University of Gdańsk

Subject card

Subject name and code	Renewable Energy, PG_00199728		
Field of study	Business and Environmental Technology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's 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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	5.0
Learning profile	academic	Assessment form	exam
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Aleksandra Pieczyńska	
	Teachers	mgr Wiktoria Mallek dr inż. Aleksandra Pieczyńska	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	30.0	45.0	0.0	105

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	105	0.0	20.0	125

Subject objectives

familiarizing students with the energy situation in the country and the world getting acquainted with renewable energy sources and ways of obtaining it familiarizing students with the types of biofuels, their production and use developing the ability to conduct an experiment independently ability to apply the methodology given in the manual and interpret the obtained results ability to present results in writing

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BiTEMU2_K02] understands the need to cooperate and work in a group, assuming responsible roles within it	demonstrates creativity in working independently and in a team, and at the same time remains open to suggestions from the leader and group mates	[SK8] observation of student's independent or team work
[BiTEMU2_K07] demonstrates responsibility for the safety of one's own work and that of others, taking into account the risks resulting from the research techniques used, and creates conditions for safe work in the laboratory or in the field	understands the need to save energy and obtain it from sources renewable, demonstrates responsibility for the proper conduct of the experiment	[SK6] demonstration of practical skills
[BiTEMU2_U05] is able to give a presentation and independently prepare various specialized written works appropriate for the field studied or in the area on the border of various scientific disciplines, using theoretical approaches, collecting various sources of data, their description and interpretation, and drawing conclusions based on scientific literature and the results of own research work	presents the correct information in an understandable way both orally and in writing technological reasoning, predicts, verifies and criticizes the results experiments, independently searches for information in the literature.	[SU2] presentation/project/paper/ report
[BiTEMU2_U07] proposes processes and methods of water treatment, sewage and waste gas treatment, environmental remediation, and waste management used in environmental protection	presents the correct information in an understandable way both orally and in writing technological reasoning,	[SU6] demonstration of practical skills
[BiTEMU2_U09] plans and performs research tasks in the field or laboratory and interprets research results on environmental protection issues	follows established research procedures; recognizes laboratory equipment and uses it to carry out tests experiments, presents the correct information in an understandable way both orally and in writing technological reasoning, performs an analysis of the selected parameter based on the procedure; predicts, verifies and criticizes the results experiments,	[SU5] implementation of a problem task [SU6] demonstration of practical skills
[BiTEMU2_W09] predicts the effects of human interference in the natural environment and analyzes the impact of human activity on the quality of the environment on a local, regional and global scale	discusses the energy situation of the country and the world lists and defines the basic types of renewable energy lists and characterizes the basic methods of obtaining energy renewable applies basic technological and chemical concepts describing the process of obtaining renewable energy discusses the advantages and disadvantages of producing and using energy from renewable sources	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[BiTEMU2_W01] provides an in-depth analysis of the relationship between economics and environmental technology, and their place within the social and natural sciences.	discusses the energy situation of the country and the world lists and defines the basic types of renewable energy discusses the advantages and disadvantages of producing and using energy from renewable sources.	[SW4] test/exam - oral or written
[BiTEMU2_K03] understands the need to properly set priorities, plan and organize tasks related to their implementation, as well as monitor and evaluate progress	understands the need for further education, shows creativity in working independently and in a team, and at the same time remains open to suggestions from the leader and group mates, demonstrates responsibility for the proper conduct of the experiment.	[SK2] presentation/project/paper/ report [SK6] demonstration of practical skills [SK8] observation of student's independent or team work

Course outcome	Subject outcome	Method of verification
[BiTEMU2_U08] searches, selects and analyzes the literature on environmental sciences, including scientific journals and databases, reading and understanding scientific texts in the native language and English	independently searches for information in the literature	[SU2] presentation/project/paper/ report
[BiTEMU2_W10] explains in detail the mechanisms of unit processes used in remediation and environmental protection as well as waste management methods	lists and characterizes the basic methods of obtaining energy renewables; classifies raw materials and appropriate biofuel production technologies	[SW5] implementation of a problem task
[BiTEMU2_W11] has an in-depth understanding of and applies safety and hygiene rules when working independently at a research or measurement station in the laboratory or in the field at an advanced level	follows established research procedures	[SW5] implementation of a problem task
[BiTEMU2_U06] uses advanced methods, techniques, and tools to assess the quality of the environment and the effectiveness of the technological processes used	complies with established research procedures, recognizes laboratory equipment and uses it to carry out tests experiments, performs an analysis of the selected parameter based on the procedure,	[SU4] test/exam - oral or written

Subject contents

Topics of the lecture:Conventional energy, resources, consumption forecasts and new trends. Characteristics of renewable energy sources.Discussion of methods of obtaining solar, wind, geothermal and water energy. Heat pumps. Photovoltaic cells. Solar panels. Hydrogen technologies. Characteristics and technologies for the production of solid, gaseous and liquid biofuels. Hydrogen as the fuel of the future. Fuel cells.

Prerequisites and co-requisites

No requirements

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	51.0%	100.0%

Recommended reading

Basic literature	• Proekologiczne odnawialne źródła energii, W.M. Lewandowski, WNT 2012 • Biopaliwa, W.M. Lewandowski, M. Ryms, WNT 2013 • Biopaliwa, technologie dla zrównoważonego rozwoju, E. Klimiuk, M. Pawłowska, T. Pokój, PWN 2012 • Technologie energetyczne, Tadeusz Chmielak, PWN, 2018 • Energetyka wodorowa, Tadeusz Chmielak, PWN, 2020
Supplementary literature	• Pandey A., Handbook of plant-based biofuels, CRC Press Taylor &Francis Group, 2009 • Fundaments of Energy generation, Ewa Klugmann-Radziemska, Wydawnictwo PG, 2009
eResources addresses	

Example issues/ example questions/ tasks being completed

Describe the technology of biodiesel productionDescribe selected bioethanol production using first generation technologyPresent the structure and principle of operation of a wind turbinePresent the structure and principle of operation of a flat and vacuum solar collector

Work placement

Not applicable

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