



Subject card

Subject name and code	CHEMOMETRICS, PG_00064394						
Field of study	Chemistry						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study 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	2		Language of instruction		Polish		
Semester of study	4		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: 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 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		
	[K6_W01] applies his/her knowledge of selected branches of mathematics and physics to analyse, interpret and solve problems and to describe physical, chemical phenomena and technological processes		The student has the knowledge necessary to use specialized vocabulary. They are ready to prepare and communicate technical information, as well as use advanced numerical and statistical techniques to solve chemometric problems.		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U04] creates detailed documentation of the results obtained from the experiments carried out individually or as part of a team, analysing and interpreting the results in the form of text documents, spreadsheets, graphs, technological diagrams, multimedia presentations using correct chemical nomenclature		Student is able to correctly compile a consolidated record of experimental results and prepare a written report that includes a discussion and interpretation of these results.		[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		
	[K6_K03] is aware of the importance of caring for the quality and diligence of the tasks performed, being responsible for their consequences		The student is aware of the importance of the reliable application of basic and advanced chemometric techniques, with particular emphasis on the mathematical foundations of the methods, and is responsible for the correct interpretation of the results of the optimization process and their consequences in research and professional work.		[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	Course content – lecture		
	The lectures will include following issues:		
	• experimental design with particular regard to factor and minimum design, • data collection, archiving and pre-processing, • methods of graphic presentation of multidimensional data, • application of the principal components analysis to multidimensional data sets, • mathematical modeling of relationships with particular emphasis on the rules of models creation and assessment of their adequacy, • classification, i.e. determining the rules of belonging of objects to predefined classes, • similarity analysis, i.e. searching for natural clusters of objects.		
	Course content – laboratory		
	As part of the laboratory, students will independently carry out chemometric analysis of their multidimensional data sets using various chemometric techniques.		
Prerequisites and co-requisites	Prerequisite subjects: mathematics, computer science. Prerequisites: knowledge of basic concepts of statistics, skills in using a spreadsheet computer program (e.g. Excel)		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	practical exercises	60.0%	40.0%
	lecture test	60.0%	50.0%
	compilation of results	60.0%	10.0%
Recommended reading	Basic literature	J.Mazerski: "Chemometria Praktyczna", Wydawnictwo Malamut, Warszawa 2009 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	1. Design a series of measurements whose results will allow you to create a model of relationship between yield the chemical synthesis and its conditions: temperature, time and catalyst content. 2. Based on the attached results of the regression analysis, determine an adequate model of a relationship 3. Evaluate the prognostic capacity of the obtained model.		
Practical activities within the subject	Not applicable		

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