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 2025	Academic year of realisation of subject	2026/2027
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
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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Gębicki	
	Teachers		

Lesson types

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/2025/course/view.php?id=4948

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 electrical engineering, automation and computer science, including the operation of measurement and control systems	knows the principles of operation of process control systems in unit processes and operations.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U06] Recognizes the relationships between technological issues and their impact on the environment, taking into account the principles of sustainable development, systemic and non-technical aspects, and occupational health and safety principles	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

Subject contents	Course content – lecture 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 Course content – exercises 1. Introduction to Process Balancing 2. Material Balance for a Unit Operation 3. Material Balance for a Unit Process 4. Energy Balance for a Process Unit Course content – laboratory 1. Unit activities based on the process of obtaining fatty acid methyl esters (3 lab sessions) 2. Removal of volatile organic compounds from air by biofiltration (1 lab session) 3. Planning a factorial experiment (2 lab sessions) 4. Process kinetics in chemical technology (2 lab sessions)
Prerequisites and co-requisites	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

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></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>
<tr><td>laboratory - entrance test + report on the implementation of laboratory classes</td><td>60.0%</td><td>25.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><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>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">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>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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