



## Subject card

Subject name and code	Video and Audio Perception, PG_00048320						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Multimedia Systems -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Bożena Kostek					
	Teachers	prof. dr hab. inż. Bożena Kostek dr hab. inż. Piotr Szczuko					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
E-learning hours included: 0.0							
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study		SUM
	Number of study hours	30	4.0		16.0		50
Subject objectives	The aim of the course is to familiarize students with the issues underlying the perception of sound and image, as well as methods of hearing and sight.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_K02	The student knows the principles of conducting audiometric, behavioral, optometric tests.			[SK3] Assessment of ability to organize work [SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills		
	[K7_W02] Knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study	The student knows the principles of conducting auditory correlation and stereoscopic vision tests. Student knows the basics of digital prostheses and fitting processes. Student knows the basics of cochlear implants as well as eye implants.			[SW1] Assessment of factual knowledge		
[K7_W08] Knows and understands, to an increased extent, the fundamental dilemmas of modern civilisation, the main development trends of scientific disciplines relevant to the field of education.	The student knows the basics of sound and vision perception and anatomy and physiology of ear and eye.			[SW1] Assessment of factual knowledge			

Subject contents	<p><b>Lecture</b></p> <p>1. Introduction. References. 2. Neurons. Cell Biology and Properties. 3. Synapses. Cell Electrophysiology, Action Potential. 4. Optic and Auditory Nerves 5. Auditory Pathway. Visual Pathway. 6. Anatomy and Physiology of Ear 7. Outer Ear - Function. Middle Ear - Function. Middle Ear - Properties 8. Internal Ear - Function. Internal Ear - Properties 9. Corti System 10. Hearing Process Theories. Equal Loudness Contours 11. Loudness Perception. Pitch Perception 12. Just Noticeable Difference in Frequency. Pitch of Complex Tones 13. Masking Critical Bands 14. Audiometry Types and Classification. Pure-Tone Audiometry. 15. Audiometric Tests. High-Frequency Audiometry . 16. Impedance Audiometry (Tympanometry). Objective Audiometry (Auditory BrainStem Response ABR) 17. Evoked Otoacoustic Emissions. Behavioral Audiometry 18. Subjective Tones. Beats. Combination Tones, Sum and Difference Sounds. 19. Sound Localization 20. Sound Localization Theories. Binaural Effects 21. Electronic Hearing Aids. Hearing Aids - Characteristics 22. Modeling of Hearing Aids. Simulation of Hearing Aid 23. Digital Hearing Aids. Cochlear Implants 24. Cochlear Implants Coding Strategies. Hearing Aid Fitting Process 25. Anatomy and Physiology of the Eye. Photochemistry of Vision 26. Color Vision. Perception of Motion 27. Perception of Visual Stimuli. Visual Dysfunctions 28. Optometry. Stereo Vision 29. Electronic Eye Prostheses 30. Animal Hearing and Seeing 31. Summary 32. Final Exam</p>			
Prerequisites and co-requisites				
Assessment methods and criteria	Subject passing criteria		Passing threshold	Percentage of the final grade
	Written exam		50.0%	50.0%
	Midterm colloquium		50.0%	50.0%
Recommended reading	Basic literature		<p>Gelfand S.A., Essentials of Audiology, Theme, New York 1998. R. Gawroński, Bionika. System nerwowy jako układ sterowania, PWN, Warszawa, 1970. Chalupa L. M., Werner J. S., The Visual neurosciences, Chapter 87 Stereopsis (Schor C. M.), 1300-1312, The MIT Press, Cambridge, MA, 2004. Hojan E., Akustyka aparatów słuchowych, Wyd. Naukowe Uniwersytetu im. A. Mickiewicza, Poznań 1997. J. Renowski, Laboratorium akustyki psychofizjologicznej, skrypt, Wrocław, 1972. T. Bystrzanowska, Audiologia kliniczna, PZWL, Warszawa, 1973. Chalupa L. M., Werner J. S., The Visual Neurosciences, Chapter 86 The perceptual organization of depth (Fleming R., Anderson B. L), 1284-1299, The MIT Press, Cambridge, MA, 2004. J. Blauert, Raumliches Horen, Hirzel, Stuttgart, 1974. A. Czyżewski, B. Kostek, H. Skarżyński, Technika komputerowa w audiologii, foniatrii i logopedii, Akademicka Oficyna Wydawnicza, 2002. E. Walsh, Fizjologia układu nerwowego, PZWL, Warszawa, 1966. J.V. Tobias, Foundations of Modern Auditory Theory, Academic Press, New York, 1972. G.V. Bekesy, Experiments in Hearing, Mc Grow-Hill, New York, 1960.</p>	
	Supplementary literature		No requirements	
	eResources addresses		<p>Adresy na platformie eNauczanie:</p> <p>Percepcja dźwięku i obrazu - 2023_2024 - Moodle ID: 17282  <a href="https://enauzanie.pg.edu.pl/moodle/course/view.php?id=17282">https://enauzanie.pg.edu.pl/moodle/course/view.php?id=17282</a></p>	
Example issues/ example questions/ tasks being completed	according to the lecture topics			
Work placement	Not applicable			