

Subject card

Subject name and code	Biofuels, PG_00117705						
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	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_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		
	[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_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		

Subject contents	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		
Prerequisites and co-requisites	non		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	activity during classes	51.0%	20.0%
	assessment of task completion, tests and reports	51.0%	80.0%
Recommended reading	Basic literature	given by the teacher during the class	
	Supplementary literature	independently searched by the student	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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