University of Gdańsk

Subject card

Subject name and code	Mechanoscopy and physical methods of examining traces - lecture, PG_00132723		
Field of study	Criminology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master'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	2.0
Learning profile	academic	Assessment form	exam
Conducting unit	Faculty of Law and Administration -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Anna Synak	
	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	0.0	35.0	50

Subject objectives

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

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<tr><td>Learning outcomes</td><td>
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<tr><th>Course outcome</th><th>Subject outcome</th><th>Method of verification</th></tr>
<tr><td>[KRYMMU2_WG05] Has an in-depth knowledge of methods and tools, including data and information extraction techniques, specific to criminology and forensic science</td><td>The student has knowledge of physics, which he can use to propose solutions and interpret specific problems in the field of mechanoscopy. He can match a specific research method to a given evidence material. He knows various techniques of analyzing traces in forensics, their advantages and disadvantages.</td><td>[SW4] test/exam - oral or written
[SW1] oral statement/ conversation/discussion</td></tr>
<tr><td>[KRYMMU2_K05] Is able to independently and critically complement knowledge and skills, extended by the interdisciplinary dimension</td><td>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.</td><td>[SK1] oral statement/conversation/ discussion</td></tr>
<tr><td>[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</td><td>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.</td><td>[SW4] test/exam - oral or written
[SW1] oral statement/ conversation/discussion</td></tr>
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<tr><td>Subject contents</td><td>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 and analysis of unknown substances.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
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<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>egzamin pisemny/ustny</td><td>51.0%</td><td>100.0%</td></tr>
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Recommended reading	Basic literature	[1] M. Pluta, Mikroskopia optyczna, PWN, Warszawa, 1980. [2] D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, t. 4, PWN, 2012. [3] E. Hecht, Optyka, PWN, 2012. [4] A. Barbacki, Mikroskopia elektronowa, Wyd. Politechniki Poznańskiej, 2005. [5] W. Dziadur, J. Mikuła, Mikroskopia elektronowa, transmisyjna, skaningowa, tom 1, tom 2, Kraków 2016. [6] E. U. Kurczyńska, D. Borowska-Wykręt, Mikroskopia świetlna w badaniach komórki roślinnej, PWN, 2007. [7] M. Wędzony, Mikroskopia fluorescencyjna dla botaników, Kraków, 1996. [8] J.Liu, J.Tan, Confocal Microscopy, Morgan&Claypool Publishers, 2016. [9] A. Ho-Pui Ho, D. Kim, M.G.Somekh (Editors) Handbook of Photonics for Biomedical Engineering, Springer, 2017r. [10] J. Pawley (Editor), Handbook of Biological Confocal Microscopy (any edition). [11] J.A.Litwin, M. Gajda, Podstawy technik mikroskopowych, Wydawnictwo Uniwersytetu Jagiellońskiego, 2011. [12] K. Kurzydłowski, M. Lewandowska, Nanomateriały inżynierskie - konstrukcyjne i funkcjonalne, PWN, Warszawa, 2010.[14] J. Widacki - Kryminalistyka" , Wydawnictwo C.H. Beck, 2012. [13] A. Filewicz, W. Krawczyk, A. Musiał - Ślady fizykochemiczne. Ślady kryminalistyczne. Ujawnianie, zabezpieczenie, wykorzystanie" pod redakcjąM. Goca i J. Moszczyńskiego, Diffin, Warszawa 2007.

	Supplementary literature	[1]. A. Szummer - Podstawy ilościowej mikroanalizy rentgenowskiej". Wydawnictwo Naukowo - Techniczne, Warszawa 1994; [2]. C. Aitken, A. D. Stoney - The Use of Statistic in Forensic Science", Ellis Horwood, New York, 2000; [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; [4]. J. Wąs - Gubała - Pojedyncze włókno - śladem w badaniach kryminalistycznych, Przegląd Włókienniczy, 1999; [5].R. Howland, L. Benater, STM/AFM Mikroskopy ze skanującą sondą. Elementy teorii i praktyki, Warszawa,2002. [6] Z.Hrynkiewicz, E. Rokita (red.) - Fizyczne metody badań w biologii, medycynie i ochronie środowiska", Wydawnictwo Naukowe PWN, Warszawa1999; [7]J.R. Taylor, Wstęp do analizy błędu pomiarowego, PWN Warszawa 1999 [8]H. Szydłowski, Pracownia fizyczna wspomagana komputerem, PWN 2012,
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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