



Subject card

Subject name and code	Power supply systems in biomedical systems, PG_00064438						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	February 2025	Academic year of realisation of subject			2024/2025		
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	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	dr inż. Adam Bujnowski dr hab. inż. Sebastian Molin mgr inż. Kamil Osiński					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	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		3.0		12.0	60
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_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
	[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 and 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_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 modern power unit Student knows modern methods of energy generation	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge	
Subject contents	<p>Basic terms, requirements for power sources</p> <p>Electrical energy distribution</p> <p>AC/DC conversion, passive and synchronous rectifiers</p> <p>Linear stabilizers - topologies and configurations</p> <p>DC/DC converters - topologies and parameters</p> <p>Power supply topologies, AC power generation</p> <p>Chemical power sources - primary and secondary cells</p> <p>Parameters of portable power sources in biomedical applications</p> <p>Biological power sources and energy harvesting</p> <p>Modern wearable power sources</p>		
Prerequisites and co-requisites	<p>Circuit theory</p> <p>Basic electronic components</p> <p>Spice like simulators - basic knowledge</p>		
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	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed	<p>Given schematic of power supply - describe basic parameters - output voltage, efficiency</p> <p>Describe power loss in given DC/DC topology circuit</p> <p>Match basic parameters of Diode/ transistor in given DC/DC design</p> <p>Analyze lifespan of battery for given application</p>	
Work placement	Not applicable	

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