

Subject card

Subject name and code	Forgery Detection, PG_00188350						
Field of study	Wykrywanie fałszerstw (Wykład)						
Date of commencement of studies	October 2026		Academic year of realisation of subject			2028/2029	
Education level	Bachelor's 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	3		Language of instruction			Polish	
Semester of study	5		ECTS credits			2.0	
Learning profile	academic		Assessment form			exam	
Conducting unit	Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Agnieszka Chylewska				
	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	1. Providing comprehensive knowledge on the categories of document forgeries, consumer product counterfeits, falsified biological materials, and physicochemical traces, with particular emphasis on their significance in forensic science. 2. Presenting the fundamental principles and methodologies for the identification and analysis of forgeries using microscopic, spectroscopic, and other core instrumental techniques routinely applied in forensic laboratories. 3. Developing the competence to select appropriate analytical methods tailored to the type of material examined and the specific characteristics of the suspected forgery is essential. 4. Enhancing the ability to interpret analytical results about the authenticity and falsification of documents, substances, products, and chemical or biological traces. 5. Shaping a critical and analytically grounded approach to assessing the evidential value of materials and recognizing the methodological limitations inherent in forensic analyses.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[AKRL3_U01] The graduate is able to identify, analyse and solve complex research problems in chemistry and forensic science by selecting appropriate methods and information sources.	The student identifies and analyzes cases of document and object forgery, and selects appropriate analytical methods and sources of information - including chemical, microscopic, and spectroscopic techniques - to address complex evidential problems.	[SU4] test/egzamin - ustny lub pisemny
	[AKRL3_W09] The graduate knows and understands the principles of documentation, securing, and interpreting evidence material, as well as the use of microscopic and spectroscopic methods.	The student is familiar with the principles of proper collection, documentation, and preservation of evidential material, including microtraces, and is able to select appropriate microscopic and spectroscopic techniques for their subsequent analysis and interpretation.	[SW4] test/egzamin - ustny lub pisemny
	[AKRL3_K04] The graduate is ready to cooperate with representatives of other fields—law, medicine, biology—within forensic expertise.	The student understands the interdisciplinary nature of forgery analysis and can demonstrate how the results of chemical examinations integrate with findings obtained by specialists from other fields; the student is able to formulate conclusions and reports in a manner that enables their effective use by experts from related disciplines.	[SK4] test/egzamin - ustny lub pisemny
	[AKRL3_W03] The graduate knows and understands the structure and chemical properties of compounds relevant in forensic examinations.	The student explains the relationship between the molecular structure and the chemical properties of compounds present in materials subjected to forensic analysis, and interprets research results in the context of the physicochemical characteristics of the examined materials.	[SW4] test/egzamin - ustny lub pisemny
	[AKRL3_K05] The graduate is ready to promote science and raise social awareness in the field of forensic analytics.	The student is able to explain, in a clear and substantively accurate manner, the operating principles of selected techniques used in forgery analysis, and can present research results together with their interpretation in a form accessible to individuals outside the expert community.	[SK4] test/egzamin - ustny lub pisemny
Subject contents	1. Fundamental issues related to the falsification of documents, products, and biological materials, as well as the principles of documenting and securing evidential material. 2. Document security features, mechanisms of document falsification, and methods for assessing authenticity are discussed. 3. Microscopic, spectroscopic, and other instrumental techniques used in forgery analysis, including their limitations and validation, are discussed. 4. Falsification of consumer products, particularly cosmetics and pharmaceuticals, including authenticity assessment and typical chemical modifications. 5. Identification and authenticity analysis of plant and biological materials using fundamental chemical and instrumental methods. 