



Subject card

Subject name and code	Industrial chemometrics, PG_00035170						
Field of study	Engineering and Technologies of Energy Carriers						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group			Obligatory subject group 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	3	ECTS credits			2.0		
Learning profile	practical profile	Assessment form			assessment		
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Tomasz Laskowski					
	Teachers	dr hab. inż. Tomasz Laskowski dr inż. Paweł Szczęblewski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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	2.0		18.0		50
Subject objectives	The aim of the course is to familiarize the student with advanced chemometric techniques that can be applied in industrial process planning as well as in the analysis of obtained results.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_W03	The student learns basic and advanced chemometric techniques used in industry for designing technological processes and evaluating the obtained results.			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	K7_U07	The student is able to solve a complex chemometric problem for a specific set of measurement results.			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task		
Subject contents	<ul style="list-style-type: none">• Introduction to Chemometrics. Fundamental concepts and differentiation between statistical and chemometric approaches.• Archiving and control of experimental data.• Single-variable analysis: statistical sample vs. general population, variable distributions.• Graphical representation of variable distributions: histograms and quantile plots.• Statistical tests: identification of outliers and gross errors.• Parametric and nonparametric tests for population comparison. Analysis of variance (ANOVA).• Pairwise variable analysis: correlation and determination coefficients, variable distribution entropy, and relationship linearization.• Introduction to the chemometric approach: specific variable transformations.• Exploratory analysis: factor analysis, the concept of information, and principal component analysis (PCA).• When chemometrics meets statistics: modeling relationships, linear regression, statistical significance, and adequacy of chemometric models.						
Prerequisites and co-requisites	Basic knowledge of statistics and MS Excel.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project presentation	60.0%	50.0%
	test	60.0%	50.0%
Recommended reading	Basic literature	Jan Mazerski: "Chemometria praktyczna".	
	Supplementary literature	-	
	eResources addresses	Adresy na platformie eNauczanie: Chemometria w przemyśle 2024-2025 - Moodle ID: 44414 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44414	
Example issues/ example questions/ tasks being completed	The student must collect their own dataset, formulate a problem based on this dataset, and then solve it using advanced chemometric techniques.		
Work placement	Not applicable		

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