MODULE INFORMATION SHEET

Name of Module Unit	**Biological Techniques for Environmental Monitoring**
Name in polish language	Techniki Biologiczne w Monitoringu Środowiska
Module type	compulsory / ~~elective~~
Form of studying	full-time day courses
Level of study	graduate course (M.Sc. level)
Type of study (for extra-mural courses)	-
Programme	Environmental Engineering
Speciality	Environment Protection Engineering
Responsible department	Department of Biology
Responsible person	Dr Ewa Miaśkiewicz-Pęska

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
2	15		15			2

Learning outcomes (knowledge, skills, competences)

After completing the course student has practical knowledge on the various methods used in microbiological studies on the air, water and soil environment. Moreover, has a broaden knowledge of development trends in the field of biology regarding techniques and methods used in environmental research as part of environmental engineering.

Student is able to analyse and assess the quality and effectiveness of the treatment of the air and water as well as soil remediation and speaks correctly nomenclature used in environmental engineering.

Student understands the need for constant training in the use of biological methods and techniques in environmental engineering and also can work and solve the problems not only individually but also in a team.

Prerequisites

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Rules for integrated grade setting

0.5 x lecture + 0.5 x laboratory

Recommended readings

1. Cappucino J.C, Sherman N. Microbiology – a laboratory manual. Pearson 2011.
2. Mara D., Horan N. Handbook of water and wastewater microbiology, vol.1 and 2 Elsevier Academic Press, London 2003.
3. Haas D., Unteregger M., Habit J., Galler H., Marth E., Reinthaler F.(2010) Exposure to Bioaerosol from Sewage Systems. Water Air and Soil Pollution 207: 49-56
4. Heikkinen M.S.A., Hjelmroos-Koski M.K., Häggblom M.M., Macher J.M. (2005) Bioaerosols. In: Aerosols Handbook:Measurement, Dosimetry and Health Effects (Ruzer L.S., Harley N.H., Eds.), pp. 291-342. CRC Press, Boca Raton.

Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	Basic equipment and techniques in biological monitoring, microscopic observations, sterilization and disinfection, types and characteristics microbiological cultivation media	4	S
2	Quantitative assessment of environmental samples. Microbial counts. Cultivation methods. Indirect methods based on dry weight, turbidity, C and N content, ATP concentration, enzymatic activity tests	2	Ex
3	Detection and identification of microorganisms in environmental samples – conventional techniques and the molecular biology methods.	4	Ex
4	Analysis of environmental samples: water soil and air assessment methods	4	S
5	TEST	1	
	Total	**15**	**hours**

S – topics listed in the legal study programme standards from 12.07.2007
Ex – extended topics

Lecturers

Prof. Ewa Karwowska

Assessment method

Written test

Contents of laboratory

	Topics	Time (hrs.)	Scope (S / Ex)
1	Introduction - safety rules. Bright field microscopy. Bacterial staining	3	Ex
2	Basic laboratory techniques and pure cultures isolation	2	Ex
3	Enumeration of microorganisms and identification of bacteria (culture-based methods)	2	Ex
4	Qualitative and quantitative water analysis	2	S
5	Estimation of MPN and coliform/*Escherichia coli* index to assess drinking and surface water quality.	2	S
6	Microbiological air analysis.	2	S
7	Estimation of the microbial air contamination. **TEST**	2	S
	Total	**15**	**hours**

S – topics listed in the legal study programme standards from 12.07.2007
Ex – extended topics

Persons responsible for laboratory

Dr Ewa Miaśkiewicz-Pęska

Assessment method for laboratory

Reports, discussion, test