



## Subject card

Subject name and code	Electronic Musical Instruments, PG_00048141						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2026	Academic year of realisation of subject				2029/2030	
Education level	first-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	4	Language of instruction				Polish	
Semester of study	7	ECTS credits				2.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Multimedia Systems -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Grzegorz Szwoch					
	Teachers	dr hab. inż. Grzegorz Szwoch					
Lesson types	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	This course teaches students about hardware and software electronic musical instruments. Various sound synthesis algorithms, used in commercial instruments, as well as sampling, are presented. Additional, related topics presented during the course are: MIDI standard, computer music tools and sound effects.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U07] can apply methods of process and function support, specific to the field of study	The student knows how to modify a synthetic sound by choosing the right synthesis algorithm and by tuning its parameters.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	The student is able to perform a digital sound synthesis process based on the learned synthesis algorithms. The student can build a virtual instrument based on sampling.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
[K6_W03] knows and understands, to an advanced 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	The student knows how the algorithms for sound synthesis and sampling work.			[SW1] Assessment of factual knowledge			

Subject contents	Course content – lecture 1. History of electronic musical instruments, basic ideas 2. Properties of musical signals, analysis and additive synthesis 3. Subtractive synthesis - modular analog synthesis 4. Hybrid wavetable synthesis, digital signal generators 5. Digital synthesis by frequency modulation (FM) and phase distortion (PD) 6. Sampling, samples and samplers 7. Physical instrument modelling, waveguide synthesis. 8. MIDI in electronic musical instruments 9. Computer music software 10. Sound effects in electronic musical instruments			
Prerequisites and co-requisites				
Assessment methods and criteria	Subject passing criteria		Passing threshold	Percentage of the final grade
	Practical exercise		50.0%	50.0%
	Colloquium (final)		50.0%	50.0%
Recommended reading	Basic literature	Lecture presentations and other supplementary materials: <a href="http://sound.eti.pg.gda.pl/student/materialy.html">http://sound.eti.pg.gda.pl/student/materialy.html</a>  Instructions for laboratory classes: <a href="http://sound.eti.pg.gda.pl/student/laboratoria.html">http://sound.eti.pg.gda.pl/student/laboratoria.html</a>		
	Supplementary literature	Synteza. Poradnik dla każdego. Wydanie specjalne magazynu Estrada i Studio, AVT 2013.  Peter Kirn: Real World Digital Audio. Edycja polska. Helion 2007, ISBN: 83-246-0448-0  M. Russ: Sound Synthesis and Sampling. Focal Press, Oxford 1996.  Piotr Kołodziej: Komputerowe studio muzyczne i nie tylko. Przewodnik. Helion 2007, ISBN: 978-83-246-0727-3		
	eResources addresses			
Example issues/ example questions/ tasks being completed				
Practical activities within the subject	Not applicable			

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