



Subject card

Subject name and code	Basics of Medical Devices Design , PG_00068225									
Field of study	Biomedical Engineering									
Date of commencement of studies	October 2025	Academic year of realisation of subject		2027/2028						
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		4.0					
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. Adam Bujnowski							
	Teachers		dr inż. Adam Bujnowski							
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM			
	Number of study hours	30.0	0.0	15.0	15.0	0.0	60			
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		SUM				
	Number of study hours	60		6.0		34.0				
100										
Subject objectives	The aim of the course is to introduce students with basic problems inherit to designing electronic medical equipment									

Learning outcomes	Course outcome	Subject outcome	Method of verification												
	[K6_W01] knows and understands, to an advanced extent, mathematics necessary to formulate and solve simple issues related to the field of study	The student can choose the appropriate calculation method, including numerical one, to obtain the expected effect.	[SW3] Assessment of knowledge contained in written work and projects												
	[K6_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	The student is able to choose the right solution for a specific technical problem.	[SU4] Assessment of ability to use methods and tools												
	[K6_U10] can individually plan their own lifelong education, also by means of advanced information and communication technologies (ICT), and communicate with people from their environment, firmly justify their point of view, participate in debates, present, assess and discuss different opinions and points of view, as well as use specialist terminology related to the field of study in communication	Student performs designing tasks both individually and in cooperation with other team members according to schedule prepared and can present effects of work	[SK2] Assessment of progress of work [SK1] Assessment of group work skills [SK3] Assessment of ability to organize work												
	[K6_K01] is ready to cultivate and disseminate models of proper behaviour in and outside the work environment; make independent decisions; critically evaluate actions of their own, teams they lead and organisations they are part of; take responsibility for results of these actions; responsibly perform professional roles, including:n - observing rules of professional ethics and require it from others,n - care for the achievements and traditions of the professionn	The student understands the consequences of incorrect solutions in the construction of medical equipment	[SK5] Assessment of ability to solve problems that arise in practice												
Subject contents	<p>Course content – lecture</p> <p>1 Computer aided design, CAD, CAM, 2 Types of medical equipment, 3 Safety Aspects, 4. Safety Classes, 5 Monitoring and measurement, 6 Requirements definition (end user, manufacturer, Functional, exploitation), 7. Elements of reliability of electronic devices, 8 Product definition, 9 Determinants design (environmental, production ....), 10. life cycle of the project, 11. Ecological Design, 12 Construction of a typical medical device, 13 Ways implementation of the application part, 14 Ways implementation signal barriers, 15 invasive and non-invasive measurements, 16 power, and security aspects, 17 Power Management, 18 Standards and requirements 19 EM Environment, 20. Disturbance characteristics, 21 Compatibility EM, 22 Compatibility Biological 23 Standards, 24 Software, 25 Real-time system, 26 Self-diagnosis, 27 software diagnostic methods, 28 IEEE 829-1998, 29. methods of equipment aging, 30 The certification</p>														
Prerequisites and co-requisites	Electronic circuit, Digital circuits, Microcontrollers														
Assessment methods and criteria	<table border="1"> <thead> <tr> <th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr> </thead> <tbody> <tr> <td>Laboratory</td><td>60.0%</td><td>30.0%</td></tr> <tr> <td>Lecture</td><td>60.0%</td><td>30.0%</td></tr> <tr> <td>Project</td><td>60.0%</td><td>40.0%</td></tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Laboratory	60.0%	30.0%	Lecture	60.0%	30.0%	Project	60.0%	40.0%
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Recommended reading	<p>Basic literature</p> <p>Kisiel R., Bajera A., Podstawy konstrukcji urządzeń elektronicznych</p> <p>Norma PN-EN 60601</p> <p>Supplementary literature</p> <p>Biomedical Circuits and Systems, IEEE Transactions on</p> <p>eResources addresses</p>														
Example issues/ example questions/ tasks being completed	<p>Design and develop an EOG measurement unit.</p> <p>Describe construction of the ECG (EMG/ CT/ RTG etc..)</p>														

Practical activites within  
the subject

Not applicable

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