University of Gdańsk

Subject card

Subject name and code	Physiochemical detection methods in forensic science, PG_00007242						
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	0.0	0.0	30.0	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.	The student performs analytical measurements and is able to analyse the data obtained using instrumental methods. Performs chromatographic determinations of selected forensic traces. The student will learn the software that operates the chemical apparatus.	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written
[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	Independently performs identification and analysis of traces and compounds used in forensic analysis. Identifies the fingerprint. Distinguishes and identifies the traseologic traces.	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written
[CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.	Preparation of performed experiments in English. Prepares statistical analysis of the data on the basis of the obtained experiments.	[SU2] presentation/project/paper/ report [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.	Identifies and describes the components of the chemical apparatus used during laboratory activities. Describes the laboratory equipment used in forensic analysis. Knows how to select appropriate materials for dactyloscopic and traseological analyses.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[CHEML3_W04] Characterises the basic methods of chemical compound analysis.	The student will be able to carry out and interpret the results of analysis of chemical compounds and traces in forensic science. The student is capable of performing analyses and identification of traces in the areas of dactyloscopy and traseology.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[CHEML3_W02] Describes the properties of elements and the most important chemical compounds, enumerates the methods of their preparation and methods of analysis.	Defines the basic principles of visual inspection of occurrence. Defines and classifies the rules of marking and securing the crime scenes.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[CHEML3_K05] Observes established procedures in laboratory work and is responsible for the safety of her/his and others' work.	Identifies the hazards associated with the use of chemical substances in household. Behaves caution in handling with chemicals and explosives.	[SK2] presentation/project/paper/ report [SK4] test/exam - oral or written

Subject contents

Laboratory are divided into two thematic blocks. The first part is consists of a qualitative and quantitative analysis in forensic science using chromatographic and spectroscopic techniques such as: gas chromatography, thin layer chromatography, or spectroscopy UV / Vis methods.The second part of laboratory includes practical learning of revealing fingerprints with mechanical and physicochemical methods and the basics of learning to identify a human on the basis of fingerprints on fingerprint cards and exercises in the field of traseology.

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.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Final colloquium of laboratories (50%)</td><td>51.0%</td><td>30.0%</td></tr>
<tr><td>3 partial tests of laboratories (35 %)</td><td>51.0%</td><td>21.0%</td></tr>
<tr><td>3 reports (15 %)</td><td>51.0%</td><td>9.0%</td></tr>
<tr><td>2 reports</td><td>51.0%</td><td>40.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>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.</td></tr>
<tr><td>Supplementary literature</td><td>1. R. Zieliński, Badania instalacji elektrycznej na miejscu pożaru, CLK KGP, Warszawa 1992
2. L. Rodowicz, Kryminalistyczne badanie śladów obuwia, CLK KGP, Warszawa 2000</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. How to perform a chromatographic analysis by GC.
2. How to perform a chromatographic analysis by HPLC.
3. List the types of fingerprint types.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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