GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Alternative Energy Sources, PG_00065960		
Field of study	ALTERNATYWNE ŹRÓDŁA ENERGII		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2025/2026
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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Anna Dettlaff	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
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 in didactic classes included in study plan	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_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] Ocena wiedzy faktograficznej
[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] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu
[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] Ocena umiejętności rozwiązywania problemów występujących w praktyce

<table>
<tr><td>Subject contents</td><td>Course content – lecture

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).</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Test</td><td>60.0%</td><td>100.0%</td></tr>
</table>
</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>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</td></tr>
<tr><td>Supplementary literature</td><td>No recommendations</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table>
</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>What are the differences between a solar collector and a photovoltaic cell?

Describe how the heat pump works.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.