GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	CHEMOMETRY, PG_00064300		
Field of study	Chemical Technology		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2024/2025
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	at the university
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		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Tomasz Laskowski	
	Teachers	dr hab. inż. Tomasz Laskowski dr inż. Julia Borzyszkowska-Bukowska	

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	3.0	17.0	50

Subject objectives

A student:

- designs,collects and controls the multidimentional data
- creates graphical presentations of multidimentional data
- selects variables necessary to describe the basic properties of the analyzed set of objects (samples)
- uses principal component analysis to analyze the data sets
- creates regression models depending on several variables and assess their relevance and appropriateness
- classifies the analyzed objects according to the values of several variables

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	The student 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	The student 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	The student learns basic and advanced statistical and chemometric methods and understands when to apply each approach.	[SW1] Assessment of factual knowledge

Subject contents

The lectures will address , inter alia, following issues : · - 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))

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 202016 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	Adresy na platformie eNauczanie: CHEMOMETRIA 2024-2025 - Moodle ID: 44423 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44423

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.

Work placement

Not applicable

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