University of Gdańsk

Subject card

Subject name and code	Monographic lecture - Modern technologies in industry, PG_00082461		
Field of study	Chemical Business		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Optional subject group
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish Polish language
Semester of study	2	ECTS credits	3.0
Learning profile	academic	Assessment form	credit
Conducting unit	Faculty of Chemistry -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Dagmara Jacewicz	
	Teachers	dr hab. Dagmara Jacewicz dr inż. Aleksandra Pieczyńska dr inż. Paweł Mazierski	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	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	20.0	25.0	75

Subject objectives	The aim of the course is to familiarize students with modern technologies used in industry, i.e. to familiarize students with all the issues mentioned in the program content of the lecture.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BCHMU2_U01] Is able to, on the basis of her/his knowledge, propose a solution to problems in chemistry, taking into account the economic aspect by using advanced measurement techniques.	The student evaluates the usefulness of i way of functioning in industry of existing solutions engineering and technical and research and measurement methods; uses chemical knowledge in correlation with others sciences, e.g. economics.	[SU4] test/exam - oral or written
	[BCHMU2_W05] Knows and understands the main trends in the development of chemistry combined with economics as two interpenetrating scientific disciplines.	The student is able to use chemical knowledge in correlation with other sciences (e.g. economics) to explaining the course of processes technological. Student has the ability to use acquired knowledge to determine priorities.	[SW4] test/exam - oral or written
	[BCHMU2_K04] Is willing to properly assess the acquired knowledge, respect and disseminate it in order to solve specific cognitive and practical issues.	Student: defines and presents modern technologies; describes, illustrates and explains them functioning; discusses the impact discussed technologies on natural environment.	[SK4] test/exam - oral or written
	[BCHMU2_W01] Knows and understands complex physicochemical processes and is able to analyse their course in connection with other fields of science.	The student is able to interpret physicochemical processes and is able to analyze them in connection with other fields of science, e.g. in the pharmaceutical industry, medical industry or hydrogen production.	[SW4] test/exam - oral or written
	[BCHMU2_U02] Is able to define her/his interests, develop them within the chosen direction and in connection with the subject of her/his master's thesis by implementing the process of self-education and planning her/his professional career.	The student understands the need continuous learning; shows responsibility for timely delivery implementation of tasks; has consciousness the need to be honest and reliable work.	[SU4] test/exam - oral or written
Subject contents	1. Pharmaceutical industry 2. Production of plant protection products 3. Application of stop-flow technique in industry 4. Catalysts and large-scale catalytic processes 5. Gas separation techniques 6. Porous materials used for gas separation 7. Carbon dioxide separation, conversion and storage techniques 8. Production of hydrogen, including biohydrogen 9. Hydrogen storage and transport 10. Energy storage 11. Photovoltaic cells		
Prerequisites and co-requisites	Basic knowledge of inorganic and organic chemistry		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written test and open-ended questions	51.0%	100.0%
Recommended reading	Basic literature	1. Shaping techniques of adsorbents and their applications in gas separation: a review, J. Mater. Chem. A, 2022,10, 22853-22895 2. Zeolites and metalorganic frameworks for gas separation: the possibility of translating adsorbents into membranes, Chem. Soc. Rev., 2023, 52, 4586-4602 3. CO2 Separation, Purication and Conversion to Chemicals and Fuels, Franz Winter, Rashmi Avinash Agarwal, Jan Hrdlicka, Sunita Varjani, ISSN 2522-8366 4. The Potential Applications of Nanoporous Materials for the Adsorption, Separation, and Catalytic Conversion of Carbon Dioxide, Adv. Energy Mater., 4: 1301873 5. Energy technologies, Tadeusz Chmielak, PWN, 2018 6. Hydrogen energy, Tadeusz Chmielak, PWN, 2020	
	Supplementary literature	1. A review of air separation technologies and their integration with energy conversion processes, Fuel Processing Technology, 70, 2, 2001, 115-134 2. Fundaments of Energy generation, Ewa Klugmann-Radziemska, Wydawnictwo PG, 2009 3. Biopaliwa- technologie dla zrównoważonego rozwoju, Ewa Klimiuk, Małgorzata Pawłowska, Tomasz Pokój, PWN, 2012	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Pharmaceutical industry - innovative technologies in pharmacy 2. Stages of preparing a tablet using 3D printing 3. Application of the "hot-melt extrusion" technique in the pharmaceutical industry 4. Modern equipment used to test granulation 5. Tank-mix technique 6. Stopped-flow technique		
Work placement	Not applicable		

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