

## Specification for the book of courses

<b>Study program</b>		Electrical Engineering and Computer Science		
<b>Module</b>		Communications and Information Technologies		
<b>Type and level of studies</b>		Undergraduate Academic Studies		
<b>The name of the course</b>		Communication Acoustics		
<b>Lecturer (for lectures)</b>		Čirić G. Dejan		
<b>Lecturer/associate (for exercises)</b>		Panajotović S. Aleksandra		
<b>Lecturer/associate (for OFE)</b>		Panajotović S. Aleksandra		
<b>Number of ECTS</b>		6	<b>Course status (obligatory/elective)</b>	Obligatory
<b>Prerequisites</b>				
Mastering basic theoretical and practical knowledge about the nature of sound, generating and transmitting sound, sound sources, transducers, effects of environment (closed and open space), sound perception and consequences. Practical knowledge is related to abilities and skills of application of technology based on sound (e.g., devices for sound acquisition, basic processing and sound signal storage).				
<b>Course objectives</b>				
Theoretical knowledge from the field of sound focusing on communication technologies. Implementation of theoretical knowledge in analysis and modelling of sound fields as well as design of acoustical devices and systems containing acoustical components, acoustical design and noise control at elementary level. Skills of applying acoustical devices and measurement equipment.				
<b>Course outcomes</b>				
Theoretical knowledge from the field of sound focusing on communication technologies. Implementation of theoretical knowledge in analysis and modelling of sound fields as well as design of acoustical devices and systems containing acoustical components, acoustical design and noise control at elementary level. Skills of applying acoustical devices and measurement equipment.				
<b>Course outline</b>				
<b>Theoretical teaching</b>				
Physical characteristics of sound (generation and transmission of sound waves, sound sources, sound field quantification, phenomena in sound transmission). Electro-acoustical transducers (principles and characteristics). Standard microphones and special purpose microphones (microphone arrays for 3D sound recording and digital (MEMS) microphones). Speakers and headphones. Psychological-physiological acoustics: physiology of hearing and the consequences on the perception of sound; aspects of perception - intensity, pitch and timber, subjective perception of sound, equal loudness curves, binaural localization, effects of masking. Sound in enclosed space. Room acoustics. Objective measurements and subjective evaluation of parameters of the sound field. Sound recording and reproduction. Characteristics of speech, musical, and ambiental sounds. Sound applications in the industry and medicine.				
<b>Practical teaching (exercises, OFE, study and research work)</b>				
Problem solving in computational exercises (Sound transmission and sound sources. Analogies. Electro-acoustical transducers. Room acoustics. Psychological acoustics. Software tools for sound processing (Sound Forge, Adobe Audition, WaveLab). Computer simulations (Design of electro-acoustical transducers. Room acoustics). Practical lab and studio exercises (Characteristics of electro-acoustical transducers (speakers, cross-overs and headphones). Room impulse response. Objective measurements and subjective evaluation of parameters of the sound field. Characteristics of speech and music. Sound recording and reproduction).				
<b>Textbooks/references</b>				
1 J. Blauert: Communication acoustics, Springer, Berlin, 2005.				
2 F. A. Everest, K. C. Pohlmann: Master Handbook of Acoustics, 5th ed., McGraw Hill, New York, USA, 2009.				
3 T. D. Rossing: Springer handbook of acoustics, Springer, New York, 2007.				
4 J. Blauert, N. Xiang: Acoustics for engineers - Troy lectures, 2nd edition, Springer, Berlin, 2009.				
5 G. Ballou: Handbook for sound engineers, 4th edition, Elsevier, Focal Press, Burlington, 2008.				
<b>Number of classes of active education per week during semester/trimester/year</b>				
<b>Lectures</b>	<b>Exercises</b>	<b>OFE</b>	<b>Study and research work</b>	<b>Other classes</b>
2	2	1	0	0
<b>Teaching methods</b>				
Lectures; Computational exercises; Laboratory sessions; Studio exercises; Consultations.				
<b>Grade (maximum number of points 100)</b>				
<b>Pre-exam duties</b>		<b>Points</b>	<b>Final exam</b>	
<b>Activity during lectures</b>		5	<b>Written exam</b>	
<b>Exercises</b>		20	<b>Oral exam</b>	
<b>Colloquia</b>		25		
<b>Projects</b>				