

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Communications and Information Technologies - Communications and Information Processing		
Type and level of studies		Undergraduate Academic Studies		
The name of the course		Audio and video systems		
Lecturer (for lectures)		Ćirić G. Dejan		
Lecturer/associate (for exercises)		Joković J. Jugoslav		
Lecturer/associate (for OFE)		Joković J. Jugoslav		
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives				
Gaining theoretical and practical knowledge in the field of audio and video systems. This knowledge includes insights into audio and video signals/systems, acquisition, processing, storing, visualization and interpretation of audio and video information, as well as the application of audio and video in communication systems, multimedia, industry and medicine.				
Course outcomes				
Gained knowledge and skills in order to understand and apply modern technologies based on audio and video information. Students need to be trained to use audio and video systems, devices and software in communications, industry, medicine, etc.				
Course outline				
Theoretical teaching				
Audio signals (features, formats). Audio systems: basic concepts, division and interconnections. Standards of recording and reproduction of the sound in analogue and digital domain. Compression of audio signals. Parallel and serial processing of audio signals (processing tools). Spatial dimensions of a sound image. Virtual spatial sound (recording, spatial processing, coding and decoding, virtual reality systems). Applications of sound in industry and medicine. Video signals -basic concepts, digital representation of video signals, scalable video coding. Video compression standards (H.26X and MPEG). Error control in video communications. TV centre concept, studio and production equipment. Synchronisation concept. Video and audio signal mixers. Linear and non-linear editing. Digital interfaces. SDI-SDTI-ASI, video and audio routing. Video servers. Production centre automation. AAF, mxf. Virtual studio.				
Practical teaching (exercises, OFE, study and research)				
Computational exercises: solving of problems in the fields of acquisition, digitalisation, processing, visualisation, storage and interpretation of audio and video signals. Practical teaching: usage of standard procedures and software tools for work with sound (Sound Forge, Adobe Audition, Audacity) and video (Adobe Premier, ATEM), usage of audio equipment for sound acquisition in diverse environments (e.g., industry), usage of audio and video information for virtual environment generation.				
Textbooks/references				
1	I. McLoughlin: Applied speech and audio processing with Matlab examples, Cambridge University Press, Cambridge, 2009.			
2	G. Ballou: Handbook for sound engineers, 4th edition, Elsevier, Focal Press, Burlington, 2008.			
3	M. Vorlander: Auralization - Fundamentals of acoustics, modelling, simulation, algorithms and acoustic virtual reality, Springer, Berlin, 2008.			
4	Y. Wang, J. Ostermann, Y-Q Zhang: Digital video processing and communications, Prentice Hall, 2002.			
5	K. Paulsen: Moving media storage technologies - Applications & workflows for video and media, Focal Press, 2011.			
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	2	0	0
Teaching methods				
Lectures; Computational exercises; Lab sessions; Studio exercises; Consultations.				
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures		5	Written exam	25
Exercises		20	Oral exam	25
Colloquia				
Projects		25		