University of Gdańsk

Subject card

Subject name and code	Biofuels, PG_00117705		
Field of study	Chemistry		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's 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	2	ECTS credits	1.0
Learning profile	academic	Assessment form	credit
Conducting unit	Laboratory of Advanced Oxidation Processes -> Department of General and Inorganic Chemistry -> Faculty of Chemistry -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Ewa Siedlecka	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	15.0	0.0	0.0	15

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	15	2.0	8.0	25

Subject objectives

To familiarize students with the energy situation in the country and the world, types of energy sources, types of biofuels, their production and use, chemical and microbiological methods of obtaining (bio)hydrogen, methods of its storage, use in fuel cells, hydrogen-based transport, methods of generating energy based on microbiological cells, developing the ability to independently experiment, the ability to apply the methodology given in the instructions and to interpret the obtained results, the ability to present the results in writing.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_U04] Applies acquired knowledge of chemistry and related scientific disciplines.	- classifies raw materials and technologies for biofuel production - discusses the energy situation of the country and the world - discusses the advantages and disadvantages of biofuel production and use	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
[CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.	- explains and understands the basic chemical and biochemical processes occurring during biofuel production - applies the basic technological concepts describing the biofuel production process,	[SK1] oral statement/conversation/ discussion
[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.	- performs experiments based on instructions, and solves problems during their execution. - discusses and formulates own opinions based on presented knowledge	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report

<table>
<tr><td>Subject contents</td><td>Characteristics of renewable energy sources. Conditions of current energy policy and forecasts for the future. Legislation on energy and bioenergy in Poland. Biomass energy resources. Biomass waste as a raw material for the production of energy and liquid and gaseous biofuels. Characteristics of gaseous biofuels: biogas production, chemical, biochemical and other methods of biohydrogen production, methods of hydrogen storage and application, fuel cells. Characteristics of liquid biofuels. The impact of fuel quality on exhaust quality. Technology for the production of third and fourth-generation biofuels: bioethanol from lignocellulose, biodiesel from algae, pyrolysis and gasification of biomass and municipal waste. Obtaining synthetic gasoline from biomass. Microbiological cells as an energy source for medical purposes, and energy recovery from sewage. Selected examples of energy production technologies. Problems of laboratory exercises: basics of laboratory work, performing exercises thematically related to obtaining energy from unconventional sources and biofuels</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>non</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>assessment of task completion, tests and reports</td><td>51.0%</td><td>80.0%</td></tr>
<tr><td>activity during classes</td><td>51.0%</td><td>20.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>given by the teacher during the class</td></tr>
<tr><td>Supplementary literature</td><td>independently searched by the student</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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