Specification for the book of courses

Study program	Communications and Information Technologies		
Module	Communications and Information Processing		
Type and level of studies	Master studies		
The name of the course	Speech synthesis and recognition		
Lecturer (for lectures)	Ćirić G. Dejan, Perić H. Zoran, Nikolić R. Jelena		
Lecturer/associate (for exercises)	Eferica M. Predrag		
Lecturer/associate (for OFE)			
Number of ECTS	4	**Course status (obligatory/elective)**	Elective
Prerequisites			
Course objectives	Acquiring theoretical knowledge within the field of speech synthesis, speech and speaker recognition. Student qualifications for application of acquired knowledge in solving real-life issues in the mentioned fields. Mastering skills for usage of models, algorithms and software tools in speech synthesis and speech/speaker recognition.		
Course outcomes	Theoretical and practical knowledge in speech communications and speech technology based on speech synthesis (e.g., application of speech automated devices), that is, speech and speaker recognition (e.g., man-to-machine communications and speech commands related applications).		
Course outline			
Theoretical teaching	Chronology of development of speech synthesis from text. Importance and applications of speech synthesis. Advantages of man-machine speech communications. Applications of speech technologies in smart houses. Technologies based on language. Prosodic features of speech. Generating speech basis for speech/speaker recognition and synthesis. Basic system structure for automated speech synthesis. Speech synthesis from text (linguistic processing of text, synthesis). Speech synthesis in time domain. Parametric speech synthesis. Rule-based speech synthesis. Speech synthesis by connecting speech segments. Quality estimation of synthesized speech. Applications of speech synthesis. Speech automated devices. Automated speech and speaker recognition. Acoustical, lexical, phonetical and linguistical models. Systems for automated speech recognition. Algorithms for identification and verification of a speaker. Application of neural networks for speaker recognition. Emotion recognition in speech signals. Development directions in speech technologies.		
Practical teaching (exercises, OFE, study and research	In computational and practical exercises, students will work on algorithms and software (solutions) tools for speech synthesis and speech/speaker recognition. Within practical exercises, students will work on projects whose topics are covered by the course themes. Practical teaching is related to applications of available systems (platforms) for speech synthesis and speech/speaker recognition.		
Textbooks/references			
1	J. Benesty, M. M. Sondhi, Y. Huang: Springer handbook of speech processing, Springer, Berlin, 2008.		
2	G. Fant: Speech acoustics and phonetics, Kluwer Academic Publishers, Dordrecht, Netherlands, 2004.		
3	I. McLoughlin: Applied speech and audio processing with Matlab examples, Cambridge University Press, Cambridge, 2009.		
4	D. Yu, L. Deng: Automatic speech recognition: A deep learning approach, Springer, London, 2015.		
5	J. Holmes, W. Holmes: Speech synthesis and recognition, 2nd edition, Taylor and Fransis, Londond, 2001.		

Number of classes of active education per week during semester/trimester/year				
Lectures	**Exercises**	**OFE**	**Study and research work**	**Other classes**
2	1	0	0	0
Teaching methods	Lectures; Computational exercises; Laboratory sessions; 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**	35
Colloquia			
Projects	30		