UNIVERSITY OF WARMIA AND MAZURY
Faculty of Agriculture and Forestry

56S1-OCZSCMN SEWAGE PURIFICATION WITH NATURAL METHODS ECTS: 3.0

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: optional *
Year of the study: IV

COURSE CONTENTS

LECTURES: Basic legal acts on the classification of water and wastewater management. Main sources of water pollution. Methods of surface water purification. Basic principles of environmental biotechnology - the use of biotic factors to remove pollutants from the environment. Characteristics, composition, and properties of wastewater. Principles of developing environmentally friendly technologies - zero and low waste. Technologies for treatment and design of wastewater treatment plants with hydrophilic systems, facultative algae ponds, and agricultural wastewater treatment plants. Reuse of effluents from wastewater treatment plants in pond ecosystems and agricultural wastewater reuse systems. Self-purification of water in watercourses, ponds, wetlands, and buffer reservoirs. Economic and ecological aspects of wastewater treatment with natural methods.

CLASSES: Balancing wastewater and pollutant loads. Design of hydrophyte wastewater treatment plants, facultative algae ponds and agricultural wastewater treatment plants. Calculation of hydraulic load and pollutant load. Evaluation of the effectiveness of wastewater treatment by natural methods. Design of a wastewater treatment plant using natural methods.

EDUCATIONAL PURPOSE: Familiarize students with: the scope and specificity of activities related to wastewater treatment, issues related to the needs and possibilities of wastewater management in the environment, the impact of wastewater discharge on the natural environment.

LEARNING OUTCOMES

Knowledge. Demonstrates knowledge of basic methods, techniques and tools needed for wastewater treatment. Has basic knowledge of the impact of discharged sewage on the quality of water in the receiver and their impact on water eutrophication and biodiversity of the aquatic environment.
Skills. Has the ability to search and use information from various sources, necessary to determine the methods of wastewater treatment in rural areas. Has the ability to determine the methods of wastewater treatment and neutralization in a specific environment.
Social competences. Understands the need to constantly expand and supplement knowledge about wastewater treatment techniques and technologies. Able to think and act in an entrepreneurial way.

TEACHING FORMS AND METHODS

Lectures. Informative lecture with a multimedia presentation.
Classes. Project exercises.

FORM AND CONDITIONS FOR VERIFICATION OF LEARNING OUTCOMES

Lectures. Written test
Classes. Project - preparation and defense of the project.

BASIC LITERATURE

1) Heidrich Z., Kalenik M., Podedworna J., Stańko G. Sanitacja wsi, Wyd. Seidel-Przywecki Sp. zo.o., 2008.

ADDITIONAL LITERATURE

1) Łomotowski J., Szpindor A., Nowoczesne systemy oczyszczania ścieków, Wyd. Łomotowski J., Szpindor A., 2002.

THE TEACHER/TEACHERS CONDUCTING THE CLASSES:

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* note: optional course availability depends on Polish students' choice!