

关。GDAŃSK UNIVERSITY 创 OF TECHNOLOGY

Subject card

Subject name and code	Introduction to Power Electronics, PG_00042048								
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering								
Date of commencement of studies	October 2020		Academic year of realisation of subject			2021/2022			
Education level	first-cycle studies		Subject group			Obligatory subject group in the field of study			
						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	2		Language of instruction			Polish			
Semester of study	4		ECTS credits			3.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department of Power	partment of Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering						Engineering	
Name and surname of lecturer (lecturers)	Subject supervisor dr hab. inż. Piotr Musznicki								
	Teachers		dr hab. inż. Piotr Musznicki						
	dr inż. Krzysztof Iwan								
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
of instruction	Number of study hours	30.0	0.0	15.0	0.0		0.0	45	
	E-learning hours included: 0.0								
	Adresy na platformie eNauczanie: Podstawy Energoelektroniki [2021/22] - Moodle ID: 22944 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22944								
Learning activity and number of study hours	Learning activity	Participation in classes includ	n didactic led in study	didactic Participation in d in study consultation hours		Self-study		SUM	
	Number of study hours	45		5.0		25.0		75	
Subject objectives	The aim of the course is to familiarize students with the basic of power electronics converters including their construction, methods of control, application and problems of their. Classical topologies are presented and newest selected issues, especially for the control of electrical machines and for renewable energy sources.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	К6_К02		Students working in groups are able to verify the laboratory exercise program, distribute tasks, and write documentation.			[SK1] Assessment of group work skills			
	K6_W03		Students are able to choose the power electronics inverter linked with electro-mechanical machine or system.			[SW1] Assessment of factual knowledge			
	κο_VVU5		presents importance of modern Power Electronics of modern Power Electronics converters in engineering practice. It acquaint students with basic Power Electronics elements and devises and problems which can appears during exploitation. Students learn the most often used devices topology, their application and control method and understand phenomena and processes connected with operation of power switches and converters.			knowledge			

Subject contents	Lecture: 1. The role of Power Electronics. Basic elements.2/3 Rectifiers 4/5 DC/DC low power converters 6/7 DC/AC Inverters 8. Basic and method of modulation used in PE. 9 AC/AC converters 10. Resonant converters 11 Control systems. 12/13 Energetic aspects in PE, fast switches, quality of conversion energy, ups and active filters 14/16 Selected problems in PE converters, electromagnetic compatibility, signal distortion, secure circuit. Laboratory: 1. 1-phase diode rectifier 2.Power transistors IGBT 3. Thyristors 4. 1-phase voltage inverter 5.AC/AC converter 6. Transformerless DC/DC converters						
Prerequisites and co-requisites	Basic knowledge of theoretical lows and analysis method in electrical circuit.						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Laboratory	60.0%	50.0%				
	Midterm colloquium	50.0%	30.0%				
	Endterm colloquium	60.0%	20.0%				
Recommended reading	Basic literature	1.Nowak M., Barlik R.: Poradnik inżyniera energoelektronika. Warszawa: WNT 1998.					
		2.Mohan N., Undeland T.M., Robbins W.P., Power Electronics: Converters, Applications and Design, 3rd Edition, John Willey & Sons, Inc, 2003.					
		3.Materiały pomocnicze do Laboratorium w postaci autorskich instrukcji udostępnianych przez Internet					
	Supplementary literature	1.Tunia H., Smirnow A., Nowak M., Barlik R.: Układy Energoelektroniczne. Warszawa: WNT 1998.					
		2.Dmowski A: Energoelektroniczne układy zasilania prądem stałym w telekomunikacji i energetyce. Warszawa: WNT 1998.					
		3.Kaźmierkowski M.P., Matysik J.T., Wprowadzenie do elektroniki i energoelektroniki, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2005.					
	eResources addresses	Podstawy Energoelektroniki [2021/22] - Moodle ID: 22944 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22944					
Example issues/ example questions/ tasks being completed							
Work placement	Not applicable						