



Subject card

Subject name and code	Designing devices for food industry and protection of environment, PG_00040107						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Part-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Bartosz Dawidowicz				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	22.0	0.0	15.0	0.0	0.0	37
	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	37		10.0		78.0	125
Subject objectives	Teaching the basics of construction and calculation of typical devices from process equipment used in environmental protection. An indication of the specificity of devices in this application.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W06] possesses elementary knowledge on automatics and robotics of mechanical systems		The student is able to present the operation of industrial equipment on a functional diagram.		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_W08] possesses basic knowledge including the methodology of designing machine parts, mechanical devices, selection of construction materials, manufacturing and operation, with the lifetime cycle		The student is able to correctly design a device and/or a machine for the food industry / environmental protection.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[K6_U11] is able to analyse the operation of devices and compare the construction solutions applying usage, safety, environmental, economic and legal criteria		The student is able to design a machine, apparatus and/or a set of devices and perform technical analysis.		[SU1] Assessment of task fulfilment		
Subject contents	Lecture. Selected issues of process equipment, including REACTORS. General concepts, classification, their place in environmental protection. Technological operations carried out in reactors: mixing, air injection, circulation of the reactor contents. Periodic and flow reactors. Ideal and real reactors. Dynamic characteristics. Cascade. Types of flows in reactors. Aeration systems. Construction of diffusers. Mixing power, examples of mixers used in reactors. . Construction of absorbers. TANKS FOR WASTEWATER. Construction. Basics of calculations. Apparatus used for secondary and subsequent treatment of sewage. SEALS. Stabilization. Thickening. Drainage. Basics of device construction. Other examples of process equipment in environmental protection. DESIGN. Selected issues in the design of apparatus, eg: the basics and methods of dimensioning the treatment plant. Selected processes in environmental protection						
Prerequisites and co-requisites	basics of physics, chemistry, fluid mechanics and wastewater treatment						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Grade of the project		56.0%		50.0%		
	Exam from the lecture		56.0%		50.0%		

Recommended reading	Basic literature	<ul style="list-style-type: none"> • Vesilind A., Peirce J.J., Weiner R.: Environmental engineering. Butterworth Publishers, Stoneham, 1988. • Łomotowski J., Szpindor A.: Nowoczesne systemy oczyszczania ścieków. Arkady, W-wa, 1999. • Grandison A.S., Lewis M.J.: Separation processes in the food and biotechnology Industries. Woodhead Publishing Ltd., Cambridge, 1996. • Ciborowski J.: Inżynieria procesowa. WNT, W-wa, 1965.
	Supplementary literature	<ul style="list-style-type: none"> • Pikoń J.: Aparatura chemiczna. PWN, W-wa, 1978. • Wodociągi - Kanalizacja. Abrys sp. z o.o., monthly
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • Diffusers - types, requirements. • Disadvantages of real reactors. • Scheme and description of the flow reactor operation. 	
Work placement	Not applicable	

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