

Subject card

Subject name and code	Molecular Forensic Diagnostics, PG_00188286						
Field of study	Forensic Analytics						
Date of commencement of studies	October 2026		Academic year of realisation of subject			2026/2027	
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	1		Language of instruction			Polish	
Semester of study	2		ECTS credits			1.0	
Learning profile	academic		Assessment form			credit	
Conducting unit	Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Magda Rybicka-Misiejko				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15		2.0		8.0	25
Subject objectives	The objective of the course is to familiarize students with basic and advanced molecular analysis techniques used in forensics, with a particular focus on DNA analysis. The course aims to provide knowledge about methods of evidence identification, principles of DNA isolation and amplification, as well as interpretation of genetic test results in a forensic context. Students also learn about quality assurance principles and the use of the latest scientific achievements in molecular biology.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[AKRL3_W07] The graduate knows and understands the principles of quality assurance in analytical and forensic laboratories.	The graduate knows and understands the principles of quality assurance in analytical and forensic laboratories. This includes maintaining independence, impartiality, confidentiality, and consistency in laboratory operations. The graduate understands the importance of documented procedures, proper personnel qualifications, contamination control, and adherence to international standards to ensure reliable and credible test results. They are aware that quality assurance also involves regular monitoring, internal controls, participation in proficiency testing, and compliance with accreditation requirements to guarantee the highest standards in laboratory practice.	[SW4] test/exam - oral or written
	[AKRL3_W04] The graduate knows and understands the specialist principles of biological analysis of evidence material, including the identification of DNA, proteins, and other biological traces.	The graduate knows and understands the basics of biological analysis of forensic material, including the principles of DNA identification, proteins, and other biological traces. This includes recognizing types of biological traces (such as blood, saliva, semen), methods of DNA isolation and analysis, and interpreting research results in the forensic context. Such foundational knowledge enables the proper application of molecular techniques in evidence analysis, which is crucial for individual identification and analysis of biological material in criminal cases.	[SW4] test/exam - oral or written
	[AKRL3_W12] The graduate knows and understands, at an advanced level, the latest trends and achievements in analytical chemistry, toxicology, molecular biology and instrumental methods used in forensic science.	The graduate knows and understands at an advanced level the latest trends and achievements in DNA analysis used in forensic science. They are familiar with modern technologies such as next-generation sequencing (NGS), which enables rapid and precise analysis of genetic material. They can utilize DNA phenotyping techniques to predict physical traits, biogeographical origin, and age, supporting effective investigations. With this knowledge, the graduate is able to apply advanced DNA analysis methods in forensic practice, contributing to the effectiveness of investigations and solving criminal cases.	[SW4] test/exam - oral or written
	[AKRL3_K01] The graduate is prepared to critically evaluate their own knowledge and its relevance to solving cognitive, practical, and societal problems, as well as to responsibly make use of expert opinions.	The student is prepared to critically evaluate their knowledge in the field of molecular forensic diagnostics, understands its importance in solving practical problems related to the analysis of biological material, and is able to seek expert opinion when necessary to ensure the reliability and correctness of research result interpretation.	[SK4] test/exam - oral or written

Subject contents	- Basics of molecular biology of DNA and types of biological material in forensics (blood, saliva, semen, contact traces). - Securing, storing, and documenting evidence material for DNA analysis; sources of contamination and how to avoid it. - Methods of DNA isolation from various types of forensic material (blood, degraded samples, mixtures, trace amounts) including manual and automated techniques. - DNA amplification (PCR, STR analysis, autosomal, Y-STR, X-STR markers) and quality control of the extracted material. - DNA profiling and interpretation of genetic profiles, including mixture analysis and low template DNA analysis.								
Prerequisites and co-requisites									
Assessment methods and criteria	<table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>test</td><td>51.0%</td><td>100.0%</td></tr></table>	Subject passing criteria	Passing threshold	Percentage of the final grade	test	51.0%	100.0%		
Subject passing criteria	Passing threshold	Percentage of the final grade							
test	51.0%	100.0%							
Recommended reading	Basic literature	- Literatura wykorzystywana podczas zajęć - Treści udostępnione przez prowadzącego wykłady. - Słomski, R. (red.) Analiza DNA. Praktyka. Poznań: Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu, 2014 - Bal J. Genetyka medyczna i Molekularna. PWN Warszawa 2017 - Lewandowska Ronnegren A. Techniki laboratoryjne w Biologii Molekularnej. MedPh, Wrocław 2018 - Butler J.M., Fundamentals of Forensic DNA Typing - Shewale J.G., Liu R.H. (red.), Forensic DNA Analysis: Current Practices and Emerging Technologies							
	Supplementary literature	- Buckingham, M.L., Flaws, L.: Molecular diagnostics: Fundamentals, Methods and Clinical Applications. 2019 - Chang-Hui Shen Diagnostic Molecular Biology, 2nd edition (2023)							
	eResources addresses								
Example issues/ example questions/ tasks being completed									
Work placement	Not applicable								

Document generated electronically. Does not require a seal or signature.