



Subject card

Subject name and code	CHEMOMETRY, PG_00064300						
Field of study	Chemical Technology						
Date of commencement of studies	February 2027		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group		Optional subject group Specialty subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		blended-learning		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Tomasz Laskowski				
	Teachers						
Lesson types	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: 15.0						
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		3.0		17.0	50
Subject objectives	The aim of the course is to familiarize the student with methods for working with multidimensional datasets, with particular emphasis on extracting so-called useful (actionable) information. An additional objective is to develop practical skills in using the R and Python programming languages for data analysis.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U04] predicts the properties of the materials obtained and the course of processes involving them, based on knowledge of technology and related fields and computer methods of data analysis, modelling and simulation		is able to formulate a problem for a given dataset and subsequently solve it using appropriately selected statistical and chemometric techniques.		[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	[K7_U06] applies computer, statistical and specialised database methods to solve scientific and technological problems in technology and related fields		is able to apply various chemometric and statistical techniques depending on the quality of the data and the nature of the problem.		[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	[K7_W03] selects methods of data analysis, including statistical and modelling, useful for solving scientific and technological problems		knows basic and advanced statistical and chemometric methods and understands when to apply each approach.		[SW1] Assessment of factual knowledge		

Subject contents	Course content – lecture The lectures will address, inter alia, following issues: <ul style="list-style-type: none">• experimental designs with particular emphasis on factorial and minimal ones• collecting , archiving and preprocessing of multivariate data sets• graphical presentation of multidivariate data• principal component analysis (PCA) of multivariate data sets• multivariate mathematical models selection of descriptors and adequacy of model• object classification to predefined classes (supervised pattern recognition)• similarity analysis (natural clustering of the objects, unsupervised pattern recognition))		
	Course content – laboratory The student will develop and analyze a self-prepared dataset by applying successive stages of a chemometric workflow: data acquisition, data quality control, data transformation, similarity analysis, factor analysis, and relationship modeling.		
Prerequisites and co-requisites	Subjects pre: mathematics, computer science Prerequisites: knowledge of basic statistical concepts, the ability to use a spreadsheet computer program (eg Excel)		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test at the end of the semester or oral exam	60.0%	100.0%
Recommended reading	Basic literature	J.Mazerski: "Chemometria Praktyczna", ed. II., Wydawnictwo Malamut, Warszawa 2020 J.Koronacki, J.Mielniczuk: Statystyka dla studentów kierunków technicznych i przyrodniczych. WN-T, W-wa 2001	
	Supplementary literature	E.Steiner: "Matematyka dla chemików", Wydawnictwo Naukowe PWN, Warszawa 2001 S.Brandt: Analiza danych, Wydawnictwo Naukowe PWN, Warszawa 1998	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Collect your own dataset, accordingly to the guides given by your supervisor. State a scientific problem for your data and solve it using chemometric techniques learned along the way.		
Practical activities within the subject	Not applicable		

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