University of Gdańsk

Subject card

Subject name and code	Renewable Energy, PG_00081018		
Field of study	Business and Environmental Technology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	Master's studies	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	2	ECTS credits	2.0
Learning profile	academic	Assessment form	
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Aleksandra Pieczyńska	
	Teachers	mgr Mateusz Baluk	

Lesson types							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	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	0.0	0.0	30

Subject objectives	
	familiarizing students with the energy situation in the country and the world, and introducing renewable energy sources and methods of obtaining it, familiarizing students with the types of biofuels, their production and use developing the ability to independently conduct experiments and the ability to apply them methodology given in the manual and interpretation of the obtained results, ability to present the results in in writing

Learning outcomes

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_K02] is able to cooperate and work in a group, assuming responsible roles	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_W11] applies safety and hygiene rules when working independently at a research or measurement station in the laboratory or in the field	follows established research procedures;	[SW5] implementation of a problem task
[BiTEMU2_W10] explains 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_W01] describes the relationship between economics and ecological technology, their place in the system of social and exact 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.	[SW1] oral statement/ conversation/discussion
[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_K03] is able to properly define priorities and 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
[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_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

Course outcome	Subject outcome	Method of verification
[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
[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 basic 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

Subject contents

Problems of laboratory exercises - basics of laboratory work, carrying out exercises thematically related to obtaining energy from renewable sources (technological and qualitative aspects). classes include, among others, technologies for the production and characteristics of biofuels, testing of wind turbines, photovoltaic cells, solar collectors, and heat pumps.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	51.0%	60.0%
report	51.0%	30.0%
activity in classes	0.0%	10.0%

Recommended reading

Basic literature	Instructions for laboratory exercises 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, 2009Fundaments of Energy generation, Ewa Klugmann-Radziemska,Wydawnictwo PG, 2009
eResources addresses	Adresy na platformie eNauczanie: Energia Odnawialna 1

Example issues/ example questions/ tasks being completed

Describe the transesterification reactionList the advantages and disadvantages of biofuelDescribe the principle of operation of a solar collectorList the types of photovoltaic cells

Work placement

Not applicable