

Course title: ECOLOGY OF MICROORGANISMS

ECTS credit allocation (and other scores): 2

Semester: summer

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Natural sciences

Language: English

Number of hours per semester: 30 h.

Course coordinator/ Department and e-mail: Dorota Górniak; Department of Microbiology and Mycology;
gorniak@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Methods of testing soil microorganisms, sampling, quantitative testing of physiological groups of bacteria: ammonifying, nitrifying atmospheric nitrogen binding, proteolytic, amylolytic and lipolytic; counting bacteria by fluorescence microscopy, calculating bacterial volume and biomass; determination of bacterial respiration rate; determination of microbial diversity of the rhizosphere zone; determination of the quantitative and qualitative structure of aqueous bacteriocenoses using fluorescent markers; analysis of bacterial metabolic activity: enzymatic activity, secondary production; study of the effect of bacterivorous (protozoa) and bacteriolytic (viruses) organisms on the quantitative dynamics of bacterial consortia.

LECTURES: History of development of main research directions: water and soil microbiology; influence of abiotic factors on microorganisms; occurrence of microorganisms in ecological syndromes; soil microorganisms and their role in the circulation of elements and energy flow, circulation of soil organic matter, physiological groups of bacteria, commercial use of soil microorganisms; sets of microorganisms in aquatic ecosystems; causes of diversity of microorganisms and mechanisms of its maintenance; role of the detrusive food chain and "microbial loop" in the circulation of matter; anthropogenic disorders of microbiocenosis, eutrophication - causes, consequences; influence of biomanipulation on the structure of water microbiocenoses; biofilms - mechanisms of formation, the meaning of the phenomenon of "quorum sensing"; molecular aspects of interactions between microorganisms and other organisms.

LEARNING PURPOSE: The aim of education is to learn the role of microorganisms in maintaining homeostasis and the functioning of various environments and natural ecosystems.

On completion of the study programme the graduate will gain:

KNOWLEDGE: Student characterizes the structure and functions of ecological systems at various levels of the organization. Student knows the basic principles of methodology of experimental and field work.

SKILLS: Student carries out simple observations and performs simple physical, biological and chemical measurements in the field and laboratory. Performs commissioned simple research tasks or expertise under the guidance of a scientific supervisor.

SOCIAL COMPETENCIES: Student is able to work in a team, taking various roles and setting priorities. Student is aware of the need to constantly update knowledge in the field of biology.

Basic literature: 1) Mc Arthur J.V. , Microbial Ecology, wyd. Elsevier, 2006 ; 2) Barton L.L., Northup D.E., Microbial Ecology, wyd. John Wiley & Sons , 2011 ; 3) Paul E. , Soil Microbiology, Ecology and Biochemistry , wyd. Academic Press , 2014 ; 4) Błaszczak M., Mikrobiologia środowisk, PWN, 2022.

Supplementary literature: Microbial Ecology, wyd. Springer ; 2) , Extremophiles, wyd. Springer

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 31 h.

Student's independent work: 19 h.