GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Eco-energy, PG_00035156						
Field of study	Engineering and Technologies of Energy Carriers						
Date of commencement of studies	February 2024		Academic year of realisation of subject	2024/2025			
Education level	second-cycle studies		Subject group	Obligatory subject group in the field of study Subject group related to practical vocational preparation			
Mode of study	Full-time studies		Mode of delivery	at the university			
Year of study	1		Language of instruction	Polish			
Semester of study	2		ECTS credits	5.0			
Learning profile	practical profile		Assessment form	exam			
Conducting unit	Department of Energy Conversion and Storage -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Ewa Klugmann-Radziemska				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	15.0	0.0	75
	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	75		5.0	45.0		125
Subject objectives	To familiarize students with the issues of energy generation in relation to the protection of the natural environment						

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_W06	the student has structured and theoretically founded knowledge covering key issues and selected issues in the field of advanced detailed knowledge in the field of engineering and technology of energy carriers	[SW1] Assessment of factual knowledge
K7_W02	student knows and understands selected issues in the field of advanced detailed knowledge concerning the production, conversion and modification of performance and operation and transmission of energy and its carriers	[SW1] Assessment of factual knowledge
K7_U04	student is able to assess the usefulness and the possibility of using new achievements when formulating and solving complex engineering tasks, including atypical tasks as well as simple research problems	[SU2] Assessment of ability to analyse information
K7_W05	student knows and understands the basic processes taking place in the apparatus and its components used for the production and conversion of electricity, knows and understands in an in-depth degree - selected issues of generating energy from conventional and renewable sources as well as their transmission and storage	[SW2] Assessment of knowledge contained in presentation
K7_U01	the student is able to plan and carry out experiments, interpret the results obtained and draw conclusions	[SU1] Assessment of task fulfilment

Subject contents

1. Conventional energy. Natural fuels and their resources. 2. The impact of non-renewable fuels on the natural environment. 3. Renewable energy sources - introduction. 4. Solar radiation. 5. Solar collectors. 6. Photovoltaic cells. 7. Possibilities of using solar energy in Poland and in the world. 8. Biomass and biofuels. 9.Biogaz. 10. Water therapy. 11. Wind energy. 12. Geothermal energy. 13. Heat pumps. 14. Fuel cells. 15. Storage of energy. 16. Ecological and economic aspects of the use of renewable energy sources. 17. Project of heating installation / building supply with the use of environmentally friendly energy.

Prerequisites and co-requisites

Completed courses in mathematics and physics at the level of first-cycle studies

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
egzam	60.0%	50.0%
exercises, project	70.0%	50.0%

Recommended reading

Basic literature

Ewa Klugmann-Radziemska, *Fotowoltaika w teorii i praktyce*, Warszawa-Legionowo: Wyd. BTC, 2010, s. 200: 123 rys., 39 tab. - bibliogr. 105 poz. - ISBN 978-83-60233-58-0

Lewandowski Witold, Klugmann-Radziemska Ewa, *Proekologiczne odnawialne źródła energii. Kompendium,* Wydawnictwo Naukowe PWN, 2017, s. 488, ISBN:978-83-01-19067-5

E.Klugmann-Radziemska *Odnawialne Źródła Energii - Przykłady obliczeniowe*, Wyd. Politechniki GdańskiejGdańsk 2009, 2010, s.1-100, wyd. III,IV

E.Klugmann-Radziemska, *Fundamentals of Energy Generation,* Wyd. Politechniki Gdańskiej, Gdańsk 2009, s.189

	Supplementary literature	Photovoltaic Geographical Information System (PVGIS) Regulation of the Minister of Infrastructure and Construction regarding technical conditions which should be met by buildings and their location Polish Standardization Documents Catalogs of device manufacturers
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Convert 500, 50 and 5 tons of CO2 equivalent to mass limits for refrigerant HFC-23 (GWP = 14,800). 2. Estimate what amount of energy can be obtained from PV modules in a single-family house, which has a floor area of 100 m2, roof slope in the south direction is 45o, year-round efficiency of 12% PV cells, and total energy losses of 15%. H = 1150 kWh / m2.	
Work placement	Not applicable	