GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00048770		
Field of study	Green Technologies		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Energy Conversion and Storage -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Anna Kuczyńska-Łażewska	
	Teachers	dr inż. Anna Kuczyńska-Łażewska	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	30.0	0.0	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	2.0	28.0	75

Subject objectives

The student becomes acquainted with the subject of obtaining energy from various sources - from conventional to renewable. The course explains the physical and chemical basis related to obtaining energy, the efficiency of its conversion and storage, and the calorific value of fuels. In addition, environmental aspects are discussed in relation to the different ways of producing electricity and heat.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U05] can formulate and solve engineering tasks analytical methods, simulation as well as experimental, able to apply knowledge of basic physics and mathematics to analyze the results of experiments, is able to analyze and assess existing technical solutions	is able to use the knowledge gained during the lecture (calculation formulas) in order to carry out laboratory exercises and vice versa	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
[K6_W01] has a basic knowledge from some branches of mathematics and physics useful for formulating and solving simple problems in the field of environmental technologies and modern analytical methods	knows the formulas and equations needed to calculate the efficiency and performance of various energy sources	[SW1] Assessment of factual knowledge
[K6_K02] is aware of the social role of a technical college graduate, take the reflections on the ethical, scientific and social aspects of the work performed, understands the need to promote, formulating and providing the public with information and opinions concerning the activities of the profession of engineer.	is aware of its contribution to shaping the awareness of the energy economy and its importance for the country and the world	[SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness

Subject contents	Global energy market. Generating energy from conventional sources: - coal, oil and natural gas - combustion reactions, thermodynamic cycles in combustion and steam engines - basics of nuclear energy - nuclear fission reaction Obtaining energy from renewable sources: - photovoltaic cells and modules - photovoltaic effect, Ohm's law and two Kirchhoff's laws - heat pumps - thermodynamic cycles - wind energy - the phenomenon of lifting force, the principle of operation of wind turbines - hydropower - conversion of potential energy into kinetic energy, tides, currents - biofuels - biofuel production reactions
Prerequisites and co-requisites	Prerequisites: basic knowledge of mathematics, physics, chemistry, computer science. Completion of the course takes place in accordance with the rules that were announced to the students at the beginning of the semester.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory	60.0%	50.0%
Test	60.0%	50.0%

Recommended reading

Basic literature	1. Bogdanienko J. Odnawialne źródła energii. W-wa PWN 1989 2. Lewandowski W.M. Proekologiczne źródła energii odnawialnej. Wwa WNT 2001 3. Boyle G. Renewable Energy. 2nd ed. New York Oxford University Press Inc. 2004 4. E.Klugmann-Radziemska. Fundamentals of Energy Generation. Wyd. P.G. Gdańsk 200 5. E.Klugmann-Radziemska. Odnawialne Źródła Energii -Przykłady obliczeniowe. Wyd. P.G. Gdańsk 2009
Supplementary literature	1. E.Klugmann-Radziemska E.Klugmann, Systemy słonecznego ogrzewania i zasilania elektrycznego budynków Wydawnictwo Ekonomia i Środowisko, 2002 2. E.Klugmann, E.Klugmann-Radziemska, Ogniwa i moduły fotowoltaiczne oraz inne niekonwencjonalne źródła energii Wydawnictwo Ekonomia i Środowisko, 2005
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable