



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 multidimensional 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	<ol style="list-style-type: none"> 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 eNauzanie: Environmetrics 2023-2024 - Moodle ID: 34442 https://enauzanie.pg.edu.pl/moodle/course/view.php?id=34442
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	