6. Diagnostic characteristics of fibers and hair and their applications in comparative examinations. 7. Foundations of food fraud, the most frequently adulterated products, and their associated health and legal consequences. 8. Selected legal regulations concerning food authenticity and labelling requirements. 9. Instrumental techniques used in food authenticity analysis include spectroscopy, chromatography, mass spectrometry, isotopic analysis, and microscopic methods. 10. Biological and molecular methods for species identification and detection of foreign admixtures. 11. Elements of chemometrics in food authenticity evaluation (multivariate analyses and classification models). 12. Radiological and nuclear techniques in forensic science, including radiation detection, diagnostic imaging, and their applications in the analysis of materials, traces, and identification studies, are also discussed.		
Prerequisites and co-requisites	Knowledge of the fundamentals of general and analytical chemistry (chemical properties of compounds, basics of chemical equilibria, qualitative and quantitative analytical methods), organic chemistry, and physical chemistry, as well as a general familiarity with the basic principles of instrumental techniques. Additional: The ability to work with specialist literature in English, enabling independent retrieval of information on new cases and analytical techniques.		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam (90 minutes)	51.0%	100.0%
Recommended reading	Basic literature	1. J. Warylewski, <i>Prawo karne. Część ogólna</i>, Warszawa 2012. 2. M. Kulicki, V. Kwiatkowska-Wójcikiewicz, L. Stępka, <i>Kryminalistyka. Wybrane zagadnienia teorii i praktyki śledczej</i>, Toruń 2009. 3. E. Gruza, J. Moszczyński, M. Goc, <i>Kryminalistyka, czyli rzecz o metodach śledczych</i>, Warszawa 2011. 4. B. Hołyst, <i>Kryminalistyka</i>, Warszawa 2010. 5. B. Kosmowska-Ceranowicz, W. Gierłowski (red.), Bursztyn. <i>Poglądy, opinie. Materiały z seminariów Amberif 1994-2004</i>. Międzynarodowe Stowarzyszenie Bursztynników, Gdańsk-Warszawa 2005. 6. B. Broda, <i>Zarys botaniki farmaceutycznej</i>, Warszawa 2002.	
	Supplementary literature	1. L. Koźmiński, <i>Kryminalistyczne aspekty fałszerstw dokumentów publicznych. Zarys problematyki</i>, Piła 2008. 2. Wybrane artykuły z czasopism <i>Problemy Kryminalistyki</i>", <i>Przegląd Policyjny</i>", <i>Kwartalnik Prawnokryminalistyczny</i>". 3. K. Suchocka-Tropiło, I. Olszewska-Kaczyńska, <i>Botanika lekarska</i>. Wydawnictwo SGGW 2003. 4. Z. Fijałek, K. Sarna, <i>Falszowanie leków i inne przestępstwa farmaceutyczne</i>, <i>Problemy kryminalistyki</i> 263: 5-11, 2009. Scientific articles concerning chemical instrumental methods used for the detection of forgeries.	
	eResources addresses	Basic https://bg.ug.edu.pl/e-biblioteka/zasoby-elektroniczne - Electronic resources of the University of Gdańsk Library: a multidisciplinary collection containing over 240,000 e-books. Supplementary https://bg.ug.edu.pl/e-biblioteka/zasoby-elektroniczne - Electronic resources of the University of Gdańsk Library: a multidisciplinary collection containing over 240,000 e-books.	
Example issues/ example questions/ tasks being completed	1. Discuss the main categories of document, product, and biological material forgeries. 2. Classify the types of security features used in public documents. 3. Identify typical forgery methods (alteration, counterfeiting, hybrid forgery). 4. Compare the applications of IR, UV-Vis, and Raman spectroscopy in trace analysis. 5. Discuss key limitations and validation principles of instrumental methods. 6. Characterize the chemical modifications found in counterfeit cosmetics and pharmaceuticals. 7. Indicate the criteria used to assess product authenticity. 8. Present the fundamental techniques for species identification of plant and biological materials. 9. Analyze the physicochemical features that determine the authenticity of a biological sample. 10. Discuss the characteristics enabling differentiation between natural and synthetic fibers. 11. List the most frequently adulterated food products and describe the mechanisms of their falsification. 12. Discuss the health and economic consequences of food fraud. 13. Discuss the applications of spectroscopy, chromatography, and mass spectrometry in detecting adulteration. 14. Explain the importance of isotopic analyses in determining the origin of food products. 15. Explain the role of multivariate analyses and classification models in authenticity assessment. 16. Describe the methods for detecting alpha, beta, and gamma radiation and their applications.		
Work placement	Not applicable		

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