GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Modern Sources of Electric Energy, PG_00038358						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2022		Academic year of realisation of subject	2022/2023			
Education level	second-cycle studies		Subject group				
Mode of study	Part-time studies		Mode of delivery	at the university			
Year of study	1		Language of instruction	Polish			
Semester of study	2		ECTS credits	1.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marcin Jaskólski					
	Teachers	dr inż. Alicja Lenarczyk					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	0.0	0.0	0.0	10
	E-learning hours included: 0.0						
	NOWOCZESNE ŹRÓDŁA ENERGII ELEKTRYCZNEJ [Niestacjonarne][2022/23] - Moodle ID: 28551 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28551						
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	10		2.0		13.0	25
Subject objectives	The purpose of this course is to familiarize students with modern energy sources.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_K03		
K7_U09	They acquire skills regarding the principles of balancing energy objects with examples: conventional steam thermal power plants, especially supercritical steam parameters and equipped with hybrid systems with gasification of coal, with fluidized boilers, as well as with gas-steam blocks. Became acquainted with nuclear power plants with the latest generation of reactors.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
K7_K02	The student achieves knowledge about the role and importance of new energy sources for the national power system, about the construction and operating rules of various types of sources, and in particular those expected to be implemented in Poland in the near future.	[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work
K7_U11		
K7_W12		
K7_W08	They learn about small-scale hybrid systems with small biomass-fired power plants, wind farms, solar systems and systems equipped with fuel cells. They acquire the knowledge of small associated systems equipped with diesel engines as well as small gas turbines. They also get to know solutions of power plants using other types of unconventional energy sources (geothermal energy, magnetohydrodynamic energy, sea and ocean energy).	[SW1] Assessment of factual knowledge
K7_W03		

Subject contents

Different kinds of the sources especially the planed energy sources in Poland. Balancing principles of energy objects on the examples of: conventional steam power plants, especially the ultra supercritical plants and also these which are equiped with the hybrid systems with coal gasification and the boilers with fluidised bed combustion chamber and also with combined gas and steam blocks. Nuclear power stations with reactors of the latest generation. Some kinds of large and small combined heat and power energy sources. Calculations of technical and working coeffitients of above-mentioned sources. Importance of environmental protection problems.

Prerequisites and co-requisites

Good knowledge of elements of physics (basic lows, physical quantities and their units and measures, mechanics, electrical engineering, thermodinamics, heat transfer). Knowledge of electrical energy generation technologies: energy conversions, efficiency of single conversion, efficiency of conversion cycle and thermodinamic cycle efficiency. Basic knowledge of mathematics: algebra, geometry, trigonometry, differential and integral calculus.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lecture test	60.0%	100.0%

Recommended reading

Basic literature	1. Kubowski J.: Nowoczesne elektrownie jądrowe. Warszawa: WNT 2010. 2. Pawlik M., Strzelczyk F.: Elektrownie. Warszawa: WNT 2009. 3. Chmielniak T.: Technologie energetyczne. Warszawa: WNT 2008.
Supplementary literature	1. Praca zbiorowa: Poradnik inżyniera elektryka. Tom III. Warszawa: WNT 2007. 2. Cieśliński J., Mikielewicz J.: Niekonwencjonalne źródła energii. Gdańsk: Wydawnictwo Politechniki Gdańskiej 1996. 3. Szargut J., Ziębik A.: Podstawy energetyki cieplnej. Warszawa: Wydawnictwo Naukowe PWN 2000. 4. Lewandowski W.: Proekologiczne odnawialne źródła energii. Warszawa: WNT 2007.
eResources addresses	

Example issues/ example questions/ tasks being completed

1. Balancing principles of energy objects.

2. Describe last generation of nuclear power plants.

3. Describe importance of environmental protection problems.

Work placement	Not applicable