



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Environmental biology

Course

Field of study

Environmental Engineering Extramural First

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

24

Tutorials

Laboratory classes

18

Projects/seminars

Other (e.g. online)

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 - when formulating and solving engineering tasks in the field of environmental engineering to notice their systemic and non-technical aspects and the need to apply the principles of sustainable development (obtained during the lecture and laboratory exercises) - [KIS_U05]



3. 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]

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 U03,U05,U08,K01,K03).

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: Fundamentals of ecology. Biosphere characteristics. Smog, ozone hole, greenhouse effect. Place of microbiology in environmental engineering; basics of systematics of organisms; characteristics and structure of prokaryotic organisms; structure of eukaryotic cell, physiology of organisms. The concept of metabolism (nutrition of prokaryotes; breathing; reproduction; conjugation). Characteristics and physiology of bacteria; The influence of external factors on microorganisms. Basics of microorganism cultivation and their practical use. Culture media for microorganisms; Bacteriological sanitary analysis of water. Indicator microorganisms in water testing and drinking water admission criteria; Polish and world (WHO) water quality regulations (for drinking, bathing, swimming pools). Water and its purification. Water intakes (surface and underground). Drinking water disinfection methods. Microorganisms found in water. Basics of hydrobiology. General characteristics of the lakes; annual thermal and oxygen cycle.

- Topics of laboratory exercises;



1. Microscope, principles of microscopy, cell and bacterial colony morphology, morphology of microscopic fungi, simple and complex staining, classification of microorganisms and their occurrence in the environment.
2. Culture media, sterilization and disinfection.
3. Bacteriological sanitary analysis of water - test of water by fermentation - test (FP), membrane filters (FM) and plate - culture.
4. Bacteriological sanitary analysis of water - reading and final statement. Identification of microorganisms.
5. Construction of a typical plant cell and microscopic analysis of seston.
6. Bacteriological air pollution - test methods. Indicator organisms of air pollution. UV disinfection of air.
7. Assessment of the sanitary state of the air in the tested rooms

Teaching methods

informative lecture, lecture with multimedia presentation, problem lecture. Laboratories: practice, problem method, case study, measurement, observation, experiment.

Bibliography

Basic

1. Michałkiewicz M., Fiszler 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

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.



Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	42	1,5
Student's own work (literature studies, preparation for laboratory, preparation for tests/exam) ¹	58	2,5

¹ delete or add other activities as appropriate