



## Subject card

Subject name and code	, PG_00037589						
Field of study	Green Technologies						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2023/2024		
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	4		Language of instruction		English		
Semester of study	7		ECTS credits		3.0		
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				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	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	45		2.0		28.0	75
Subject objectives	Aim of this course is to familiarize Student with several most important chemometric techniques and their application in environmental monitoring & sciences.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W01] has a basic knowledge from some branches of mathematics and physics useful for formulating and solving simple problems in the field of environmental technologies and modern analytical methods		A Student is familiar with advanced chemometric techniques and is able to properly choose proper techniques in order to solve a given scientific problem.		[SW1] Assessment of factual knowledge		
	[K6_U03] is able to use information and communication technologies relevant to the common tasks of engineering, is able to use known methods and mathematical-physical models to describe and explain phenomena and chemical processes		A Student is able to use a spreadsheet or the basis of the R programming language to solve complicated mathematical problem for a mutidimensional set of data, being a result of measurements.		[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task		
Subject contents	1. Introduction to chemometrics & environmental sciences, data acquisition & documentation 2. Data control 3. Data processing, visual analysis 4. Analysis of similarities 5. Principal component analysis (PCA) 6. Classification, time series 7. Experiment planning, dependence modelling 8. Dependence modelling, part 2						
Prerequisites and co-requisites	1. Basic knowledge of statistical terms & techniques. 2. Experience in usage of a spreadsheet.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	project		60.0%		20.0%		
	homework		60.0%		30.0%		
	test		60.0%		50.0%		

Recommended reading	Basic literature	1. Practical Guide to Chemometrics, edited by Paul Gemperline, Taylor & Francis, 2006. 2. Statistics and Chemometrics for Analytical Chemistry, J.N. Miller & J.C. Miller, Pearson Education Limited, 2005.
	Supplementary literature	- brak -
	eResources addresses	Adresy na platformie eNauczenie: Environmetrics 2023-2024 - Moodle ID: 34442 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=34442">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=34442</a>
Example issues/ example questions/ tasks being completed	A Student will be asked to prepare an individual dataset, to state a problem for this dataset and to solve it on her/his own, using chemometrical techniques learned during the classes. Also, the lecturer will provide some additional datasets in order to practice additional techniques.	
Work placement	Not applicable	