

<b>Course title</b> Wykład monograficzny - Chemiczna i radiochemiczna analiza środowiska / Monographic lecture - Chemical and radiochemical environmental analysis		<b>ECTS code</b> 13.3.0702	
<b>Name of unit administrating study</b>  <b>Faculty of Chemistry</b>			
<b>Studies</b>			
<b>Field of study</b>	<b>Type</b>	<b>Form</b>	
Chemistry	Master	Full-time studies	
<b>Teaching staff</b> Prof dr hab. Bogdan Skwarzec			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b>	
<b>A. Forms of classes, in accordance with the UG Rector's regulations</b> Lecture		classes - 30 h	
<b>B. The realization of activities</b> In-class learning		Tutorial classes - 15 h	
<b>C. Number of hours</b> Lecture 30 h		Student's own work - 30 h	
		TOTAL: 75 h - 5 ECTS	
<b>The academic cycle</b> Second year, summer semester			
<b>Type of course</b> obligatory		<b>Language of instruction</b> Polish	
<b>Teaching methods</b> <ul style="list-style-type: none"> <li>lecture with multimedial presentation</li> </ul>		<b>Form and method of assessment and basic criteria for evaluation or examination requirements</b>	
		<b>A. Final evaluation, in accordance with the UG study regulations</b> Course completion (with a grade)	
		<b>B. Assessment methods</b> Written exam	
		<b>The basic criteria for evaluation</b> Obtaining a positive assessment of the written credit consisting of open questions covering only the issues listed in the lecture	
<b>Required courses and introductory requirements</b>			
<b>A. Formal requirements</b> The student should have completed a monographic lecture „Environmental radiochemistry and radiological protection” at the second degree studies.			
<b>B. Prerequisites</b> Students are required to complete obligatory subjects: completion of first degree chemical studies with specialization in chemical analytics and diagnostics, food chemistry, cosmetics chemistry and environmental chemistry The monographic lecture is intended for students of chemistry of the second degree and specialization in chemical analytic and diagnostics, environmental chemistry and environmental technology.			
<b>Aims of education</b>			
- To familiarize students with the basics and methods of chemical and radiochemical analysis of the environmental.			
- To familiarize students with the applications of chemical and radiochemical analysis in studies of terrestrial and marine environment.			
- To familiarize students with the validation of chemical and radiochemical methods.			

### Course contents

1. Trace analysis in environmental studies, research methods and technique.
2. Radioactive elements in nature, radiometry (gamma, beta and alpha spectrometry) and sources of radioactive contamination in the natural environment
3. Validation in chemical and radiochemical analysis and criteria for evaluation of analytical results.
4. Speciation and speciation analysis of toxic and radiotoxic elements.
5. Determination of radioactive gamma, beta and alpha radionuclides in natural samples.

### Bibliography of literature

#### A. Literature required to pass the course:

##### Primary literature:

##### A.1. Literature used during classes:

- Skwarzec B., Polon, uran i pluton w ekosystemie południowego Bałtyku, Rozprawy i monografie, 6, Instytut Oceanologii PAN, Sopot 1995.
- Skwarzec B., Radiochemia środowiska i ochrona radiologiczna, Wydawnictwo DJ s.c, Gdańska, 2002.
- Skwarzec B., Analysis of radionuclides, In: Handbook of trace analysis: fundamentals and applications, Ed: I. Baranowska, Springer, Switzerland, Charter 15, 431-453, 2015, ISBN 978-3-319-19613-8.

##### A.2. Literature for individual studies

- Analiza śladowa, pod redakcją I. Baranowskiej, Wydawnictwo MALAMUT, Warszawa, 2013.
- G.W van Loon, S.J. Duffy: Chemia środowiska. Wydawnictwo PWN (2008). ISBN: 978-83-01-15324-3.

##### B. Extracurricular readings:

- Ćwiczenia rachunkowe z chemii analitycznej pod redakcją Z. Galusa, PWN, Warszawa 2009,
- M. Wesołowski. K. Szefer, D. Zimna – Zbiór zadań z chemii analitycznej, Warszawa 2002.
- A. Cygański, B. Ptaszyński, J. Krystek – Obliczenia w chemii analitycznej, WN-T, Warszawa 2000

### Knowledge

After completing the course, each student:

1. Defines basic concepts of chemical and radiochemical environmental analysis.
2. Knows and understands analytical and spectroscopic methods used for the quantification of elements and radionuclides.
3. Understands the concept and application of validation in environmental analysis and distinguishes and applies the basic criteria for assessing analytical results.

### Social competence

After completing the course, each student:

1. Understands the need and further education in the field of chemical and radiochemical analysis.
2. Knows the basic principles of safe work with toxic substances and radioactive isotopes.
3. Makes the public aware of the impact of radioactivity and toxic substances on human life.
4. Demonstrates the most independent, active approach to problems and creativity in independent and team work.