

**56S1-
CHEMIA GLEBY**

CHEMISTRY OF SOIL

ECTS: 4.0

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

FIELD OF THE STUDY: Environmental protection

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

Course status: obligatory *

Year of the study: III

COURSE CONTENTS

LECTURES: The principles of collecting and preparing soil samples for chemical analysis. Chemical methods of soil control. Human influence on chemical properties of soils. Cycle of transformations organic matter and nutrients in soil. Immobilization - mineralization processes. Cation ratios in soils and their influence on vegetation. Redox processes in soils. Heavy metals in the soil environment. Radioactive substances in the environment. Possibilities and methods of preventing unfavorable chemical changes in soils. Soil cleaning from chemical pollutants. Methods of balancing nutrients in the environment.

CLASSES: Laboratory exercises are focused on chemical analysis of soils, including one field exercise dedicated to collecting soil samples. The scope of exercises includes: determination of the type of soil humus, determination of exchangeable cations content in soils, calculation of cation ratios in soils, determination of available magnesium content, determination of phosphate sorption, determination of exchangeable aluminum content, determination of active manganese content, determination of heavy metals content in soils (Zn, Cd, Cu), determination of selected PAHs in soil, determination of S-SO₄ content, determination of mineral nitrogen N-NH₄ and N-NO₃, determination of soil salinity. During the exercises, a vase experiment is conducted to demonstrate the impact of soil contamination on higher plants - students conduct observations and submit a report.

EDUCATIONAL PURPOSE: Educational objectives focused on familiarizing students with the entirety of chemical transformations taking place in soils.

LEARNING OUTCOMES

Knowledge. Describes the basic chemical and physicochemical properties of soils. He knows the basic analytical methods for soils, and identifies the risks associated with chemical contamination of soils. He is aware of the human impact on chemical changes in soils. Analyzes the effects of pollution and learns methods of preventing pollution or eliminating it from the environment.

Skills. Performs soil chemical analyzes and interprets the results. Interprets the processes of chemical soil degradation and selects methods of preventing chemical contamination of soils. Has knowledge of the advantages and disadvantages of activities in the field of reducing and removing the effects of chemical soil pollution.

Social competences. The student understands and appreciates the need for lifelong learning. He can cooperate in a group in the field of soil chemical analysis. Complies with safety rules and demonstrates responsibility for the entrusted equipment. He can think and act in the field of soil protection.

TEACHING FORMS AND METHODS

Lectures. Informative lecture with a multimedia presentation.

Classes. Laboratory exercises - soil chemical analysis, analysis of results, and conclusions.

FORM AND CONDITIONS FOR VERIFICATION OF LEARNING OUTCOMES

Lectures. Written test - positive answers to three questions.

Classes. Oral exam - Positive answers to three randomly selected questions.

BASIC LITERATURE

1) Greinert H., Greinert A., Ochrona i rekultywacja środowiska glebowego. Wyd. Wydawnictwo Politechniki Zielonogórskiej, 1999. 2) Kowalik P., Ochrona środowiska glebowego 2001, Wyd. PWN, 2001. 3) Namieśnik J., Jamrógiewicz Z., Fizykochemiczne metody kontroli zanieczyszczeń środowiska, Wyd. PWN, 1999. 4) O'Neill P., Chemia środowiska, Wyd. PWN, 1998. 5) Fotyma M., Mercik S., Faber A., Chemiczne podstawy żyzności gleb i nawożenia, Wyd. PWRiL, 1987.

ADDITIONAL LITERATURE

THE TEACHER/TEACHERS CONDUCTING THE CLASSES:

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