



Subject card

Subject name and code	Computer Analysis of Music, PG_00064069						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	February 2025	Academic year of realisation of subject			2025/2026		
Education level	second-cycle studies	Subject group			Optional subject group Specialty 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	2	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
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					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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		2.0		18.0	50
Subject objectives	The aim of the course is to familiarize students with the issues underlying musical signal and musical data processing.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, making assessment and critical analysis of the prepared software as well as a synthesis and creative interpretation of information presented with it		Student can use the knowledge in the field of musical acoustics in music informatics. The student is able to use musical notation, analysis and parameterization of musical signals in the music information retrieval.		[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information		
	[K7_W03] knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum		Student has got knowledge in the fields of musical acoustics and music informatics. Student has got knowledge in characteristics of musical instruments. Student has got knowledge in musical notation, analysis and parametrization of musical signals.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		

Subject contents	<p>Lecture</p> <p>1. Introduction. References 2. Musical Systems. Equal Tempered Scale 3. Musical Scales. Musical Notation 4. Musical Instruments Families and Types. Musical Instruments Characteristics. Musical Instruments Sound Generation 5. Pipe Organ Characteristics. Modeling of Pipe Organ Control System 6. Signal Processing Analysis of Musical Sounds. Sonograph Analysis 7. Time-Frequency Domain Analysis of Musical Instrument Sounds. Pitch Detection Algorithms 8. Musical Instrument Sound Parametrization. 9. Time Domain-Based Parameters. Frequency Domain-Based Parameters. Time-Frequency Domain-Based Parameters 10. MPEG-7 Standard Descriptors 11. Analysis of Singing. Singing Voice - Types 12. Vocal Tone Extraction. Formant Analysis of Singing 13. Musical Sound Separation. Blind Signal Separation Algorithms 14. Music Information Retrieval systems, Query-by Humming (QBH) and Query-by-Example (QBE) systems, multimedia music databases 15. Lecture summary 16. Exam</p> <p>Laboratory</p> <p>1. Introduction, organizatory meeting. 2. Signal analysis of typical aerophones, chordophones and idiophones. 3. Wavelet analysis of musical instrument sounds. 4. Parameterization of musical instrument sounds in the Matlab system. 5. Fundamental frequency detection in the Matlab system. 6. Sound timbre recognition of musical instruments.</p> <p>7. Parametrical analysis of the singing voice. 8. Laboratory evaluation and discussion</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 913 794 943">Subject passing criteria</th> <th data-bbox="799 913 1137 943">Passing threshold</th> <th data-bbox="1142 913 1481 943">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 949 794 978">Midterm colloquium</td> <td data-bbox="799 949 1137 978">50.0%</td> <td data-bbox="1142 949 1481 978">50.0%</td> </tr> <tr> <td data-bbox="456 985 794 1014">Practical exercise</td> <td data-bbox="799 985 1137 1014">50.0%</td> <td data-bbox="1142 985 1481 1014">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Midterm colloquium	50.0%	50.0%	Practical exercise	50.0%	50.0%
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Example issues/ example questions/ tasks being completed												
Work placement	Not applicable											

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