

Course title: Environmental microbiology

Basic Data of the subject	
Academic Unit:	Faculty of Civil Engineering
Course title :	Environmental microbiology
Level:	Bachelor
Course status :	Elective
Study year:	II (second), semester III (third)
Number of hours per week:	2+2
Credit value - ECTS:	6
Time/location:	Faculty of civil engineering
Professor:	Prof.Dr. IdrizVehapi
Contact details:	Tel;044509610., Consultations Room D; idriz.vehapi@uni-pr.edu ; ivehapi@yahoo.com , Consulting hours; Thursday 13 ⁰⁰ -16 ⁰⁰
Course description:	This subject is related to principles and concepts of interaction between microorganisms and the environment, the influence of ecological factors on microorganisms, the role of microorganisms in matter and energy circulation, the ways of life-cycle interaction between microorganisms and the environment, and microorganisms ability to live in extreme conditions.
Course Objectives:	The Environmental microbiology course aims to develop knowledge about the relationship between microorganisms and the environment, between microorganisms and other organisms, the role of microorganisms in the circulation of matter in the environment, and the ability of microorganisms to live in environments with extreme conditions.
Learning outcomes:	After completing this course students will be able to: <ul style="list-style-type: none"> • Describe ways of interaction between microorganisms and the environment. • Define the role of ecological factors in the life of microorganisms. • Understand and describe the ways and role of microorganisms in the biogeochemical circulation of C, N, S, P, etc. • Understand the ways of co-existence of microorganisms: examples of symbiosis, mutual dependence, water and terrestrial environment conditions. • Understand the ability of microorganisms to live in environments with extreme conditions.
Contribution in student's load (must correspond with student's learning outcomes)	

Activity	Hours	Days/weeks	Total
Lectures	2	15	30
Exercise Theoretical/ labour	2	15	30
Practic work			
Consultations with lectures	2	5	10
Field exercises			
Intermediate tests/seminars			
Home work	2	10	20
Individual time spent studying (at the library or at home)	2	15	30
Final preparation for the exam	4	5	20
Time spent on evaluation (tests, quizzes,final exam)	2	4	8
Projects,presentations ,etc	2	1	2
Total			
Teaching methodology:	Lecture, interactive lesson with students in groups, discussion, debates, illustrations, drawings, slides, models, etc.		
Evaluation Methods:	Periodic exam I: 30% Periodic exam II: 25% Assignment: 10% Attendance and activity: 5% Final exam: 30% Total: 100%		
Literature			
Basic literature:	<ol style="list-style-type: none"> 1. Prescott, L. M. HARLEY., P. J. and D. A. KLEIN (1999): MICROBIOLOGY, 4th edition, McGraw-Hill, faqet 831-906. 2. Tortora, Funke, Case (1986): Microbiology an Introduction. Faqe: 700-726 		
Additional literature:	<ol style="list-style-type: none"> 1. Muje Plakolli: Mikrobiologjia e pergjithshme, botoi ETMM, Prishtine, 2001. 2. Alexander–Strete–Niles: Lab Exercises in Organismal and Molecular Microbiology., The McGraw–Hill Companies, 2003 3. MYUNG-BO KIM (2008): PROGRESS IN ENVIRONMENTAL MICROBIOLOGY., by Nova Science Publishers, Inc. New York 4. I.L. Pepper and C.P. Gerba (2004): Environmental Microbiology A Laboratory Manual., Elsevier Academic Press 30 Corporate Drive, Suite 400, Burlington, MA 01803, USA 525 B Street, Suite 1900, 		

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Designed study plan:

Week	Lecture which will be held.
Week 1	Environmental microbiology. Microorganisms and ecosystem structure. Their physiological state in the ecosystem.
Week2	Food Circulation Processes (Carbon Cycle, Sulphur, Nitrogen and other cyclic processes).
Week 3	Interactions between microorganisms and metals as well as interactions in substrate utilization.
Week 4	Microorganisms causing diseases and their survival and genetically programmed microorganisms
Week 5	Environments with extreme conditions and methods used in environmental studies.
Week 6	Air microbiology.
Week 7	Microbiology of open waters - the seas and the oceans.
Week 8	Freshwater Microbiology
Week 9	Food concentrations, gradients, surfaces and microbial biofilm
Week 10	Microbial communities of sea and freshwater environments: marine environment; Carbon circulation in the ocean environment.
Week 11	The role of microorganisms in the treatment of wastewater
Week 12	Symbiotic forms of microorganisms: commensalism, mutualism, parasitism etc.
Week 13	Interactions of soil microorganisms with the atmosphere.
Week 14	Soil Environment: The physical - chemical and microbiological composition of the soil.
Week 15	Associations of soil microorganisms with plants.

Designed study plan: The practical part

Week	Lecture which will be held.
Week 1	Aseptic Techniques: mediums and laboratory equipment for microbiology work
Week2	Physical factors that influence the development of microorganisms
Week 3	Chemical factors that influence the development of microorganisms
Week 4	PH influence on the development of microorganisms
Week 5	Techniques for planting bacterial cultures
Week 6	Examination of food article
Week 7	Some morpho-physiological characteristics of bacteria causing food breakdown
Week 8	Methods of bacterial dilution and planting as well as growth curves
Week 9	Bacteriological examination of water: the Coliform MPN test

Week 10	Examination of microorganisms of soil
Week 11	Determination of microorganisms in the air
Week 12	Determination of filamentous fungi
Week 13	Determination of bacteria and actinomycetes
Week 14	Biochemical Oxygen demand
Week 15	Nitrification and denitrification

Academic policies and rules of conduct:

The criteria for regular attendance and rules of conduct to be set- during the organization of the class conform UP's statute.