



Subject card

Subject name and code	Modern Analytical Techniques, PG_00048919						
Field of study	Chemistry in Construction Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
Education level	first-cycle studies	Subject group			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	4	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Justyna Płotka-Wasyłka					
	Teachers	dr hab. inż. Justyna Płotka-Wasyłka prof. dr hab. inż. Andrzej Wasik prof. dr hab. inż. Bożena Zabiegała prof. dr hab. inż. Agata Kot-Wasik dr inż. Tomasz Majchrzak dr hab. inż. Mariusz Marć dr inż. Małgorzata Rutkowska dr inż. Bartłomiej Cieśliak					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	15.0	60
	E-learning hours included: 0.0						
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=3783 Adresy na platformie eNauczanie:						
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	60	5.0		35.0	100	
Subject objectives	Acquaintance with modern analytical techniques in theory and practice that will enable analysis building materials, monitoring and analytics of environmental pollution originating from squares construction, emitted from building materials						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_W03	After completing the course, the student will have knowledge of issues related to analytical techniques, which can be used for analysis and pollution monitoring building materials and construction sites.	[SW1] Assessment of factual knowledge
	K6_W08	The student is able to analyze phenomena and provide methods for them analysis and monitoring, so much needed in terms of construction	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	K6_U06	After completing the course, the student will have knowledge of issues related to analytical techniques, which can be used for analysis and pollution monitoring building materials and construction sites.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
Subject contents	<p>1. Spectroscopic techniques used to analyze building materials</p> <p>2. Theoretical and practical basics in the use of chromatographic techniques. Analysis of building materials and processing of received data.</p> <p>3. Chemical sensors, an electronic nose type used to analyze and monitor release pollution from building materials.</p> <p>4. Micro-extraction techniques used to prepare samples for analysis. Building materials and their solid, liquid and gas impurities.</p>		
Prerequisites and co-requisites	Basic knowledge of chemistry. Knowledge of the dangers arising from emissions of building materials.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lecture	60.0%	45.0%
	seminas	60.0%	10.0%
	lab	60.0%	45.0%

Recommended reading	Basic literature	<p>1. Marian Kamiński, Podstawowe pojęcia i parametry opisujące układy chromatograficzne. Podstawowe zasady efektywnego stosowania chromatografii cieczowej do rozdzielania i oznaczania składu mieszanin, PG, 2010</p> <p>2. Praca zbiorowa pod redakcją M. Kamiskiego Chromatografia cieczowa, CEEM, Gdask, 2004.</p> <p>3. D. Berek, M. Dressler, M. Kubin, K. Marcinka Chromatografia elowa PWN Warszawa 1989.</p> <p>4. European Committee for Standardization, Safety of toys. Organic chemical compounds. Methods of analysis, BS EN 71-11:2005</p> <p>5. M. Marć, B. Zabiegała, J. Namieśnik, Trends Anal. Chem., 32 (2012) 76</p> <p>6. A. Kot-Wasik, B. Zabiegała, M. Urbanowicz, E. Dominiak, A. Wasik, J. Namieśnik, Anal. Chim. Acta 602 (2007) 141</p> <p>7. M. Urbanowicz, B. Zabiegała, J. Namieśnik, Anal. Bioanal. Chem., 399 (2011) 277</p> <p>8. A. Cygański, Podstawy metod elektroanalizy, WNT, Warszawa, 1999.</p> <p>9. S L R Ellison, A Williams, Quantifying Uncertainty in Analytical Measurement, EURACHEM/CITA, 2011.</p>
	Supplementary literature	<p>J. Warych, Oczyszczanie przemysłowcy gazów odlotowych, WNT, Warszawa, 1988.</p> <p>W. Lewandowski, Techniczno-technologiczne i aparaturowe aspekty ochrony powietrza, Wydawnictwo Poli-techniki Gdańskiej, Gdańsk, 2011</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed	Gas chromatography, liquid chromatography, spectroscopic techniques, sensors, electronic nose, qualitative analysis, quantitative analysis, building materials, dust emissions from building materials and construction sites, monitoring, road infrastructure and environmental pollution	
Work placement	Not applicable	