

<b>Study Programme :</b> MSc in Biology			
Degree level: Master degree			
<b>Course Title:</b> Experimental Microbiology			
<b>Professor:</b> Maja Karaman, Jelica Simeunovic, Petar Knezevic			
<b>Required/Elective Course:</b> elective			
<b>Number of ECTS:</b> 7			
<b>Prerequisites:</b> two passed microbiological exams			
<b>Course Objective:</b> The goal of this course is to introduce the various analytical, molecular methods and techniques and the possibilities of their application in the study of microorganisms and products of microbial metabolism.			
<b>Course Outcome:</b> After successfully completed pre-examination and examination commitments student can: - distinguish different analytical techniques and methods such as HPLC, TLC, GS-MS, followed by spectrophotometric methods (UV / VIS photometry and flow cytometry), fluorescence microscopy and to properly apply these methods in the detection, identification of microorganisms as well as their products. - master and apply the proper standard biochemical and molecular methods (electrophoresis, PCR, ELISA–tests, etc.) in the examination of different groups of microorganisms and their metabolites. - to cope with understanding appropriate bioassays that are used in testing of microorganism activities.			
<b>Course Content:</b> <i>Theoretical part</i> 1) Basic analytical methods for detection, quantification and identification of microorganisms and their products of primary and secondary metabolism (application of chromatographic methods HPLC, TLC, GS-MS, etc.) 2) The application of spectrophotometric methods (UV/VIS spectrometry, flow-cytometry) and qualitative and quantitative studies of different groups of microorganisms and their metabolites 3) Fluorescence microscopy in microbiological research 4) Standard methods in molecular microbiological research 5) The application of electrophoresis in the detection and identification of metabolic products of MO 6) Methods for nucleic acid extraction and application of MO RFLP and RAPD analysis 7) PCR technique and enforcement in the investigation, identification and analysis of the MO and their products, as well as examination of microbial populations from different environments 8) The bioassay testing and application of them in detection of microorganisms and determination of their activities. <i>Practical part</i> 1) Microbial samples of biomass preparation for analysis by analytical methods (HPLC, TLC and others.) 2) Spectrophotometric analysis of specific metabolites of microorganisms (bacteria, cyanobacteria, algae, fungi) 3) quantitative analysis of certain groups of microorganisms by flow cytometry 4) Extraction methods of nucleic acids from different groups of microorganisms (bacteria, cyanobacteria, algae and fungi)			
<b>Reading List:</b> 1. Sansonetti P and Zychlinsky A (2002): Methods in Microbiology-Molecular Cellular Microbiology. Academic Press, London, UK. 2. Maier R.M., Pepper I.L., Gerba Ch.P. (2000): Environmental microbiology. Academic press, London, UK. (selected chapters) 3. Paterson R.R.M. and Bridge P.D. (1994): Biochemical Techniques for filamentous fungi. International Mycological Institute, An Institute of CAB INTERNATIONAL. 4. Arora D.K. (2004): Handbook of Fungal Biotechnology. Marcel Dekker, Inc., New York, USA.			
<b>Total hours:</b>			
Lectures: 2	Practicals: 2	Other:	Student research work:5
<b>Methods of instruction:</b> Lecture using Power Point presentation on the video beam, practical laboratory work			
<b>Assessment (maximum number of points 100)</b>			
<b>Requirements</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>
Active participation in lectures	5	Practical exam	20
Active participation in practicals	25	Oral exam	40
Test(s) or			
Pre-exam testing	10		
<b>Remark:</b>			