


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
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 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Design of energy-efficient technological processes		13.3.0897	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	all
Faculty of Chemistry	Chemical Business	form	all
		specialty	all
		specialization	all
Teaching staff			
dr inż. Anna Gołębiewska; dr inż. Joanna Nadolna; dr inż. Paweł Mazierski			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		3	
Laboratory classes, Lecture		classes - 45 h	
The realization of activities		tutorial classes – 5 h	
classroom instruction		student's own work – 25 h	
Number of hours		Total: 75 h - 3 ECTS	
Lecture: 15 hours, Laboratory classes: 30 hours			
The academic cycle			
2024/2025 winter semester			
Type of course		Language of instruction	
obligatory		polish	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
<ul style="list-style-type: none"> - Experimental planning, service of chemical equipment - conducting experiments - designing experiments - multimedia-based lecture 		Final evaluation	
		Graded credit	
		Assessment methods	
		Lecture:	
		<ul style="list-style-type: none"> • written test: test as well as tasks and open questions (short written answer) 	
		Laboratory exercises:	
		<ul style="list-style-type: none"> • tests, execution of a specific practical work and presentation of results in the form of a written report 	
		The basic criteria for evaluation	
		Assessment methods	
		Lecture:	
		<ul style="list-style-type: none"> • written test: test as well as tasks and open questions (short written answer) 	
		Laboratory exercises:	
		<ul style="list-style-type: none"> • tests, execution of a specific practical work and presentation of results in the form of a written report 	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
Mathematics, physics, chemistry, chemical technology			
B. Prerequisites			
Knowledge of the basics of mathematics, physics, chemistry, technical drawing, computer use, chemical apparatus, technological principles			

Aims of education Aims of education To familiarize students with processes, technologies friendly to the environment and the development of practical skills in the field of modern industrial processes/installations To acquaint students with the design of the technological process in terms of biogas and biodiesel production using renewable raw materials and waste	
Course contents Course contents Lecture: The course will discuss environmentally friendly technologies and ways to verify them. Such as technologies for the production of biofuels from biomass, waste or renewable raw materials. The issues of the course will also include principles/elements of designing energy-efficient industrial processes, implementation of new technologies to the industry. Rational management of natural resources and clean production will be discussed. Laboratory exercises: As part of laboratory exercises, students will design and optimize technologies for the production of biofuels (biodiesel and biogas) from biomass. Familiarize themselves with the construction, operation principle and operation of technological installations in a technical scale.	
Bibliography of literature Bibliography of literature Literature required to pass the course Rosik-Dulewska C., Podstawy gospodarki odpadami, PWN, Warszawa 2015 Kasprzycka-Guttman T. (red.), Odpady stałe, ciekłe i gazowe – zapobieganie, powstawanie, utylizacja, OW Forest, Warszawa 2009 Jędrzak A., Biologiczne przetwarzanie odpadów, PWN, Warszawa 2007 Bilitewski B., Hardtle G., Marek K., Podręcznik gospodarki odpadami, Wydawnictwo Seidel Przywecki, Warszawa 2006 1. Burczyk B. Zielona Chemia, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006 2. Lewandowski W.M. Proekologiczne źródła energii odnawialnej, WNT W-wa 2001 3. Gradziuk P., Kowalczyk K., Kościk B., Biopaliwa, Wydawnictwo Wieś Jutra 2002r Extracurricular readings Wolny T. (red.pl) Sprawdzone metody gospodarowania odpadami komunalnymi, Stowarzyszenie Technologii Ekologicznych SILESIA, Opole 2010 Wardasz A.J., Paliwa z odpadów. Technologie tworzenia i wykorzystania paliw z odpadów, PZliTS, Poznań 2011	
The learning outcomes (for the field of study and specialization)	Knowledge Knowledge Student: - defines the basic concepts of environmental technologies - lists examples of green technologies - lists and describes processes used in the processing, usage and disposal of waste - describes the construction and operating principles of installations for the production of biogas and biodiesel, lists the basic factors affecting the efficiency of these processes - discusses the impact of environmentally friendly technologies on the natural environment
	Skills Skills Student: - can choose the parameters of the technological process to minimize the negative environmental impacts - describes the impact of selected installations/lines/processes on the environment - examines the basic physicochemical properties of waste and products arising from their development. - interprets the results of laboratory study - prepares written reports on the implementation of the experiments
	Social competence Social competence Student: - is aware of the negative impact of waste on the environment - is aware of the dangers resulting from degradation of the natural environment and the need for changes in technology - is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment and the related

responsibility for the decisions made

- complies with the safety rules in the chemical laboratory
- cooperates in the team during laboratory classes and results development
- connects the importance of developing waste management technologies for good environmental and human health
- understands the need for further education

Contact

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