University of Gdańsk

Subject card

Subject name and code	Mechanoscopy and physical methods of examining traces - lecture, PG_00132515		
Field of study	Criminology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	Master's studies	Subject group	Obligatory subject group in the field of study
Mode of study	part-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	dr hab. Anna Synak	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	0.0	0.0	0.0	10
	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	10	0.0	40.0	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

Learning outcomes

Course outcome	Subject outcome	Method of verification
[KRYMMU2_KK01] The graduate is aware of the level of his/her knowledge and skills, and also understands the need of lifelong learning	1. The student knows the limitations of his/her own knowledge of physics (its laws, achievements and applications); 2. The student understands the need for further education and training of skills; 3. The student appreciates the development made in forensics thanks to its connection with the sciences sciences and scientific analysis of crime evidence; 4. The student is aware of the helpful role of physicochemical analysis of traces in identifying perpetrators of crimes; 5. The student is aware of the prospects for the development of forensics along with the development of the exact sciences.	[SK1] oral statement/conversation/ discussion
[KRYMMU2_UW07] He/she has skills in understanding and analyzing social phenomena and utilizing the analysis in professional work	Student 1. has in-depth knowledge of selected structures and institutions in the area of social communication, 2. is able to interact and work with various professional groups 3. can work in interdisciplinary groups, 4. can communicate in an accessible and understandable way with people from various social and professional groups.	[SU1] oral statement/conversation/ discussion
[KRYMMU2_UW06] He/she is able to propose solutions of concrete problems and carry out procedures connected with solutions in this respect	The student is able to: 1. match a specific research method to a given evidence material, 2. adapt a specific research method to a specific need (e.g ordering an expert opinion).	[SU4] test/exam - oral or written
[KRYMMU2_KR08] He/ she is aware of the level of own knowledge and skills, and understands the need for lifelong learning	Student 1. is able to properly determine priorities for the implementation of a task specified by himself or others and translate it into specific actions. 2.understands the need for lifelong learning, 3. uses general knowledge of criminology (mechnanoscopy) while maintaining the ethical principles appropriate to his profession,	[SK3] text preparation/written work
[KRYMMU2_UW02] He/she acquires knowledge independently and develops his/her professional skills using various sources (in native and foreign language) and modern technologies	Student knows 1. how to prepare and present various materials and research results, 2. how to acquire and use knowledge from various disciplines to develop your skills, 3. how to use various sources of knowledge to solve specific problems	[SU1] oral statement/conversation/ discussion

Subject contents

Discussion of modern physical laboratory methods used mainly in Mechanoscopy, in the examination of crime evidence. The program includes: optical and electron microscopy (with extension to scanning electron microscope SEM, SEM-EDX coupled with an X-ray spectrometer (X-ray)), physical methods of glass examination, metallographic methods, X-ray methods.

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	[1] M. Pluta, Mikroskopia optyczna, PWN, Warszawa, 1980. [2] D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, t. 4, PWN, 2012. [3] A. Barbacki, Mikroskopia elektronowa, Wyd. Politechniki Poznańskiej, 2005. [4] W. Dziadur, J. Mikuła, Mikroskopia elektronowa, transmisyjna, skaningowa, tom 1, tom 2, Kraków 2016. [5] E. U. Kurczyńska, D. Borowska-Wykręt, Mikroskopia świetlna w badaniach komórki roślinnej, PWN, 2007. [6] J.Liu, J.Tan, Confocal Microscopy, Morgan&Claypool Publishers, 2016. [7] A. Ho-Pui Ho, D. Kim, M.G.Somekh (Editors) Handbook of Photonics for Biomedical Engineering, Springer, 2017r. [9] J.A.Litwin, M. Gajda, Podstawy technik mikroskopowych, Wydawnictwo Uniwersytetu Jagiellońskiego, 2011. [10] J. Widacki - Kryminalistyka" , Wydawnictwo C.H. Beck, 2012. [11] 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 [9]E. Hecht, Optyka, PWN, 2012.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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