

86S1-DIACHEM

CHEMICAL DIAGNOSTICS

ECTS: 3.0

HOURS PER SEMESTER/WEEK: LECTURES: 15/1; CLASSES: 45/3

FIELD OF THE STUDY: Chemistry

Level of study: First-cycle (Bachelor's degree) program

Course status: obligatory *

Year of the study: II

COURSE CONTENTS

LECTURES: Basic information on the structure, properties and functions of biomolecules. Fundamentals on bioanalytical and biomolecular methods based on the characteristic response of biomolecules. Sensors and biosensors: optical, colorimetric, electrochemical (amperometry, voltammetry, potentiometry, conductometry) used to detect and to determine the biomolecules. The construction and operation of sensors and biosensors. Examples of electrochemical biosensors applied in chemical diagnostics.

CLASSES: The student learns how to use the specialized laboratory equipment and laboratory glassware. Practical use of laboratory techniques in the identification and quantification of biomolecules by electrochemical-based biosensors. Elaboration of the final report on the analysis carried out.

EDUCATIONAL PURPOSE: To ground knowledge of the basics of analytical and organic chemistry. Transfer of knowledge in the field of operation and construction of sensors and biosensors. Developing the ability to solve problems related to chemical diagnostics: sample collection and preparation and the selection of an analytical methods. Developing the skills of proper analysis and interpretation of results, validation of the analytical procedure and the method as well as the ability to write report correctly.

LEARNING OUTCOMES

Knowledge. The student knows the structure and properties of biomolecules. He knows the construction and operation of biosensors used in chemical diagnostics.

Skills. The students is able to explain the essence of the operation of biosensors. He is able to select the appropriate techniques depending on the biomolecules to be determined. The student can write a report on the performed analytical determination. He can apply health and safety rules in analytical laboratory.

Social competences. The student evaluates objectively the contribution of one's own work and that of others in the join research and report preparation. He is aware of the continuous improvement of is knowledge.

TEACHING FORMS AND METHODS

Lectures. Information lecture, Lecture with a multimedia presentation of selected issues.

Classes. Discussion, Case study, Laboratory methods, Demonstration and observation, Work in groups.

FORM AND CONDITIONS FOR VERIFICATION OF LEARNING OUTCOMES

Lectures. Written test - credit with a grade.

Classes. Written test - credit with grade.

BASIC LITERATURE

1) McMurry J.E., Hoeger C.A., Ballantine D.S., Peterson V.E. 2012. Fundamentals of general, organic, and biological chemistry. Wyd. Pearson

ADDITIONAL LITERATURE

1) Timberlake K.C. 2010. General, Organic, and Biological Chemistry: Structures of Life. Wyd. Pearson

THE TEACHER/TEACHERS CONDUCTING THE CLASSES:

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