

<b>Course title</b> Surfaktanty i biosurfaktanty / Surfactants and biosurfactants		<b>ECTS code</b> 13.3.0422	
<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> Dr hab. Beata Grobelna, prof. dr hab. inż. Tadeusz Ossowski			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b> 3	
<b>A. Forms of classes, in accordance with the UG Rector's regulations</b> lecture, laboratory classes		classes - 45 h tutorial classes – 5 h student's own work – 25 h	
<b>B. The realization of activities</b> in-class learning		Total: 75 h - 3 ECTS	
<b>C. Number of hours</b> 45 h (15 h lecture, 30 h laboratory classes)			
<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		<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 test - open test and questions	
		<b>C. The basic criteria for evaluation or exam requirements</b>  • obtaining 51% of points from the test consisting of 10-15 open questions (50%) and 10-15 test questions (50%) covering issues mentioned in the program of the lecture..	
<b>Required courses and introductory requirements</b> completed a course in general chemistry, analytical chemistry and physical chemistry, the knowledge of the basics of general, inorganic and organic chemistry			
<b>Aims of education</b> <ul style="list-style-type: none"> <li>• familiarization with the structure and physical properties of surfactants and biosurfactants,</li> <li>• familiarization with the application of industry surfactants and biosurfactants,</li> <li>• familiarization with adsorption mechanisms and adsorption capacity of surfactants and biosurfactants.</li> <li>• Presentation of the influence of the structure of surfactants on surface properties of adsorbents.</li> </ul>			
<b>Course contents</b>  A. Problems of the lecture: Construction and physical properties of surfactants and biosurfactants, with particular reference to surfactants used in cosmetics. Classification of surfactants and biosurfactants. Acquainting with the basic utility properties of surfactants. Adsorption of surfactants at the solid-liquid interface. Methods for determining the adsorption volume at the solid-liquid interface. Micellisation of surfactants and biosurfactants. Methods for the production of surfactants. Detergents, wetting agents, dispersants, emulsifiers and foaming agents, solubilizers in cosmetic systems. Discription of the applications of selected technologies with the participation of surfactants and their impact on the environment.. B. Laboratory exercises: Methods of quantitative and qualitative determination of surfactants and biosurfactants, study of the process of ionic surfactants micellization, coagulation of colloids, viscosimetric mean molar mass of polymers, study of surfactant absorption on the interface, use of surfactants in cosmetics and cleaning agents			

## **Bibliography of literature**

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

1. Anastasiu A., „Środki powierzchniowo czynne”, WNT Warszawa, 1973.;
2. Tomasziewicz-Potępa A.: „Związki powierzchniowo czynne”. Wydawnictwo Politechniki Krakowskiej, Kraków 1999.
3. Ogonowski J., Tomasziewicz-Potępa A.: „Związki powierzchniowo czynne”. Wydawnictwo Politechniki Krakowskiej, Kraków 1999

### **B. Extracurricular readings**

1. T.F. Tadros, “Surfactants in Agrochemicals”, Marcel Dekker, New York, 1994
2. W. Malinka, „Zarys chemii kosmetycznej”, Volumed, Wrocław, 1999.
- A.3. Literatura uzupełniająca:
3. J. M. Rosen, “Surfactants and Interfacial Phenomena”, Wiley-Interscience, New York, 1989.

## **Knowledge**

1. describes the properties of surfactants and the technology of their production.
2. describes the stages of creating industrial processes and technical preparation of production with the participation of surfactants.
3. lists and describes selected uses of surfactants and their impact on humans and the environment.
4. Explains the concepts of free enthalpy, enthalpy and entropy of adsorption in surfactants.

## **Skills**

1. Classifies and differentiates surfactants based on their chemical structure.
2. Interprets the phenomena occurring with the participation of surfactants.
3. Predicts the role of surfactants and biosurfactants in cosmetics, medicine, chemical and technological processes.

## **Social competence**

1. Improves skills in the use of measurement methods and techniques.
2. Effectively communicates in a group and uses the experience of other people.
3. It is guided by the principle of saving materials and resources.
4. The student understands the need for further education, information retrieval in literature and critical interpretation of experiments.