

**Subject card**

<b>Subject name and code</b>	Mechanoscopy and physical methods of examining traces - lecture, PG_00132515						
<b>Field of study</b>	Criminology						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>			2026/2027		
<b>Education level</b>	Master's studies	<b>Subject group</b>			Obligatory subject group in the field of study		
<b>Mode of study</b>	part-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	1	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	2	<b>ECTS credits</b>			2.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			exam		
<b>Conducting unit</b>	Faculty of Law and Administration -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr hab. Anna Synak				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	10.0	0.0	0.0	0.0	0.0	10
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	10		0.0		40.0	50
<b>Subject objectives</b>	Familiarizing students with physical research methods used in Mechanoscopy [a branch that examines traces of the impact of a given thing (tool) on another thing] and other methods supporting this branch. Discussing research equipment microscopic techniques) used in modern forensics to identify traces. Familiarizing students with the technical parameters of the equipment, its capabilities and limitations from the perspective of its use in preparing an expert opinion. Learning the basic physical phenomena and processes necessary to understand the research methods discussed						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[KRYMMU2_WG05] Has an in-depth knowledge of methods and tools, including data and information extraction techniques, specific to criminology and forensic science	The student has knowledge of physics that allows them to propose solutions and interpret problems in the field of mechanoscopy. Ability to apply to a given evidence. Knows various techniques of analyzing traces in forensics, their advantages and disadvantages.	[SW4] test/exam - oral or written
	[KRYMMU2_K05] Is able to independently and critically complement knowledge and skills, extended by the interdisciplinary dimension	The student is able to expand their knowledge and skills in various fields of science related to physical methods of examining traces of crimes. Verifies the credibility of information obtained from various sources based on basic knowledge of physics.	[SK1] oral statement/conversation/discussion
	[KRYMMU2_WG02] Has an in-depth knowledge of the nature of natural sciences related to the studied major, their place in the system of sciences and their mutual relations	The student has knowledge of physics to describe and analyze selected results of physical and physicochemical tests. Verifies the credibility of information obtained from various sources. Recognizes the importance of physics and other natural sciences for criminology. Understands the need for further education and expanding knowledge related to the development of natural sciences with awareness of their impact on the development of criminology.	[SW4] test/exam - oral or written [SW1] oral statement/conversation/discussion
Subject contents	Discussion of modern physical laboratory methods used mainly in Mechanoscopy, in the study of crime evidence. The program includes: optical and electron microscopy, physical methods of glass examination, X-ray methods of examining hidden objects.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written/oral exam	51.0%	100.0%

Recommended reading	Basic literature	<p>[1] M. Pluta, Mikroskopia optyczna, PWN, Warszawa, 1980.</p> <p>[2] D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, t. 4, PWN, 2012.</p> <p>[3] A. Barbacki, Mikroskopia elektronowa, Wyd. Politechniki Poznańskiej, 2005.</p> <p>[4] W. Dziadur, J. Mikuła, Mikroskopia elektronowa, transmisyjna, skaningowa, tom 1, tom 2, Kraków 2016.</p> <p>[5] E. U. Kurczyńska, D. Borowska-Wykręt, Mikroskopia świetlna w badaniach komórki roślinnej, PWN, 2007.</p> <p>[6] J.Liu, J.Tan, Confocal Microscopy, Morgan&amp;Claypool Publishers, 2016.</p> <p>[7] A. Ho-Pui Ho, D. Kim, M.G.Somekh (Editors) Handbook of Photonics for Biomedical Engineering, Springer, 2017r.</p> <p>[9] J.A.Litwin, M. Gajda, Podstawy technik mikroskopowych, Wydawnictwo Uniwersytetu Jagiellońskiego, 2011.</p> <p>[10] J. Widacki - Kryminalistyka" , Wydawnictwo C.H. Beck, 2012.</p> <p>[11] A. Filewicz, W. Krawczyk, A. Musiał - Ślady fizykochemiczne. Ślady kryminalistyczne. Ujawnianie, zabezpieczenie, wykorzystanie" pod redakcją M. Goca i J. Moszczyńskiego, Diffin, Warszawa 2007.</p>
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	Supplementary literature	<p>[1]. A. Szummer - Podstawy ilościowej mikroanalizy rentgenowskiej". Wydawnictwo Naukowo - Techniczne, Warszawa 1994;</p> <p>[2]. C. Aitken, A. D. Stoney - The Use of Statistic in Forensic Science", Ellis Horwood, New York, 2000;</p> <p>[3]. A. Gorski, W. C. Mc Crone - Birefringence of fibres', The Mickroskope", 1998, 46, 3 - 16;6. M. Grieve - Fibres and their Examination in ForensicScience", Forensic Science Progress, vol. 4, Springer - Verlag, Berlin 1990;</p> <p>[4]. J. Wąs - Gubała - Pojedyncze włókno - śladem w badaniach kryminalistycznych, Przegląd Włókienniczy, 1999;</p> <p>[5].R. Howland, L. Benater, STM/AFM Mikroskopy ze skanującą sondą. Elementy teorii i praktyki, Warszawa,2002.</p> <p>[6] Z.Hrynkiewicz, E. Rokita (red.) - Fizyczne metody badań w biologii, medycynie i ochronie środowiska", Wydawnictwo Naukowe PWN, Warszawa1999;</p> <p>[7]J.R. Taylor, Wstęp do analizy błędu pomiarowego, PWN Warszawa 1999</p> <p>[8]H. Szydłowski, Pracownia fizyczna wspomagana komputerem, PWN 2012</p> <p>[9]E. Hecht, Optyka, PWN, 2012.</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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