GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Industrial engineering of plastics, PG_00068138		
Field of study			
Date of commencement of studies	February 2027	Academic year of realisation of subject	2027/2028
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Part-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	Department of Polymer Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Janusz Datta	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	9.0	0.0	9.0	0.0	0.0	18

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	18	5.0	27.0	50

Subject objectives

To provide knowledge of the principles underlying industrial processes in plastics processing, including the technologies, equipment, and production lines used. To develop skills in analyzing process flow diagrams, material and energy flows, evaluating process efficiency, and understanding the principles of industrial plant monitoring and control.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W04] has in-depth knowledge in the field of chemical sciences/ chemical engineering/materials engineering, enabling the description of the properties of materials, processes and technological operations involving them, taking into account recycling	has in-depth knowledge of the properties of plastics, their processing technologies, and recycling methods.	[SW1] Assessment of factual knowledge
[K7_U01] is able to obtain information from literature, databases and other properly selected sources, also in English; is able to integrate the obtained information, interpret it, draw conclusions and formulate and justify opinions	The student is able to acquire, analyze, and interpret information on industrial plastics processing technologies and draw conclusions based on the information obtained.	[SU2] Assessment of ability to analyse information
[K7_K01] understands the need for lifelong learning, is able to inspire and organize the learning process of others. is aware of his/ her own limitations and knows when to turn to experts, is able to set priorities appropriately for the implementation of tasks defined by himself/herself or others	is ready to independently expand their knowledge of industrial plastics processing technologies, prioritize tasks, and recognize when consultation with experts is necessary	[SK3] Assessment of ability to organize work
[K7_U05] is able to notice non-technical aspects, including environmental, economic and legal aspects, when formulating and solving design tasks. Applies occupational health and safety principles	is able to consider environmental, economic, and legal aspects when evaluating industrial plastics processing technologies and apply occupational health and safety principles.	[SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>Course content – lecture

Characteristics and development trends of the modern plastics industry. Chemical and technological concepts of industrial processes. Analysis and optimization of plastics processing parameters. Modern technologies, equipment, and machinery used in the plastics industry. Automation, digitalization, and monitoring of production processes. Material and energy efficiency, sustainable development, and plastics recycling. Quality management systems and evaluation of industrial process efficiency. Technological innovations, technology transfer, and industrial property protection.

Course content – laboratory

Analysis of selected technological processes for manufacturing plastic products. Identification of unit operations and material streams. Analysis of material and energy flows using process flow diagrams and Sankey diagrams. Evaluation of raw material and energy consumption, process efficiency, and opportunities for waste reduction and recycling. Interpretation of calculation results and formulation of conclusions regarding technological efficiency.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of polymer materials, familiarity with equipment and machinery used in the plastics industry, and fundamental knowledge of mass and heat balances in technological processes</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>Lecture – written examination.</td><td>50.0%</td><td>60.0%</td></tr>
<tr><td>Laboratory – completion and assessment of individual assignments</td><td>100.0%</td><td>40.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Synoradzki L., Wisialski J.(red). Projektowanie procesów technologicznych. Od laboratorium do instalacji przemysłowej. Warszawa, 2006

Synoradzki L., Wisialski J.(red). Projektowanie procesów technologicznych. bezpieczeństwo procesów chemicznych, Warszawa 2012

Szarawara J., Piotrowski.J., Podstawy teoretyczne technologii chemicznej, Warszawa,2010

Pikoń J., Aparatura chemiczna, Warszawa 1983.</td></tr>
<tr><td>Supplementary literature</td><td>Bogoczek R., Kociołek-Balawejder E.:Technologia chemiczna organiczna. Surowce i półprodukty, Wrocław 1992

Florjańczyk Z., Penczek S. (red.): Chemia polimerów T.1. oraz T.2., Warszawa 2001

Rabek J.: Współczesna wiedza o polimerach, Warszawa 2008

Sikora R.: Przetwórstwo tworzyw wielkocząsteczkowych, Warszawa 1993</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.Present the diagram Industrial installation for PVC production using the suspension polymerization method and discuss its operation.

2.Industrial installation for PUR production - present the main elements of the installation.

3.What analytical techniques can be used to control the polymer production process (at its various stages)</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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