

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Environmental Biology and ekology		Code 1010101211010130895
Field of study Environmental Engineering First-cycle Studies	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: - Laboratory: - Project/seminars: -		No. of credits 3
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences natural sciences Biology		ECTS distribution (number and %) 1 34% 1 34% 2 66% 2 66%
Responsible for subject / lecturer: dr Michał Michalkiewicz email: Michal.Michalkiewicz@put.poznan.pl tel. 61 665 24 16 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
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.
Assumptions and objectives of the course: - 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.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. The student knows the classification, systematic position, construction and characterization of prokaryotic and eukaryotic - [K_W01, K_W03, K_W04] 2. The student knows the characteristics of surface and groundwater, and the risks arising from the presence of microorganisms in the water - [K_W05, K_W07, K_W09] 3. The student knows and understands the basic concepts of ecology, biotic and abiotic factors, environmental law (Liebig and Shelford), elements of the biosphere, the characteristics of the population - [K_W02, K_W08] 4. The student knows the effects of the impact of human activity on the environment and is able to counteract the negative role of different industries in the biosphere - [K_W02, K_W08]		
Skills: 1. The student is able to characterize and evaluate the positive and negative role of microorganisms in the surrounding medium - [K_U04] 2. The student is able to calculate and identify basic microorganisms present in water and air, and give an adequate assessment of the degree of contamination of the environment - [K_U05, K_U11] 3. The student is able to identify and interpret the causes, effects and ways to remedy the environmental degradation and perform observations, prepare written documentation and graphical - [K_U14, K_U01]		

Social competencies:
1. The student is aware of the desirability of the study and control of the natural environment - [K_K01]
2. The student is aware of and ability to apply appropriate treatments aimed at reducing environmental contamination (microbiological and physico-chemical) - [K_K02]
3. The student understands and is aware of the validity of the social effects of engineering on the environment - [K_K02]
4. Student is able to rationally manage natural resources and knows the principles of sustainable development - [K_K04]

Assessment methods of study outcomes
- Examination, tests, exercise reports (effects: W1,W2,W3,W4,W5,W7,W8,W9, U1,U4,U5,U11,U14, K1,K2,K4). For each answer you can get 0-1 points. Approximately 50% of the maximum points must be obtained. Detailed information on scoring and rating scale are given before crediting.

Course description
-Ecology of organisms, populations, biocenosis, ecosystem and topography. Characteristic of ecological systems and factors. Influence of anthropopression on environmental. Threats of ecological balance and standards and environmental tidiness. Methods of researches and valorisation of environmental. Structure and working of ecosystem. Sources and flow of energy. Structure of organisms. Profile of Procaryota and Eucaryota. Basic information on botanic, zoology, morphology and physiology of organisms and micro-organisms.

Basic bibliography:
1. Michalkiewicz M., Fiszler M. Biologia sanitarna ? ćwiczzenia laboratoryjne. Skrypt Politechniki Poznańskiej, 2007.
2. Libudzisz Z., Kowal K., Żakowska Z. Mikrobiologia techniczna. Tom 1 i 2. PWN Warszawa.
3. Lampert W., Sommer U. Ekologia wód śródlądowych. Warszawa, PWB, 2001.
4. Kunicki-Goldfinger W. Życie bakterii. Wydawnictwo Naukowe PWN, 2001

Additional bibliography:
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.

Result of average student's workload	
Activity	Time (working hours)
1. Participation in lectures	30
2. Additional work of its own; eg. the library, etc.	15
3. Participation in the consultation	3
4. Preparation for the exam	25
5. Credits	2

Student's workload		
Source of workload	hours	ECTS
Total workload	75	3
Contact hours	35	1
Practical activities	0	0