

<b>Course title</b> Techniki analizy biomolekuł / Techniques of analysis of biomolecules		<b>ECTS code</b> 13.3.0977	
<b>Name of unit administrating study</b> Faculty of Chemistry			
<b>Studies</b>			
<b>Field of study</b>	<b>Type</b>	<b>Form</b>	
Chemistry	Bachelor	Full-time studies	
<b>Teaching staff</b> Aneta Szymańska Ph. D. D.Sc, dr. Magdalena Wysocka Ph. D. D.Sc, Justyna Żygowska, M.Sc.			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b> 5	
<b>A. Forms of classes, in accordance with the UG Rector’s regulations</b> lecture, laboratory classes		classes - 75 h	
<b>B. The realization of activities</b> in-class learning		tutorial classes – 10 h	
<b>C. Number of hours</b> 75 h (30 h lecture, 45 h laboratory classes)		student’s own work – 40 h	
		Total: 125 h - 5 ECTS	
<b>The academic cycle</b> Third year, winter semester			
<b>Type of course</b> obligatory		<b>Language of instruction</b> Polish	
<b>Teaching methods</b>  Lecture with multimedia presentation  Performing experiments in the laboratory class		<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> 1. Lecture - written final test exam consisting of open and closed questions 2. Laboratory class – continuous assessment of theoretical background for experiments, experimental results, and written laboratory reports	
		<b>C. The basic criteria for evaluation or exam requirements</b> A) Lecture - final score of at least 51% of total points from the final exam B) Laboratory class the final grade determined based on partial grades received during the semester	
<b>Required courses and introductory requirements</b>  - completed courses: "Analytical chemistry", "Organic chemistry" - the knowledge of basic groups of organic compounds classified on the basis of a functional group, knowledge of basic types of biomolecules, knowledge of basic laboratory analytical techniques, ability to work with basic chemical reagents (organic and inorganic) used routinely in a laboratory lab.			
<b>Aims of education</b> The goal of the subject is to extend students’ knowledge on chemical methods and instrumental techniques used in routine analysis of biomolecules and to familiarize students with the general and characteristic reactions of individual groups of biomolecules. Students will gain hands-on experience in qualitative and quantitative analysis of different types of biomolecules based on their characteristic reactions and physicochemical properties. Students skills in critical evaluation of the analysis results and presentation the results of laboratory work gained prior to the classes will be further developed and strengthened.			

## Course contents

### A. Lecture:

Characterization of physicochemical properties of individual types of biomolecules. General and characteristic reactions of specific groups of biomolecules. Methods of quantitative analysis of individual groups of biomolecules. Application of chromatographic methods for analysis. Application of electrophoretic techniques for the analysis of proteins and nucleic acids. Application of spectroscopic methods for the analysis of biomolecules.

### B. Laboratory class:

Isolation of selected groups of biomolecules (proteins, nucleic acids, sugars) from biological material. Qualitative and quantitative analysis of individual groups of biomolecules (amino acids, proteins, nucleic acids, sugars, lipids, vitamins, steroids) by means of characteristic methods (selected on the basis of physicochemical characteristics and / or used as standard) for the tested group of biomolecules. Analysis of the composition of an unknown mixture containing compounds belonging to the studied group of biomolecules using characteristic reactions and techniques based on the physicochemical characteristics of representatives of this group of chemical compounds. Presentation of the results obtained during the experiments on the analysis of the studied group of biomolecules, combined with their discussion, prepared in the form of a written report.

## Bibliography of literature

### A. Literature required to pass the course

- a. Materials provided by the lecturer and teaching assistant prior laboratory classes
- b. L. Kołyszajko-Stefanowicz (red.): *Ćwiczenia z biochemii*, PWN, 2003

### B. Extracurricular readings

- a. D. Holme, H. Peck: *Analytical Biochemistry*, 3<sup>rd</sup> Ed., Prentice Hall, 1998
- b. R. Boyer: *Modern experimental biochemistry*, 3<sup>rd</sup> Ed. , Prentice Hall, 2000

## Knowledge

student can describe the properties of the selected groups of biomolecules,  
 student can list and describe the methods of the analysis of selected groups of biomolecules;  
 student can explain the relationship between the structure of the biomolecule and its observed properties;  
 student can list and describe the basic aspects of the construction, operation, and usage of the equipment used in routine analysis of biomolecules;

## Skills

student can identify, analyze and solve problems in the field of broadly understood chemistry based on the acquired knowledge;  
 student can perform the analysis of a selected group of biomolecules using experimental methods  
 student can select the appropriate laboratory equipment to carry out simple chemical experiments  
 student is able to plan and perform simple chemical experiments and analyze the obtained results  
 student can prepare a written report describing the performance of the scientific experiment, including the analysis of the obtained data and conclusions drawn on the basis of the analysis

## Social competence

student can work individually demonstrating the initiative and independence of the action and can cooperate in the team taking on different roles in it;  
 student follows the established procedures in laboratory work and shows responsibility for the safety of his/her own work and other students;  
 student understands the necessity of constant improvement of his/her professional and personal competencies by using the information provided in various sources;  
 student formulates opinions according to the level of his/her knowledge with caution and criticism in their expression