

Subject card

Subject name and code	Laboratory course, PG_00144466						
Field of study	Chemistry						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Optional subject group 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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		10.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Joanna Makowska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	180.0	0.0	0.0	180
	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	180		30.0		40.0	250
Subject objectives	Planning and performance of experimental research project by each student working under the control / guidance of supervisor. Presentation of obtained research results in the form of written master thesis						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEMMU2_U03] Finds necessary information in specialist literature, databases and other sources, lists basic scientific journals in chemistry.	Student: • performs scheduled experiments, makes observations • analyzes the obtained results and compares them with available literature data • draws conclusions from the conducted tests and proves their correctness in based on available literature data • presents the same content in a different language convention • systematically collects and prepares documentation of her/his research work	[SU2] presentation/project/paper/report [SU5] implementation of a problem task
	[CHEMMU2_U01] Plans and implements chemical experiments of medium complexity.	Student is able to plan chemical experiments of advanced difficulty. The student is able to analyze and synthesize information, isolate key concepts and understand complex chemical issues at an advanced level - The student has the ability to think critically in the context of explaining the assumptions of his or her research problem in the field of the studied specialty.	[SU5] implementation of a problem task
	[CHEMMU2_U10] Reads with understanding scientific and popular science chemical texts in English.	Student critically selects source texts to conduct a reliable analysis of his or her own data.	[SU3] text preparation/written work [SU5] implementation of a problem task
	[CHEMMU2_K06] Undertakes research tasks consciously and responsibly, understanding the social aspects of the practical application of the acquired knowledge and skills and the responsibility related to it.	-Student is able to define a clear goal or task that he wants to achieve. Identifies the stages, operations and equipment involved in production. The student uses his knowledge in practice. - Student knows the basic concepts and principles related to the protection of intellectual property. Knows the principles of copyright and patent law	[SK5] implementation of a problem task
	[CHEMMU2_K05] Understands the need for independent search of information in scientific literature and popular science magazines.	- Student independently uses literature databases and critically selects source texts. - Student is aware of the consequences of disregarding intellectual property and the abuse of artificial intelligence tools in scientific, research and teaching work.	[SK2] presentation/project/paper/report [SK5] implementation of a problem task
	[CHEMMU2_W14] Explains concepts and principles in the field of industrial property and copyright protection and recalls knowledge about the management of intellectual property resources; is able to use patent information.	Student: • names and describes methods of synthesis and analysis and /or methods of computer theoretical calculations used during realization of master project • distinguishes and characterizes individual experimental / IT techniques used during realization of research project • identifies scientific and research apparatuses used during realization of research project and explains the principles of their operations	[SW1] oral statement/conversation/discussion
	[CHEMMU2_K04] Correctly identifies and resolves dilemmas related to the profession of a chemist.	Student: • works independently • correctly defines priorities necessary for realization of her/his own aims • cares for safety during own-self realization of chemical experiments • takes into account the made arrangements for realization of experiments	[SK1] oral statement/conversation/discussion

	Course outcome	Subject outcome	Method of verification
	[CHEMMU2_U07] Defines and implements the directions of own further education.	-Student knows his or her strengths. Knows how to conduct professional exploration in the future. Is able to regularly assess his progress and adapt his actions to new challenges.	[SU1] oral statement/conversation/discussion [SU5] implementation of a problem task
Subject contents	The program content is varied and depends on the scope of the topic of the master thesis		
Prerequisites and co-requisites	Organic chemistry, Biochemistry, Physical chemistry, Spectrochemistry, Instrumental analysis, Intellectual property protection, Advanced chemistry laboratory. Knowledge of organic and physical chemistry and biochemistry at the first-cycle education, knowledge of the basic principles of occupational health and safety in a chemical laboratory, knowledge of the construction and operating principle of basic chemical apparatus used in the laboratory of organic synthesis and physicochemistry, knowledge of basic concepts and principles of property protection industrial and copyright law, the ability to synthesize simple organic compounds based on procedures written in Polish and English languages.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Presentation of the obtained research results in the form of a written master's thesis.	100.0%	100.0%
Recommended reading	Basic literature	A. Literature required to pass the course A.1. Literature used during classes: Specialist literature in the scope of realized master thesis. The scope of literature is corrected and still adopted to conducted master research topics A.2. Literature for individual studies: Specialist literature in the scope of realized master thesis. The scope of literature is corrected and still adopted to conducted master research topics	
	Supplementary literature	B. Extracurricular readings Specialist literature in the scope of realized master thesis. The scope of literature is corrected and still adopted to conducted master research topics	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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