

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Alternative Energy Sources, PG_00065960								
Field of study	Green Technologies								
Date of commencement of studies	February 2025		Academic year of realisation of subject			2024/2025			
Education level	second-cycle studies		Subject group			Optional subject group			
Mode of study	Full-time studies		Mode of delivery			at the university			
Year of study	1		Language of instruction			Polish			
Semester of study	1		ECTS credits			2.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department Of Energy Conversion And Storage -> Faculty Of Chemistry -> Wydziały Politechniki Gdańskie						niki Gdańskiej		
Name and surname	Subject supervisor dr		dr inż. Anna Dettlaff						
of lecturer (lecturers)	Teachers								
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
of instruction	Number of study hours	15.0	0.0	0.0	15.0		0.0	30	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation ir classes includ plan	n didactic ed in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	30		5.0		15.0		50	
Subject objectives	Introducing students to the renewable energy sources								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K7_U06] conducts a critical analysis of the functioning of existing technical solutions in the field of environmental protection technology, and a preliminary economic analysis of the engineering activities undertaken		The student is able to estimate and rank the resources of the different types of energy sources available now and in the future.			[SU3] Assessment of ability to use knowledge gained from the subject			
	[K7_K03] understands non- technical aspects and effects of graduates' activities, including the impact on the environment		Students will be able to identify and characterise conventional and non-conventional energy sources, know their advantages, disadvantages and environmental impact.			[SK5] Assessment of ability to solve problems that arise in practice			
	[K7_W06] defines the principles of sustainable development, national and European conditions for environmental management, in the field of intellectual property protection and patent law		The student knows how to convert the energy of the sun, wind, water, biomass, biogas, geothermal and others into useful thermal or electrical energy.			[SW1] Assessment of factual knowledge			

Subject contents									
	Characteristics and estimation of conventional energy resources and their impact on environmental contamination.Presentation of the types, resources and possibilities of using environmentally friendly renewable energy sources, such as: hydropower (energy of water flow, energy of water level differences, wave energy, tidal energy, energy of currents); solar energy (low-temperature and high-temperature solar energy systems, active and passive systems, decentralized systems, centralized systems, solar collectors, photovoltaic cells); wind energy (lifting force, onshore and offshore wind farms); geothermal energy (geothermal energy resources, geothermal plants, heat pumps); solid, liquid and gas biofuels (energy wood, straw, biodiesel, bioethanol, biomethanol, biohydrogen, biogas, wood gas).Energy storage as a way to make renewable energy sources independent of the weather (technologies of mechanical, electrochemical, electrical, chemical and thermal energy storage, hydrogen energy, galvanic cells, fuel cells, electrochemical capacitors).								
Prerequisites and co-requisites									
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade						
and criteria	Test	60.0%	100.0%						
Recommended reading	Basic literature	 W. M. Lewandowski, E. Klugmann-Radziemska Proekologiczne odnawialne źródła energii. Kompendium, Wydawnictwo Naukowe PWN, 2017 W. M. Lewandowski, M. Ryms Biopaliwa. Proekologiczne odnawialne źródła energii, WNT, 2013 M. Budziszewska, A. Kardaś, Z. Bohdanowicz Klimatyczne ABC. Interdyscyplinarne podstawy współczesnej wiedzy o zmianie klimatu, Wydawnictwa Uniwersytetu Warszawskiego, 2021 B.K. Hodge Alternative Energy systems and applications, Wiley, 2017 E.E. Michaelides Alternative Energy Sources, Springer, 2012 B. Viswanathan Energy Sources. Fundamentals of Chemical Conversion Process and Applications, Elsevier, 2017 I. Stober, K. Bucher Geothermal Energy: From Theoretical Models to Exploration and Development Springer-Verlag Berlin Heidelberg, 2013 T. Abbasi, S.M. Tauseef, S.A. Abbasi, Biogas Energy, Springer, 2012 							
	Supplementary literature	No recommendations							
	eResources addresses	Adresy na platformie eNauczanie:							
Example issues/ example questions/ tasks being completed	What are the differences between a solar collector and a photovoltaic cell? Describe how the heat pump works.								
Work placement	Not applicable								

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