

HOURS PER SEMESTER/WEEK: LECTURES: 15/1; CLASSES: 30/2

FIELD OF THE STUDY: Chemistry

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

Course status: optional *

Year of the study: III

COURSE CONTENTS

LECTURES: The pollution, purification, and disinfection of water. Chemical composition of natural water. Characteristics of the most important classes of chemical pollutants in natural water. Fundamentals of wastewater treatment technology (mechanical, biological, and chemical). Collecting wastewater samples. Extraction methods used for analysis. Types of classical methods applied for quantitative analysis of water and wastewater. Instrumental methods of water analysis (FT-IR, HPLC, GC). Identification of chemical compounds in natural water and wastewater samples. Calculations used in analytical chemistry and basic statistics.

CLASSES: The student learns how to use the laboratory equipment and glassware for quantitative instrumental analysis. Practical use of chromatographic and spectrophotometric techniques. Elaboration of the final report on the analytical determination of chemical compounds in water and wastewater carried out. Quick analytical methods.

EDUCATIONAL PURPOSE: To ground knowledge of analytical chemistry. Provide knowledge regarding the pollution, purification, and disinfection of water and make the students familiar with basic laboratory techniques used in quantitative and qualitative analyses of natural water and wastewater. To develop the ability to select the appropriate analytical method to solve issues related to the analysis of water samples. To develop the ability to perform basic calculations related to analytical chemistry. To develop skills in independent laboratory work. To develop communication and teamwork skills

LEARNING OUTCOMES

Knowledge. The student knows the basic chemical pollutants in natural and wastewater. He understands the principles of and the rules of quantitative and qualitative instrumental analysis applied determination of water samples.

Skills. The student confidently uses classical methods of instrumental analytical chemistry. He can apply the principles of health and safety in the laboratory. The student selects appropriate conditions and appropriate analytical techniques depending on the analyzed compounds. He correctly interprets the results of the analytical measurements. He performs calculations in the basic level area (preparation of the solutions of the desired concentration, calculation of pH values) and calculations related to the estimation of results.

Social competences. The student evaluates objectively the contribution of one's own work and that of others in the joint research and report preparation. He applies the health and safety rules in a lab.

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) Skoog D.A., West D.M., Holler F.J., Crouch S.R. 2014. Fundamental of Analytical Chemistry. Ninth edition. Brooks/Cole, Cengage Learning

ADDITIONAL LITERATURE

1) Fifield F.W., Kealey D. 2000. Principles and Practice of Analytical Chemistry. Wyd. Wiley-Blackwell

THE TEACHER/TEACHERS CONDUCTING THE CLASSES:

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