

Course Unit Descriptor

Study Programme: Biology and Ecology
Course Unit Title: Microbial Ecology
Course Unit Code: OE023
Name of Lecturer(s): Full Professor Dragan Radnović
Type and Level of Studies: Bachelor Degree
Course Status (compulsory/elective): Compulsory
Semester (winter/summer): Winter
Language of instruction: English
Mode of course unit delivery (face-to-face/distance learning): Face-to-face
Number of ECTS Allocated: 5
Prerequisites: None
Course Aims: The aim of the course is to provide a framework for understanding the relationship between microorganisms and their role in biogeochemical cycling in natural communities
Learning Outcomes: After taking this course, students should be able to: Relate metabolic reactions carried out by microbes to global biogeochemical cycling of elements: understand these reactions in terms of chemistry, microbial physiology, and the importance in the environment. Understand the mechanisms how abiotic factors can influence on the microbial growth and microbial cells and how we can use these knowledge for controlling the growth of microorganisms. Understand the factors that regulate interactions between microbes and the importance of these interactions in structuring microbial communities. Understand relations between microorganisms and plants, animals and man. Describe and explain the distribution and role of microorganisms in different habitats such us atmosphere, water ecosystems and soil. Describe how microbes are useful in biotechnological and environmental applications such as sewage treatment, bioremediation, etc. relate the physiology of microbes to their role in these processes.
Syllabus: Theory The definition of microniche and the term of biogeosphere through biogeochemical cycles of carbon, nitrogen, sulfur, phosphorus and some metals (Fe, Mn, and Hg in particular). The concept of ecological valence and the relationship of microorganisms to abiotic and biotic environmental factors. Distribution and importance of microorganisms in the atmosphere, hydrosphere and pedosphere. Environmental factors in controlling microorganisms and basic principles of application of ecological principles in biotechnology. Practice Sampling and isolation of different group of microorganisms from different environments. Formation and analysis of microbes in Winogradsky column. Examination of the representation of different physiological groups of microorganisms in water and soil. The influence of environmental factors on the growth of microorganisms isolated from diverse habitats.
Required Reading: 1. Jean-Claude Bertrand, Pierre Caumette, Philippe Lebaron, Robert Matheron, Philippe Normand, Te'lesphore Sime-Ngando (2015): Environmental Microbiology: Fundamentals and Applications. Microbial Ecology. Springer Dordrecht Heidelberg New York London. ISBN 978-94-017-9117-5. 2. Madigan, M.T., Martinko, J.M., Bender, K.S., Buckley, D.H., Stahl., D.A., Brock T. (2015) Brock:

Biology of Microorganisms (14th or current eds.), Prentice Hall. ISBN0321897390; (2) Atlas, R.M., and R. Bartha. 1997. Microbial Ecology: Fundamentals and Applications, Benjamin Cummings.

Weekly Contact Hours: 75	Lectures: 30	Practical work: 45
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Teaching Methods: Lectures and students group work

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	Points	Final exam	points
Active class participation	2	written exam	-
Test I–IV	36	oral exam	40
Preliminary exam(s)	-	Practical exam	22
Seminar(s)			

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.