



Subject card

Subject name and code	Eco-energy, PG_00066044						
Field of study	Ekoenergia						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2026/2027		
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		4.0		
Learning profile	practical profile		Assessment form		exam		
Conducting unit	Department of Energy Conversion and Storage -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Ewa Klugmann-Radziemska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	0.0	30.0	15.0	0.0	65
	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	65		10.0		25.0	100
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_U01] is integrates and interprets information from literature, databases and other sources		the student is able to plan and carry out experiments, interpret the results obtained and draw conclusions		[SU1] Ocena realizacji zadania		
	[K7_W06] defines the techniques of designing technological processes; describes the methods of selecting the right technological process; the resistance of materials to degradation, degradation mechanisms and methods of improving corrosion resistance		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] Ocena wiedzy faktograficznej		
	[K7_W02] identifies the problems of modern chemical engineering including the properties of energy carriers, lists the types of these carriers and outlines the prospects for their development		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] Ocena wiedzy faktograficznej		
	[K7_U04] prepares a critical analysis of existing technical solutions and is able to propose their improvements (improvements).		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] Ocena umiejętności analizy informacji		

Subject contents	Course content – lecture 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
	exercises, project	70.0%	50.0%
	egzam	60.0%	50.0%
Recommended reading	Basic literature	Ewa Klugmann-Radziemska, <i>Fotowoltaika w teorii i praktyce</i> , 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, <i>Proekologiczne odnawialne źródła energii. Kompendium</i> , Wydawnictwo Naukowe PWN, 2017, s. 488, ISBN:978-83-01-19067-5	
		E.Klugmann-Radziemska <i>Odnawialne Źródła Energii - Przykłady obliczeniowe</i> , Wyd. Politechniki GdańskiejGdańsk 2009, 2010, s.1-100, wyd. III,IV	
		E.Klugmann-Radziemska, <i>Fundamentals of Energy Generation</i> , 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		
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.		
Practical activites within the subject	Not applicable		

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