final, oral part of the exam, a student demonstrates comprehensive understanding of the material.				
Grading (maximum number of points 100)				

Pre-exam obligations	points	Final exam	points
Participation in lectures	10	Oral exam	40
Colloquia	50		