

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Electronics - Multimedia technologies		
Type and level of studies		Undergraduate Academic Studies		
The name of the course		Audio production		
Lecturer (for lectures)		Ćirić G. Dejan		
Lecturer/associate (for exercises)		Ćirić G. Dejan		
Lecturer/associate (for OFE)		Ćirić G. Dejan		
Number of ECTS		5	Course status (obligatory/elective)	Elective
Prerequisites				
Mastering theoretical and practical knowledge of sound, editing and sound processing software, audio devices and systems, sound recording and audio production. Focus is on forming audio contents for multimedia applications, computer games as well as accompanying content of video materials.				
Course objectives				
Theoretical knowledge in the field of audio technique. The application of theoretical knowledge. The use of audio equipment, studio space and appropriate programs. The skills of recording and processing sound, audio mixing, mastering and production.				
Course outcomes				
Theoretical knowledge in the field of audio technique. The application of theoretical knowledge. The use of audio equipment, studio space and appropriate programs. The skills of recording and processing sound, audio mixing, mastering and production.				
Course outline				
Audio signals (types of audio signals, analogue audio signals, audio signal digitalization, the effects of parameters on sound quality). Formats of recording, transfer and audio information inscription/storage (WAV, AIFF, RAW, MPEG, MIDI, HD and 3D sound). Software for recording, processing and production of sound (AVID - Pro Tools, Steinberg - Cubase, Steinberg – WaveLab, Adobe Audition). Basic processing of audio signals (recording, mastering and production). Audio devices (systems). Studio audio technique - audio interface/mixer (audio-visual control, control of level, spectrum, dynamics and sound spatiality). Professional audio systems based on DAW or DSP platforms. Sound recording (input acoustical environment and microphonic concept - choice and set up of microphones); recording of an orchestra and speech; video and film sound; special audio effects. Virtual spatial sound (3D sound recording, 3D spatial processing of sound, coding and decoding in virtual reality systems). Audio processors (filters, dynamic processors, effects based on time delay). Parallel and serial processing of audio signals. Audio production (pre-production, production and post-production). Sound design, sound effects.				
Theoretical teaching				
Application of software tools for sound recording, editing and processing of audio signals. Sound recording in diverse environments (open and closed spaces, controlled and uncontrolled environments) and for different purposes (multimedia contents, movies, computer games). Usage of different types of microphones and audio equipment. Audio production.				
Practical teaching (exercises, OFE, study and research)				
Application of software tools for sound recording, editing and processing of audio signals. Sound recording in diverse environments (open and closed spaces, controlled and uncontrolled environments) and for different purposes (multimedia contents, movies, computer games). Usage of different types of microphones and audio equipment. Audio production.				
Textbooks/references				
1	Y. Huang, J. Benesty: Audio signal processing for next-generation multimedia communication systems, Kluwer Academic Publishers, Boston, 2004.			
2	G. Ballou: Handbook for sound engineers, 4th edition, Elsevier, Focal Press, Burlington, 2008.			
3	S. Savage: The art of digital audio recording, Oxford University Press, New York, 2011.			
4	B. Katz: Mastering audio - The art and the science, Focal press, 2002.			
5	R. Izhaki: Mixing audio - Concepts, practices and tools, Focal press (Elsevier), Oxford, 2008.			
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	1	0	0
Teaching methods				
Lectures; Practical exercises; Studio exercises; Consultations.				
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures		5	Written exam	
Exercises		30	Oral exam	40
Colloquia				
Projects		25		