

Study Programme : PhD in Biology DNB043			
Level: Doctoral degree			
Course title: Selected topics in mycology			
Lecturer: Maja Karaman, Milan Matavulj			
Status: Elective Course			
ECTS: 15			
Requirements: Credit points of Microbiology, Biology or Ecology of algae and fungi and Mycology			
Learning objectives: A course designed to acquaint students with the selected procedures of experimental research in the field of mycology. Emphasis will be placed on systematization of basic knowledge on catabolic and anabolic aspects of metabolism, on fungal primary and secondary metabolism, and bioactive metabolites, connecting this experience with the possibilities of use of fungi in biotechnology as a resource of enzymes and other bioactive compounds.			
Learning outcomes: Enabling students for independent and individual experimental work in the selected field of mycology: fungal primary and secondary metabolism: experiment design, results obtaining and recording, analysis and interpretation of results, and elaboration and presentation, eventually use of new experience.			
Syllabus: <i>Theoretical part:</i> Through the lectures, in this course students get acquainted with the contemporary concept of functional structure of single cell or hyphal (mycelial) organization as the basis for different types of mechanisms of nutrients uptake. Energetic metabolism (aerobic and anaerobic respiration, fermentation), and nutritional types of fungi (saprotrophism, parasitism, mycorrhizae). Fungal biosynthesis; Fungal enzymes and regulation of metabolism; Physiology of fungal growth, development, and reproduction; Fungal eco-physiology; Fungal role in environmental cycling of matter as one of the most important group of decomposers. The impact of ecological factors on fungal metabolism; Primary and secondary metabolism as the basis for biotechnological processes of the production of fungal bioactive compounds; Physiological groups of fungi; Fungi as indicators of biotransformation processes in natural ecosystems. Physiology of pathogenesis and immunology. Protection and conservation of fungi. <i>Practical part:</i> Emphasis will be placed on the methodology of examination of fungal physiology, what should enable students to understand contemporary tendencies of use of fungi in different biotechnology fields, as well as to understand the role of fungi and problems related to biologically active substances in the environment, and functioning the biosystem and ecosystem as a whole. Through the active engagement, students will be involved in experimental research in the frame of research projects and transfer of knowledge.			
Literature:			
1. Karaman MA, Novaković MS, Matavuly MN (2012): Fundamental Fungal Strategies in Restoration of Natural Environment. In book: Fungi: Types, Environmental Impact and Role in Disease. Editors: Paz Silva A. and Sol M., 2012 Nova Science Publishers, Inc., ISBN: 978-1-61942-671-9. Chapter X, pp: 167-214. https://www.novapublishers.com/catalog/product_info.php?products_id=36343 https://www.novapublishers.com/catalog/downloadOA.php?order=1&access=true&osCsid=5285184c32b433cad910b36614df7fd9			
2. Karaman M, Matavulj M, Janjic Lj (2012): Antibacterial agents from lignicolous macrofungi. In the book: "Antimicrobial agents" , ed. by Varaprasad Bobbarala, InTech, September 9, 2012, Chapter 18. pp: 361-386. ISBN: 978-953-51-0723-1; http://cdn.intechopen.com/pdfs/38659/InTech-Antibacterial_agents_from_lignicolous_macrofungi.pdf			
3. Radnović D, Matavulj M, Karaman M (2007): Mycology. Faculty of Sciences, University of Novi Sad. WUS Austria (In Serbian)			
4. Matavulj M, Molitoris HP (1992): Fungal degradation of polyhydroxyalkanoates and a semiquantitative assay for screening their degradation by terrestrial fungi. FEMS Microbiology Reviews (ISSN-0168-6445) , 103: 323-332, ISSN: 0168-6445. English)			
5. Madigan MT and Martinko JM (2006): BROCK – Biology of Microorganisms. Pearson, Prentice Hall, 11th edition (In English).			
6. Turnet W B: Fungal metabolites. Academic press, London..., 1971 (In English).			
7. Group of authors (1998): Biologically active compounds of higher plants, fungi, algae and bacteria. Institute of Biology, Faculty of Sciences, University of Novi Sad, (In Serbian).			
8. Bekker ZE (1963): Physiology of fungi and their practical use. University of Moscow (In Russian).			
9. Alexander Martin: Biodegradation and bioremediation. Academic press, 1994 (In English).			
10. Eriksson K-EL, Blanchette RA, Ander P (1990): Microbial and Enzymatic Degradation of Wood and Wood Components. Spring.-Verlag.			
Weekly teaching load			
Lectures: 2	Exercises: 2	Other:	Student research work: 5
Teaching methodology: Lectures, practicals, consultations, seminars, colloquia participation in scientific meetings, visiting microbiological laboratories and active participation in research projects. Student choose two topics for seminar work which should be elaborated using internet or standard literature sources.			
Grading method (maximal number of points 100)			
Requirements: Two elaborated selected topics in the form of PP-presentation and review paper			
Remark: During the semestar students' seminar works will be evaluated, and remarks will be incorporated into summary remark making 50% of points. Another 30% they will gather through the oral exam, and 20% through the evaluation of their experimental research work.			