GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Basics of construction, PG_00061920		
Field of study	Podstawy konstrukcji		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Polymer Technology -> Faculty of Chemistry -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Justyna Kucińska-Lipka	
	Teachers	prof. dr hab. inż. Janusz Datta	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	0.0	30.0	15.0	45

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	45	5.0	25.0	75

Subject objectives

Acquisition of knowledge concerning the design of steel structures, e.g., reactors, tanks, and reservoirs. Learning the principles of material selection for structures and auxiliary equipment. Calculating stresses in structural elements. Learning about the design and operation of various machine components.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] Can critically analyze and evaluate the functioning – particularly in the context of materials engineering –existing technical solutions, particularly equipment, objects, systems, processes.	The student is able to evaluate the operation and functioning of various technical devices and the processes taking place within them.	[SU4] Ocena umiejętności korzystania z metod i narzędzi
[K6_W05] Has the knowledge of mechanics, technology and electrical engineering, including engineering graphics and using computer aid, the use of databases in the design of technological processes.	The student has knowledge of mechanics and technology that allows them to perform various tasks, including design tasks, using databases.	[SW1] Ocena wiedzy faktograficznej
[K6_K01] Understands the need to improve professional and personal competencies; is conscious of own limitations and knows when to turn to experts, properly establishes priorities helping to accomplish tasks defined by oneself or others.	The student understands the need to improve their skills because they are aware of their limitations. They are able to ask experts for help in order to complete tasks in the best possible way.	[SK3] Ocena umiejętności organizacji pracy
[K6_U06] Can integrate obtained information, interpret it and draw conclusions, as well as formulate and justify opinions.	The student is able to connect facts, interpret the information obtained, and draw conclusions.	[SU2] Ocena umiejętności analizy informacji

Subject contents

Designing the structure of a mixing device, e.g., an emulsifier, reactor, or homogenizer, for specified technical parameters and its intended use. Selection of a range of structural elements for calculations of wall thickness, pressure and buckling.. Stress analysis. Dimensioning of details and roughness. Joining of materials. Principles for selecting material for a structural element, taking into account the environment and operating temperature. Modern hybrid and multi-material structures, as well as SPS and SIP sandwich structures.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">General information on modern construction materials</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Seminars</td><td>100.0%</td><td>40.0%</td></tr>
<tr><td>Project implementation</td><td>100.0%</td><td>60.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. Wilczewski T., Pomoce projektowe z podstaw maszynoznawstwa chemicznego, Wydawaca Politechnika Gdańska, 2008, Gdańsk

2. Pikoń J.,Podstawy Konstrukcji aparatury chemicznej cz 1,2., Wydawca: Państwowe Wydawnictwo Naukowe, 1979, Warszawa.

3. Uzi Mann, Principles of Chemical Reactor Analysis and Design, John Wiley & Sons, 2009, Texas.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Gawdzik A.j. Tabiś B., Podstawy projektowania reaktorów chemicznych , Wydawca: Politechnika Krakowska, 1987; Kraków</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">1. Calculate the circumferential stress acting on the cylindrical wall of the emulsifier, knowing the values: d, p, and g.

2. Will a tank supported on four 1.5 m high tubular columns buckle when a mass of 2 tons acts on them?

3. Select a material (discuss the options) for the inspection hatch gasket.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="3">Not applicable</td></tr>
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