GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Process apparatus in environmental protection, PG_00064850		
Field of study	Mechanical Engineering		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2027/2028
Education level	second-cycle studies	Subject group	Specialty subject group Subject group related to scientific research in the field of study
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	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Bartosz Dawidowicz	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	0.0	30

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	30	5.0	15.0	50

Subject objectives

Teaching the basics of construction and calculation of typical devices from process apparatus used in environmental protection. Indication of the specificity of devices in this application. Providing the methodology for calculating the dimensions of selected elements of the installation.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U15] evaluates the feasibility of advanced methods and tools for solving complex engineering tasks of a practical nature, characteristic of the field of study, and selects and applies appropriate methods and tools for this purpose	The student is able to design a device using engineering tools.	[SU1] Assessment of task fulfilment
[K7_W13] explains the main principles of individual and teamwork organization, including various forms of entrepreneurship utilizing knowledge from the field of engineering and technical sciences and disciplines relevant to the course of study	Student posiada wiedzę z zakresu aparatury procesowej w ochronie środowiska.	[SW1] Assessment of factual knowledge
[K7_W04] demonstrates knowledge covering selected topics of advanced specific knowledge, in particular methods, techniques, tools specific to Mechanics and Mechanical Engineering processes, systems and equipment	The student is able to calculate the basic dimensions of selected devices and apparatus used in environmental protection.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents

Course content – lecture

An introduction to basic concepts in environmental engineering and the role of process equipment. Characterization of the origin and classification of environmental pollutants. A review of selected unit processes used in environmental protection, along with an analysis of the design of related equipment. Methods for removing particulate and gaseous pollutants from waste gases, and a description of the operation and design of selected equipment. Definition of wastewater and analysis of water pollution; a review of technological processes and equipment used in wastewater treatment plants. Principles and processes of sewage sludge treatment.

Course content – project

Fundamentals of environmental protection equipment design. Fundamentals of process equipment selection and dimensioning, using selected devices as an example. Design calculations using applicable standards and regulations.

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
Exam from the lecture	56.0%	50.0%
Grade of the project	56.0%	50.0%

Recommended reading

Basic literature

1. Kabsch P.: Odpylanie i odpylacze. T. 1 i 2. WNT, W-wa, 1992.

2. Warych J.: Oczyszczanie gazów. Procesy i aparatura. WNT, W-wa, 1998.

3. Mazur M., Teisseyre M.: Podstawy teorii i konstrukcji urządzeń odpylających. Skrypty PWr., Wrocław, 1977.

4. Juda J., Nowicki M.: Urządzenia odpylające. PWN, W-wa, 1979.

5. Vesilind A., Peirce J.J., Weiner R.: Environmental engineering. Butterworth Publishers, Stoneham, 1988.

6. Łomotowski J., Szpindor A.: Nowoczesne systemy oczyszczania ścieków. Arkady, W-wa, 1999.

7. Zbigniew Heidrich, Andrzej Witkowski, " Urządzenia do oczyszczania ścieków - projektowanie, przykłady obliczeń", Wydawnictwo "Seidel-Przywecki" Sp. z o. o., 2010 Warszawa

8. Vesilind A., Peirce J.J., Weiner R.: Environmental engineering. Butterworth Publishers, Stoneham, 1988.

9. Ciborowski J.: Inżynieria procesowa. WNT, W-wa, 1965.

Supplementary literature

1. Pikoń J.: Aparatura chemiczna. PWN, W-wa, 1978.

2. Wodociągi - Kanalizacja. Abrys sp. z o.o., monthly

eResources addresses

Example issues/ example questions/ tasks being completed

1. Describe the purpose of mixing.

2. Discuss the design and operation of a centrifugal precipitator.

3. The purpose and methods of aeration in biological reactors.

4. Describe methods for removing sulfur compounds from industrial gases.

5. The design and operation of a scrubber.

Practical activites within the subject	Not applicable

Document generated electronically. Does not require a seal or signature.