


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
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 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
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Course title		ECTS code	
Diploma lecture - Modern technologies in environmental analysis		13.3.0405	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	pierwszego stopnia
Wydział Chemii	Chemia	form	stacjonarne
		specjalty	chemia biomedyczna, chemia kosmetyków, analityka i diagnostyka chemiczna, chemia żywności
		specialization	wszystkie
Teaching staff			
dr hab. Łukasz Haliński; dr Joanna Dołżonek; prof. dr hab. Piotr Stepnowski; dr hab. Anna Białk-Bielińska, profesor uczelni; prof. UG, dr hab. Monika Paszkiewicz			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		2	
Lecture		classes 30 h	
The realization of activities		tutorial classes 5 h	
classroom instruction		student's own work 15 h	
Number of hours		TOTAL: 50 h - 2 ECTS	
Lecture: 30 hours			
The academic cycle			
2024/2025 summer semester			
Type of course		Language of instruction	
obligatory		polish	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
multimedia-based lecture		Final evaluation	
		Graded credit	
		Assessment methods	
		- (mid-term / end-term) test	
		- oral course credit	
		The basic criteria for evaluation	
		Lecture:	
		• pass the test with open and closed questions concerning the whole course content	
		91-100%: 5.0	
		81-90%: 4.5	
		71-80%: 4.0	
		61-70%: 3.5	
		51-60%: 3.0	
		Less than 51% 2.0	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
Basic chemistry, organic chemistry, inorganic chemistry, analytical chemistry, physical chemistry.			
B. Prerequisites			
Skills in basic chemistry, organic chemistry and physical chemistry. Basic knowledge on methods used in the chemical analysis.			
Aims of education			

To provide students a clear understanding of the most important issues in modern chemical analysis of environmental pollutants

- To familiarize students with the basic knowledge on environmental pollution and pollutants
- To familiarize students with main stages of the analytical procedures
- To introduce students to principles of designing the analytical process basing on the structure and properties of the substance
- To learn students how to independently design simple analytical process

Course contents

The course includes principles of the modern environmental analysis. Specified topics of lectures are given below.

Classification of selected environmental pollutants, their sources and environmental fate. Selected physicochemical properties of compounds emitted to the environment. Main stages of the analytical process. Designing the analytical process basing on the structure and properties of chemicals.

Extraction of pollutants from selected environmental matrices. Purification and separation of analytes. Chromatographic and spectroscopic techniques in determination of environmental pollutants. Examples of the whole analytical process: pesticides and petroleum-derived organic compounds.

Bibliography of literature

Literature required to pass the course

A. Literatura wymagana do ostatecznego zaliczenia zajęć (zdania egzaminu):

A.1. Literature used during classes:

Stepnowski P., Synak E., Szafranek B., Kaczyński Z. Techniki separacyjne. Wydawnictwo UG 2010.

Witkiewicz Z. Podstawy chromatografii, Wydawnictwa Naukowo-Techniczne, Warszawa, 2005.

A.2. Literature form individual studies:

Stepnowski P., Synak E., Szafranek B., Kaczyński Z. Techniki separacyjne. Wydawnictwo UG 2010.

Witkiewicz Z. Podstawy chromatografii, Wydawnictwa Naukowo-Techniczne, Warszawa, 2005.

Szczepaniak W. Metody instrumentalne w analizie chemicznej, Wydawnictwo Naukowe PWN, Warszawa, 2002.

Extracurricular readings

Alloway B.J., Ayres D.C. Chemiczne podstawy zanieczyszczenia środowiska, PWN, Warszawa, 1999.

Van Loon G.W., Duffy S.J. Chemia środowiska, PWN, Warszawa, 2008.

Namieśnik i in. Przygotowanie próbek środowiskowych do analizy, WNT, W-wa, 2000.

Johnstone R.A.W., Rose M.E. Spektrometria mas. Podręcznik dla chemików i biochemików. PWN, Warszawa, 2001.

The learning outcomes (for the field of study and specialization)

Knowledge

Students know main sources of selected pollutants and understand importance of structure-activity relationship of a substance in determining its environmental fate. Students are able to describe main stages of the analytical process and is familiar with principles of its design. Students know selected modern methods of extraction, purification and chemical analysis of organic pollutants. Students are able to define possibilities and limitations of basic analytical methods. Students understand the importance of chemical structure and physicochemical properties of substances in choosing the most useful analytical technique for their determination.

Skills

Students are able to design simple analytical process basing on properties of the analyte. Students are able to find and verify the data in different sources. Students perform the critical review of analytical methods described in literature and estimate their usefulness in independently performed experiments. Students are able to discuss topics associated with environmental pollution, using clear language and correct nomenclature.

Social competence

Students understand the need of life-long learning in environmental pollution-related topics. Students are able to estimate the impact of human activity on natural environment in a conscious way. Students tend to verify data found in popular and scientific literature in a critical way. Students promote the importance of mathematics in describing phenomena and processes

Contact

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