

Subject card

Subject name and code	Biofuels, PG_00179517						
Field of study	Chemistry						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
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	15.0	0.0	0.0	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	familiarizing students with the energy situation in the country and the world, types of energy sources, the types of biofuels, their production and application, chemical and microbiological methods of obtaining (bio)hydrogen, methods of its storage, use in fuel cells, hydrogen-based transport with methods of generating energy based on microbiological cells, developing the ability to conduct an experiment, 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		
	[CHEMMU2_U04] Applies acquired knowledge of chemistry and related scientific disciplines.		- Explains and understands the basic chemical and biochemical processes occurring during biofuel production - applies the basic technological concept describing the biofuel production process,		[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.		- performs experiments based on the instructions,solves problems as they are performed - discusses and formulates own opinions based on the presented knowledge		[SK1] oral statement/conversation/discussion		
	[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.		- classifies raw materials and biofuel production technologies - discusses the energy situation of the country and the world - Discusses the advantages and disadvantages of producing and using biofuel		[SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report		

Subject contents	Characteristics of renewable energy sources. Conditions of the current energy policy and forecasts for the future. Legislation regarding 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 storing and using hydrogen, fuel cells. Characteristics of liquid biofuels. The impact of fuel quality on the quality of exhaust gases. 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, energy recovery from sewage. Selected examples of energy generation technologies. Topics of laboratory exercises: basics of laboratory work, performing exercises thematically related to obtaining energy from unconventional sources and biofuels.		
Prerequisites and co-requisites	organic and inorganic chemistry		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	grade for preparing the assigned task	51.0%	50.0%
	grade for work in classes	51.0%	50.0%
Recommended reading	Basic literature	current literature provided by the teacher	
	Supplementary literature	literature searched independently by students on a given topic	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Oxford debate on hydrogen as the fuel of the future		
Work placement	Not applicable		

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