

Subject card

Subject name and code	Instrumental methods in cosmetic analysis, PG_00183751						
Field of study	Metody instrumentalne w analizie kosmetyków (Wykład)						
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 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	1		Language of instruction			Polish	
Semester of study	1		ECTS credits			1.0	
Learning profile	academic		Assessment form			credit	
Conducting unit	Department of Environmental Analysis -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Monika Paszkiewicz				
	Teachers						
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		3.0		12.0	25
Subject objectives	- To introduce students to the basic analytical techniques used in the analysis of cosmetics, with particular emphasis on their structure and principles of operation - To provide knowledge on cosmetics quality control methods, covering both the theoretical basis of instrumental techniques and their practical application to the qualitative and quantitative analysis of chemical ingredients, active substances, impurities and auxiliary ingredients. - To develop competence in the field of analysing results, interpreting measurement data and formulating conclusions in the context of the requirements of the cosmetics industry. - To prepare students to independently apply instrumental techniques in cosmetics analysis.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEMMU2_W10] Uses knowledge of the principles of operation of the basic scientific and research apparatus used in chemistry.	1. Knows and understands the theoretical basis of the chromatographic process 2. Knows the structure and principle of operation of research equipment used for chromatographic separations 3. Knows the possibilities of using instrumental techniques in the quantitative and qualitative analysis of chemical components, active substances, impurities and auxiliary components used in cosmetics 4. Is able to select appropriate instrumental methods for the identification and determination of selected compounds in cosmetics	[SW4] test/egzamin - ustny lub pisemny
	[CHEMMU2_W01] Uses knowledge of spectroscopic methods of chemical compound analysis.	1. Knows and understands the theoretical basis of spectroscopic methods of chemical compound analysis 2. Knows the practical application of spectroscopic methods in the analysis of chemical compounds in cosmetics	[SW4] test/egzamin - ustny lub pisemny
	[CHEMMU2_W03] Demonstrates extended knowledge in the field of modern measuring techniques used in chemical analysis.	1. Knows the structure and operating principles of modern research equipment used in cosmetics analysis, including combined techniques (GC-MS, LC-MS) 2. Knows the possibilities of applying modern analytical techniques in the quality control of cosmetic products	[SW4] test/egzamin - ustny lub pisemny
Subject contents	Classification of methods used in the cosmetics industry to assess the quality of raw materials, active ingredients and finished products. Collection and preparation of cosmetic samples for analysis. UV-Vis spectroscopy apparatus design (radiation source, monochromator, cuvette, detector) and its application in cosmetics analysis. Instrumental analysis methods, including gas chromatography: theoretical principles, apparatus design, column characteristics, selected detectors, qualitative and quantitative analysis. High-performance liquid chromatography (HPLC): theoretical basics, apparatus design, column characteristics, selected detectors, qualitative and quantitative analysis. Mechanisms of chromatographic processes, selectivity and efficiency of chromatographic systems. Combined techniques: gas chromatography coupled with mass spectrometry (GC-MS), liquid chromatography coupled with mass spectrometry (LC-MS). Practical application of instrumental and combined techniques in cosmetics analysis. Quality of analytical data validation, accuracy and precision, reproducibility, limit of detection (LOD) and limit of quantification (LOQ), specificity, selectivity, linearity, measurement range.		
Prerequisites and co-requisites	General chemistry, organic chemistry, inorganic chemistry, analytical chemistry		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam with both open-ended and test questions	51.0%	100.0%
Recommended reading	Basic literature	- Gościńska A., Olejnik A., Nowak A., <i>Analytics of cosmetic products</i>, Cursiva Publishing Offices, Kostrzyn, 2012 - Szczepaniak W., <i>Instrumental methods in chemical analysis</i>, PWN, Warsaw, 2010 - Collective work edited by Zieliński W. and Rajca A., <i>Spectroscopic Methods and Their Application to the Identification of Organic Compounds</i>, Scientific and Technical Publishing Offices, Warsaw, 2000 - Witkiewicz Z., <i>Fundamentals of Chromatography</i>, Scientific and Technical Publishing Offices, Warsaw, 2005	
	Supplementary literature	Collective work edited by Stanisław B. and Muszalska A., <i>Methods for testing the quality of raw materials and cosmetic products</i> , Scientific Publishing Offices of the Karol Marcinkowski, Medical University in Poznań, 2009	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		