



Subject card

Subject name and code	, PG_00047947						
Field of study	Biomedical Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group			Optional 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	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Chemistry and Technology of Functional Materials -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor						
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	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		4.0		51.0	100
Subject objectives	The aim of the course is to familiarize students with chosen issues related to forensic chemistry and toxicology. The lecture content and laboratory program have been selected in a way to show not only the specificity of this area of science, but also to clearly emphasize the interdisciplinary character of the subject, which is characteristic for modern science.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W52] Knows and understands, to an advanced extent, selected aspects of chemistry and biochemistry, constituting general knowledge related to the field of study	Student knows and understands the principles of the functioning of the human body and is able to assess the influence of external factors on its functioning			[SW1] Assessment of factual knowledge		
	[K6_U53] can apply equipment used in biomedical diagnostics	Student knows and distinguishes the principles of operation of the equipment used in biomedical diagnostics, with particular emphasis on the equipment used in toxicological and forensic analysis			[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_U51] can conduct laboratory work connected with chemistry and biochemistry, specific to biomedical engineering	Student knows and uses laboratory techniques used in the field of toxicological and forensic analysis. Student is able to interpret the results of experimental work			[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		
Subject contents	The content of the course covers issues related to forensic toxicology discussed on examples, including, inter alia, specifics of sampling and preparation of samples and analysis of selected groups of substances (alcohols and other addictive substances, poisoning with narcotic substances, pesticides, drugs, etc.). Issues related to the validation of analytical methods are also discussed. Selected aspects of the orchard analysis are discussed on selected examples of groups of substances / materials, taking into account the methods and apparatus used, e.g. medium and near infrared spectroscopy, terahertz spectroscopy, chromatographic methods, chromatographic methods coupled with spectroscopic methods, including mass spectrometry.						
Prerequisites and co-requisites	Required knowledge of the issues discussed in the course of classes in: - chemistry - organic and bioorganic chemistry - analytical chemistry - biochemistry. Required practical skills from the above areas according to the laboratory schedule.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture: a colloquium covering the scope material discussed on lecture	50.0%	60.0%
	Laboratory: all practical exercises, passing the required tests	100.0%	40.0%
Recommended reading	Basic literature	<p>1. Clarke's analytical forensic toxicology / ed. by Sue Jickells, Adam Negrusz ; consulting eds. Anthony C. Moffat, M. David Osselton, Brian Widdop. London ; Chicago : Pharmaceutical Press, cop. 2008.</p> <p>2. Seńczuk W. Toksykologia współczesna. PZWL</p> <p>3. Konieczka P., Namieśnik J.: Ocena i kontrola jakości wyników pomiarów analitycznych, 2007.</p>	
	Supplementary literature	<p>1. Flanagan R.J., Taylor A., Watson I.D., Whelpton R. Fundamentals of Analytical Toxicology. Wiley, 2007.</p> <p>2. Moffat A.C., Osselton M.D., Widdop B. Clarke's Analysis of Drugs and Poisons. Pharmaceutical Press, 2004-2010.</p> <p>3. Food and Drug Administration, Guidance for Industry, Analytical Procedures and Methods Validation: Chemistry, Manufacturing and Controls Documentation, 2000.</p> <p>4. Food and Drug Administration, Guidance for Industry, Bioanalytical Method Validation, 2001,</p> <p>5. Kiemle David J., Silverstein Robert M., Webster Francis X. Spektroskopowe metody identyfikacji związków organicznych, 2012.</p>	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	1. Forensic expertises - scope and specificity 2. Forensic biological traces and their importance as evidence 3. Methods of detecting explosives 4. Modern methods of detecting document forgeries and confirming their authenticity.		
Work placement	Not applicable		

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