GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Diploma Laboratory I, PG_00064340		
Field of study	Chemical Technology		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Optional 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	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 inż. Natalia Łukasik	
	Teachers		

Lesson types

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

The aim of this course is to conduct research necessary for a master's thesis. The aim is to familiarize students with the operation of research equipment, research planning, and the analysis and interpretation of research results.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U05] uses instrumental methods applied in technology and related fields	The student selects appropriate instrumental methods, operates research equipment and interprets experimental results in the characterisation of catalysts and sorbents and in the control of processes in chemical technology and related fields.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K7_U01] designs experiments using computer methods of data analysis, computer simulations and based on the state of the knowledge in accordance with the latest scientific literature	The student designs and optimises experiments in the synthesis and testing of catalysts for steam reforming of methanol and in the sorption of sulphur impurities, using computer-based methods of experimental design, data analysis and computer simulations, and interprets and validates the results in the context of the current state of the art.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
[K7_W05] recognises the key developments in research, apparatus and technology in technology and related fields	The student analyses and critically evaluates the development trends in the production of e-fuels and chemical hydrogen storage.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Course content – laboratory
1. Review of the literature on hydrogen technologies and hydrogen storage methods.

2. Preparation of catalytic materials or selection of sorption materials for the methanol steam reforming process or purification of gas streams subsequently directed to the methanol production unit.

3. Characterization of materials using methods such as XRD, FTIR, TGA, etc.

4. Selection of process conditions. 5. Assessment of material stability.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of catalysis and materials characterization.</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>Report on the conducted research prepared at the end of the semester.</td><td>60.0%</td><td>60.0%</td></tr>
<tr><td>Short oral presentation of the results and interpretation of the findings after completion of the experiment.</td><td>60.0%</td><td>40.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. E. Pawelczyk, N. Łukasik, I. Wysocka, A. Rogala, J. Gębicki, Recent Progress on Hydrogen Storage and Production Using Chemical Hydrogen Carriers Energies 2022, 15, 49644999.

2. M. Bowker, "Methanol Synthesis from CO Hydrogenation", ChemCatChem 2019, 11, 4238-4246.</td></tr>
<tr><td>Supplementary literature</td><td>1. B. S. Barros, N. Łukasik, J. Kulesza, J. D. da Silva Fonseca in Hydrog. Technol. Fundam. Appl. (Eds.: M. Romolos Cesario, A.J. Menezes de Araújo, F.J. Almeida Loureiro, D. Araujo de Macedo), Elsevier, 2024, pp. 117147.

2. Rosen, M.A.; Koohi-Fayegh, S. The prospects for hydrogen as an energy carrier: an overview of hydrogen energy and hydrogen energy systems. Energy, Ecol. Environ. 2016, 1, 1029, doi:10.1007/s40974-016-0005-z.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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