GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Basics of chemical technology, PG_00060860		
Field of study	Chemical Technology		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2024/2025
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	2	Language of instruction	Polish no comments
Semester of study	4	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Gębicki	
	Teachers	dr hab. inż. Jacek Gębicki dr hab. inż. Justyna Łuczak dr inż. Robert Aranowski dr inż. Piotr Rybarczyk dr inż. Edyta Słupek dr inż. Aleksandra Małachowska	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	30.0	0.0	0.0	75
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44045						

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	75	8.0	42.0	125

Subject objectives	The aim of the course is to provide students with information on: technological principles, heat and material balances, chemical and technological concepts of the process, process scaling, conceptual and technological diagrams, basic definitions related to the technological process, energy transformation and the challenges of modern technology.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W05] has knowledge of chemical technology based on mineral or energy resources and modern energy sources, understands the concept of sustainable development, knows the principles of green chemistry and environmentally friendly process engineering, has knowledge of occupational safety in the chemical industry	The student understands the technological principles and aspects of energy transition, and the concepts of the circular economy. They are familiar with the concept of Industry 4.0.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U05] recognises and identifies the relationship between technological issues, implemented in industrial practice, and their impact on various elements of the environment, in the context of mechanisms and conditions of sustainable development, recognizes their systemic and non-technical aspects	The student identifies the relationships between the main technological principles and understands the principles of green engineering and the circular economy.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K6_K02] understands the non-technical aspects and implications of the activities of a chemical engineer, including the impact on the environment, is aware of professional behaviour, observance of professional ethics and respect for diversity of views and cultures	The student locates and classifies aspects related to environmental protection, health and safety and correctly identifies the role of a chemical engineer in modern industry.	[SK1] Assessment of group work skills [SK3] Assessment of ability to organize work
[K6_W12] knows the chemical nomenclature in Polish and specialized terms related to chemical technology	The student can define processes and unit operations. Correctly use specialized terms related to chemical technology. They can prepare a basic process diagram.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U12] applies the principles of health and safety at work	The student correctly identifies hazards and safety principles related to processes and unit operations. They are able to apply occupational health and safety principles in the chemical industry.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents

1. Basics of chemical processes, equilibrium constant, reaction rate,

2. Mathematical theory of experimental design, optimization

3. Elements of process design. Unit operations. Schematic and technological diagram

4. Material and heat balance

5. Technological principles

6. Basic unit operations

7. Problems of technological process kinetics

8. Basics of reactor theory

9. Scaling up a technological process

10. Energy transformation - green energy

<table>
<tr><td>Prerequisites and co-requisites</td><td>The student will have knowledge of:

1. Chemical equipment

2. Chemical and process engineering

3. Unit processes in the chemical industry

4. Thermodynamics and chemical kinetics

5. Fundamentals of environmental protection</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>laboratory - entrance test + report on the implementation of laboratory classes</td><td>60.0%</td><td>25.0%</td></tr>
<tr><td>exercises - 2 tests</td><td>60.0%</td><td>25.0%</td></tr>
<tr><td>lecture - knowledge test, 3 tests</td><td>60.0%</td><td>50.0%</td></tr>
</table>
</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>• J. Piotrowski, J. Szarawara ,,Podstawy technologii chemicznej", WNT 2010
• M. Wisniewski, K. Alejski, ,,Podstawy technologii chemicznej i reaktorów chemicznych" część 1 i 2, Wydawnictwo Politechniki Poznańskiej, 2017
• A. Selecki, L. Gradoń, ,,Podstawowe procesy przemysłu chemicznego", Wydawnictwa Naukowo-Technicznej, 1985
• K. Schmidt-Szałowski i in., Technologia Chemiczna, PWN, Warszawa, 2013</td></tr>
<tr><td>Supplementary literature</td><td>resources of the Gdańsk University of Technology library in the field of chemical technology and related technologies of the chemical industry</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table>
</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Describe the relationship between the equilibrium conversion rate and temperature.

2. Describe the relationship between the reaction rate and the conversion rate.

3. Schematically represent a model of a plug-flow tubular reactor.

4. List the types of absorbers.

5. Describe the mass transfer process in co-current and counter-current systems.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
</table>

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