

Course title Wykład specjalizacyjny - Współczesne metody spektrometrii mas/Graduate study lecture - Modern methods of mass spectrometry		ECTS code 13.3.0483	
Name of unit administrating study Faculty of Chemistry			
Studies			
Field of study	Type	Form	
Chemistry	Master	Full-time studies	
Teaching staff dr Małgorzata Czerwicka-Pach			
Forms of classes, the realization and number of hours		ECTS credits	
A. Forms of classes, in accordance with the UG Rector's regulations Lecture		classes 30 h tutorial classes 5 h student's own work 40 h TOTAL: 75 h - 3 ECTS	
B. The realization of activities In-class learning			
Number of hours Lecture 30 h			
The academic cycle 2019/2020 summer semester			
Type of course obligatory		Language of instruction Polish	
Teaching methods Lecture with multimedia presentation		Form and method of assessment and basic criteria for evaluation or examination requirements	
		A. Final evaluation, in accordance with the UG study regulations Course completion (with a grade)	
		B. Assessment methods Written exam with open questions	
		C. The basic criteria for evaluation or exam requirements - The condition for obtaining a positive rating is min. 51% of possible points from the written exam covering the scope of material realized during lectures - Negative grade can be improved on the basis of additional credit from the material realized during lectures (minimum 51% of possible points)	
Required courses and introductory requirements			
<p>a. Formal requirements Basics of organic chemistry, general and inorganic chemistry, organic chemistry, analytical chemistry</p> <p>b. Prerequisites Basic knowledge of general chemistry, organic chemistry and methods of instrumental analysis</p>			

Aims of education

- Familiarizing students with the structure and operation of modern mass spectrometers, taking into account the range of applications and limitations
- Acquainting students with the basic principles of interpretation of mass spectra of selected classes of organic compounds using various ionization techniques

Course contents**A. Problems of the lecture:**

Historical development and significance of mass spectrometry. Construction and working principle of mass spectrometer. Combined techniques: gas chromatography combined with mass spectrometry (GC-MS), liquid chromatography combined with mass spectrometry (LC-MS). Practical application of mass spectrometry techniques. Discussion of ionization methods and types of analyzers used in mass spectrometry. Types of ions: molecular, isotope, apparent and metastable. Theory of the fragmentation process, fragmentation of the main classes of compounds. Examples of mass spectrometry applications to identify organic compounds.

Bibliography of literature**A. Literature required to pass the course**

A.1. Used during classes:

R. A. W. Johnstone, M. E. Rose, Mass spectrometry, PWN, Warszawa 2001

R. M. Silverstein, F. X. Webster, D. J. Kiemle, Spectroscopic methods for organic compounds identification, PWN, Warszawa 2007

W. Zieliński, A. Rajca (red.), Spectroscopic methods and their application to identify organic compounds, WNT, Warszawa 1995

A.2. Studied independently by the student

R. A. W. Johnstone, M. E. Rose, Mass spectrometry, PWN, Warszawa 2001

R. M. Silverstein, F. X. Webster, D. J. Kiemle, Spectroscopic methods for organic compounds identification, PWN, Warszawa 2007

W. Zieliński, A. Rajca (red.), Spectroscopic methods and their application to identify organic compounds organicznych, WNT, Warszawa 1995

B. Extracurricular readings

ed. by P. Suder & Silberring, Mass spectrometry, WUJ, Kraków 2006

Knowledge

1. Knows the structure and principle of operation of a mass spectrometer,
2. Distinguishes and characterizes types of ions occurring in mass spectrometry,
3. Knows the possibilities of combining mass spectrometry with chromatographic techniques,
4. Knows examples of the use of mass spectrometry in scientific research,
5. Knows the theory of the fragmentation process.

Skills

1. Has the ability to critically evaluate the results of conducted experiments, observations and / or theoretical calculations

Social competence

1. Is able to properly set priorities for carrying out tasks by himself or others,
2. Keeps open to new solutions related to chemical compound analysis using mass spectrometry,
3. Explains to others the importance of developing modern analytical methods,
4. Appreciates the role of international contacts in the development of scientific research,
5. Understands the need for lifelong learning.