



Subject card

Subject name and code	Electronic Medical Equipment, PG_00068093						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	October 2026	Academic year of realisation of subject				2028/2029	
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	3	Language of instruction				Polish	
Semester of study	6	ECTS credits				3.0	
Learning profile	general academic profile	Assessment form				exam	
Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Artur Poliński					
	Teachers	dr inż. Artur Poliński					
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	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	45		4.0		26.0	75
Subject objectives	The aim of the course is to familiarize students with selected types and requirements for electronic medical equipment.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W10] knows and understands, to an advanced extent, the parameters, functions, and methods of analysis, design, and optimization of electronic circuits and systems, the definitions of error and measurement uncertainty, measurement methods, including time, frequency, and phase measurements, the properties of converters, and methods of digital signal processing, as well as the basic processes occurring in the life cycle of technical devices, objects, and systems, and methods of supporting processes and functions, specific to the field of study	The student acquires knowledge about the parameters of selected medical equipment	[SW1] Assessment of factual knowledge
	[K6_W02] knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study	The student acquires knowledge on measurement methods needed to understand the principle of medical devices operation	[SW1] Assessment of factual knowledge
	[K6_W51] Knows and understands, to an advanced extent, selected aspects of biomedical diagnostics and human anatomy and physiology, constituting general knowledge related to the field of study	The student acquires knowledge about selected issues related to medical diagnostics	[SW1] Assessment of factual knowledge
	[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 acquires knowledge of the basic requirements for medical devices	[SW1] Assessment of factual knowledge
Subject contents	<p>Course content – lecture</p> <p>1) ECG - device construction and parameters, 2) Cardiac monitor - device construction and parameters, 3) EMG - device construction and parameters 4) Electroimpedance measurements rheography and IKG - device construction and parameters 5) PPG - device construction and parameters 6) OCT - device construction and parameters 7) X-ray - device construction and parameters 8) Tomography: CT, MRI, PET, SPECT - device construction and parameters 9) USG - device construction and parameters 10) Doppler - device construction and parameters 11) Endoscopic equipment - device construction and parameters 12) Thermography - device construction and parameters 13) Surgical instruments - device construction and parameters 14) DaVinci - device construction and parameters</p> <p>Laboratory</p> <ol style="list-style-type: none"> 1. Examination of the properties of EMG measurement systems, 2. Examination of the properties of ECG measurement systems, 3. Examination of the properties of impedance measurement systems, 4. Examination of the properties of PPG measurement systems, 5. Examination of the properties of Doppler measurement systems in ultrasound 		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory	50.0%	50.0%
	lecture	50.0%	50.0%

Recommended reading	Basic literature	REGULATION (EU) 2017/745 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 April 2017, M. Nałęcz [red.] Biocybernetyka i Inżynieria Biomedyczna, t.2. Biopomiary, Exit, Warszawa, 2001 J. D. Bronzino [ed.], The Biomedical Engineering Handbook, CRC, 2006, Augustyniak, Piotr. <i>Elektroniczna aparatura medyczna</i> . Wydawnictwa AGH, 2015.
	Supplementary literature	Enderle [red], Introduction to biomedical engineering, Elsevier, 2005, Pawlicki G., Podstawy Inżynierii Medycznej, OWPW, Warszawa, 1997
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Practical activities within the subject	Not applicable	

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