



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Environmental biology

Course

Field of study

Environmental Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1 / 2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

30

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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Prerequisites

1. Knowledge:

Basic knowledge of the biology and ecology of the range of material from high school.

2. Skills:

The ability to use literature and self-education, making observations, drawing conclusions, working in a group.

3. Social competencies:



Is aware of the need to learn, able to work in a group.

Course objective

- familiarize students with the basic knowledge about the occurrence and use of micro-organisms in the environment;
- familiarize students with the problems of ecology, environmental contamination and preventing degradation.

Course-related learning outcomes

Knowledge

1. The student has knowledge in environmental biology useful for formulating and solving simple tasks in environmental engineering (obtained during lecture and laboratory exercises) - [KIS_W01]
2. The student has ordered knowledge of environmental biology, including knows indicator bacteria in the study of water, sewage and air, and methods of disinfection of these environments (obtained during lectures and laboratory exercises) - [KIS_W03]
3. Student has detailed knowledge of sanitary biology, including knows the threats arising from the presence of microorganisms in water, sewage, air (obtained during the lecture and laboratory exercises) - [KIS_W04]
4. The student knows the basic methods, techniques and tools to solve simple engineering tasks, including from water and sewage disinfection (obtained during the lecture) - [KIS_W07]

Skills

1. The student is able to carry out simple experiments, characterize and assess the positive and negative role of microorganisms in the surrounding environment; (obtained during lecture and laboratory classes) - [KIS_U03]
2. The student is able to identify and assess the degree of microbiological pollution of water, sewage, air and propose proper disinfection (obtained during the lecture and laboratory exercises) - [KIS_U08]
3. The student is able to prepare the elaboration of problems of environmental biology and ecology (obtained during laboratory exercises) - [KIS_U12]

Social competences

1. The student is aware of the effects of engineering activities and its impact on the natural environment (obtained during the lecture) - [KIS_K01]
2. The student is aware of the responsibility for making decisions (obtained during the lecture) - [KIS_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Examination, tests, exercise reports



During the exam is done written exam (effects: W01,W03,W04,W07). The condition of the exam is to have credit for laboratory exercises. On exercises to evaluate the knowledge and the student's work includes: written tests, oral answers, reports of the exercises (effects U01,U03,U04,U08,U012, K01,K04, K05).

Throughout the semester, students are consulted (1.5 h / wk.).

Registration for the exam: within 2 weeks of the findings with students examination date, before the session is established, the term exam, the exam takes place during the exam, an exam takes place during the resit session. Exam in the session and an exam is in writing.

Getting points for the exam (40 questions, max. 40 pts.). For each answer you get from 0 to 1 point. Approximately 45-50% of the maximum points must be obtained. Detailed information on scoring and rating scale are given before crediting.

Programme content

Lectures: Place of microbiology in environmental engineering; organisms systematic basis; characteristics and structure of prokaryotic organisms; eukaryotic cell structure and physiology of organisms. The concept of metabolism (prokaryotes nutrition, respiration, reproduction, conjugation). Characteristics and physiology of bacteria; The impact of external factors on microorganisms. Breeding base of micro-organisms and their practical use. Microorganism culture medium; Sanitary bacteriological analysis of water. Indicator microorganisms in the study of water and the eligibility criteria for drinking water; Polish and international (WHO) rules on the quality of water (for drinking, bathing, swimming pools). Water and its purification. Groundwater (surface and underground). Drinking water disinfection methods. Micro-organisms present in the water bacteria iron, manganese and sulfur. Parasitic protists present in the water. Wodnopochoodne parasitic diseases. Characteristics of human parasites. Basics of Hydrobiology. General characteristics of the lakes; annual cycle of thermal and oxygen. Microbiology and air pollution: microbiological test methods for air pollution, disinfection and air purification, aerogenic disease.

- Threads laboratory;

1. Microscope, the principles of microscopy, cell morphology and bacterial colonies, morphology of microscopic fungi, coloring simple and complex, classification of microorganisms and their occurrence in the environment.
2. The microbial culture media, sterilization and disinfection.
3. Sanitary bacteriological analysis of water, test on fermentacyjno - the tube (FP), membrane filters (FM) and plate culture.
4. Sanitary bacteriological analysis of water, reading and final judgment. Identification of microorganisms.
5. Construction of a typical plant cell and microscopic analysis of seston.



6. Bacteriological pollution of air. Test methods. Air pollution indicator organisms. Air disinfection UV rays.

7. Evaluation of the sanitary condition of the tested air spaces.

Teaching methods

Information lecture, lecture with multimedia presentation, problem lecture. Laboratories: exercise, problem, case study, measurement, observation, experiment.

Bibliography

Basic

1. Michałkiewicz M., Fiszer M. Biologia sanitarna - ćwiczenia laboratoryjne. Skrypt Politechniki Poznańskiej, 2007
2. Lampert W., Sommer U. Ekologia wód śródlądowych. Warszawa, PWB, 2001.
3. Kunicki-Goldfinger W. Życie bakterii. Wydawnictwo Naukowe PWN, 2001
4. Kunicki-Goldfinger W., Frejlik S. Podstawy mikrobiologii i immunologii. PWN W-wa.

Additional

1. Singleton P. Bakterie w biologii, biotechnologii i medycynie. PWN, 2000.
2. Nicklin J., Graeme-Cook K., Paget T., Killington R.A. Mikrobiologia - krótkie wykłady. PWN, 2000.
3. Zaremba M.L., Borowski J. Mikrobiologia lekarska. PZWL, 2001.
4. Pond E.H., Clark T.F. Mikrobiologia i biochemia gleb. Wyd. UMCS, 2000.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam) ¹	55	2,0

¹ delete or add other activities as appropriate