University of Gdańsk

Subject card

Subject name and code	Physiochemical detection methods in forensic science, PG_00007243						
Field of study	Chemistry						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2028/2029			
Education level	Bachelor's studies		Subject group	Optional subject group			
Mode of study	full-time studies		Mode of delivery	at the university			
Year of study	3		Language of instruction	Polish			
Semester of study	5		ECTS credits	2.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Laboratory of Electroanalysis and Biosensors -> Department of Analytical Chemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Paweł Niedziałkowski					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	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		5.0	15.0	50	
Subject objectives	Introduction to basic law terms and definitions in forensic science.Introduction to basic physical and chemical analysis used in forensic science. Introduction to basic chemical methods used in forensic science. Introduction to basic analyses and methods of revealing traces in forensic science. Developing the ability to carry out the basic procedures related to the detection and preservation of traces in forensic science.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEML3_U05] Uses basic statistical methods and IT techniques to describe chemical processes and analyse experimental data.	Acquires knowledge of measurement data analysis methods. Acquires knowledge of statistical analysis.	[SU4] test/exam - oral or written
[CHEML3_W10] Enumerates and describes the basic aspects of the construction, operation and use of measuring apparatus and equipment used in experimental works in the field of chemistry and related sciences.	Can mention the apparatus used in forensic analysis. Knows the physical and chemical methods used in forensic science. Recalls the basic principles and legal procedures in forensic science.	[SW4] test/exam - oral or written
[CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.	Acquaints oneself with the basic methods of preparing data obtained in measurements for forensic purposes.	[SU4] test/exam - oral or written
[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	The student have a knowledge of the analytical equipment used in forensic analysis. Students have a knowledge of the chemical apparatus used in forensic analys	[SU4] test/exam - oral or written
[CHEML3_W04] Characterises the basic methods of chemical compound analysis.	Explains the principles of sample preparation for physicochemical analysis in forensic science. Explains and recognizes the basic analytical procedures and methods in forensic science.	[SW4] test/exam - oral or written
[CHEML3_W02] Describes the properties of elements and the most important chemical compounds, enumerates the methods of their preparation and methods of analysis.	The student will be able to identify the chemical methods used to analyse the elements and chemical compounds. Student will be able to list basic analytical methods used to analyse chemical compounds.	[SW4] test/exam - oral or written
[CHEML3_K05] Observes established procedures in laboratory work and is responsible for the safety of her/his and others' work.	Understands the need for further education to acquire specialist qualifications. Anticipates the effects of the use of psychoactive drugs and narcotic drugs.	[SK4] test/exam - oral or written

Subject contents

Forensics Science - the basic concepts, scope of research.Inspection. Forensic physicochemistry - general concepts. Research methodology used in forensic science, classical qualitative analysis, chromatographic methods (TLC, GC, HPLC), spectrophotometry (IR, UV VIS, MAS, NMR, INR),electrochemistry (CV, electrography, etc.), microscopic examination.The scope of chemical research in forensics science, research of fuel, research of alcohol, research of psychoactive drugs, drug research, determination of causes of fires, explosions, examination of paint coatings, microscopic tests,testing of gunshot residues, testing of metals and their alloys, testing of cosmetics, testing of chemicals used in the household. Dactyloscopic and dermatoscopic traces, osmology, basic concepts, methods of protection traces. Analysis of phonoscopic traces. Mechanical and traseological traces. Forensic analysis of the writing and its pathology. Documentation as a forensic trace. Regulations, routines and legal aspects in forensic science and analytical practice.

Prerequisites and co-requisites

Prerequisites: applying safety rules in a chemical laboratory, using laboratory glassware, knowledge of chemical reactions including their effects, having basic knowledge of chromatographic and spectroscopic techniques and of the basic physico-chemical properties of organic substances

Specification of other subjects: Completed course in general chemistry, analytical chemistry and organic chemistry.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test/exam	51.0%	100.0%

Recommended reading	Basic literature	1. Z. Ruszkowski, Fizykochemia kryminalistyczna, CLK KGP, Warszawa 1992. 2. J. Moszczyński, Ślady w kryminalistyce, Difin, Warszawa 2007. 3. J. Mazepa, Vademecum techniki kryminalistyki, Oficyna, Warszawa 2009. 4. B. Hołdys, Kryminalistyka, Lexis Nexis, Warszawa 2006. 5. M. Małkiewicz, Kryminalistyczne badanie patologii pisma ręcznego, Wydawnictwo Akademickie i Profesjonalne, Warszawa 2009. 6. J. Moszczyński, Daktyloskopia, CLK KGP, Warszawa 1997. 7. Stepnowski P., Synak E., Szafranek B., Kaczyński Z. Techniki separacyjne. Wydawnictwo UG 2010. 8. A. Mazurek, Badania mineralogiczne śladów kryminalistycznych, CLK KGP, Zeszyty Metodyczne nr 6, Warszawa 2000.
	Supplementary literature	1. R. Zieliński, Badania instalacji elektrycznej na miejscu pożaru, CLK KGP, Warszawa 1992 2. L. Rodowicz, Kryminalistyczne badanie śladów obuwia, CLK KGP, Warszawa 2000
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Identify the type of fingerprint presented in the picture below. 2. Identify the type of explosive in the photo below. 3. Find the correct name of the drug in the picture below.	
Work placement	Not applicable	

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