Study program: Multimedia communication technologies

Course title: Error control codes

Professor/assistant: Nikola Sekulović, Ph.D

Type of course: compulsory/elective

ECTS credits: 7

Pre-requisites: attended course of Digital telecommunications

Aims of the course:

Acquiring basic knowledge regarding codes construction for error detection and correction in digital telecommunication systems.

Learning outcomes:

After this course, it is expected that students possess theoretical and practical knowledge for construction, analysis and application of error correction codes in contemporary telecommunication systems.

Syllabus

Theoretical part

Error probability. Spectrum efficiency. Shannon's second theorem. Block codes and convolutional codes. Interleaving. Linear block codes. Cyclic codes. BCH and Reed-Solomon codes. Decoding of linear block codes using trellis. Recursive systematic convolutional codes. ARQ procedures. Adaptive modulation and coding. Trellis coded modulation. Cascade codes. Turbo codes. LDPC codes. Space-time coding. Application of block codes in practice. Application of convolutional codes in practice.

Practical part

Practical problems solving from lecture units. Simulation, testing and performance analysis of systems employing forward error correction techniques in program package MatLab.

Literature

1.D. Drajić, P. Ivaniš, *Uvod u teoriju informacija i kodovanje*, Akademska misao, Beograd, 2009.
2.M. Dukić, *Principi telekomunikacija*, Akademska misao, Beograd, 2008.
3.S. Lin, D. Costello, *Error control coding*, Prentice Hall, NJ, 2004.

Number of active classes			Other forms of teaching:
Lectures: 30	Practical classes: 30	Research work:	

Teaching methods

Combination of interactive approach with practical problem solving.

Grading system (maximum 100 points), **grading scale** from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade 7 from 61-70 points, grade 8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points.

Pre-exam obligations	**points**	**Final exam**	**points**
activity during theoretical lectures	**10**	written exam	**20**
practical training	**50**	oral exam	**20**
colloquium(s)/seminar papers			
Sum	**60**	**Sum**	**40**