GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Power supply systems in biomedical systems, PG_00053329		
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering		
Date of commencement of studies	February 2022	Academic year of realisation of subject	2021/2022
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 Biomedical Engineering -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Adam Bujnowski	
	Teachers	mgr inż. Kamil Osiński dr inż. Adam Bujnowski dr hab. inż. Sebastian Molin	

Lesson type and method 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						
	Układy zasilania w systemach biomedycznych - Moodle ID: 22380 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22380						

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	3.0	17.0	50

Subject objectives	The subject goal is to present modern power system for modern electronic devices. Subject will cover energy generation , transmission and adaptation to suit modern devices demands.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 analyzes and describes topology of moder power unit Student knows modern methods of energy generation	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[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	Student describes parameters of power source on the basis of measurements ans schematic analysis Student identifies and eliminates power loss sources in power supply designs	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K7_U03] can design, according to required specifications, and make a complex 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	Student designs power supply unit on the basis of given parameters Student adequately matches components of power supply unit Student designs portable power source depending on target application	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment

Subject contents

Basic terms , requirements for power sources

Electrical energy distribution

AC/DC conversion, passive and synchronous rectifiers

Linear stabilizers - topologies and configurations

DC/DC converters - topologies and parameters

Power supply topologies, AC power generation

Chemical power sources - primary and secondary cells

Parameters of portable power sources in biomedical applications

Biological power sources and energy harvesting

Modern wearable power sources

Prerequisites and co-requisites

Circuit theory

Basic elecrtronic components

Spice like simulators - basic knowledge

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Final test	50.0%	50.0%
LAb realization	50.0%	50.0%

Recommended reading	Basic literature	DC Power Supplies: A Technicians guide by JJ Carr
	Supplementary literature	Fang Luo, Hong Ye, Renewable Energy Systems , CRC Press
	eResources addresses	
Example issues/ example questions/ tasks being completed	Given schematic of power supply - describe basic parameters - output voltage, efficiency Describe power loss in given DC/DC topology circuit Match basic parameters of Diode/ transistor in given DC/DC design Analyze lifespan of battery for given application	
Work placement	Not applicable	