

NAME OF THE COURSE		Micoorgnisms around us				
Code	PMB413	Year of study	3			
Course teacher	Assistant Professor Ana Maravić, PhD	Credits (ECTS)	2			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			15		15	
Status of the course	Elective	Percentage of application of e-learning	10%			
COURSE DESCRIPTION						
Course objectives	Microorganisms are the oldest inhabitants of the Earth, yet we have only discovered a small fraction of all the microbes that exist. The aim of this course is to familiarize students with up to date knowledge on the role and diversity of microbial communities that surround us, with particular reference to pathogenic and potentially pathogenic microorganisms in our immediate environment, as well as the direct application of standard laboratory procedures and techniques used for the isolation of microorganisms from different samples and their identification.					
Course enrolment requirements and entry competences required for the course	Attended course of General Microbiology					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	<p>After completing the course students will be able to:</p> <ol style="list-style-type: none"> <li>1. interpret the knowledge of the ecology and biodiversity of microbial communities in a range of different habitats;</li> <li>2. apply the methods and techniques of growth, isolation and identification of various types of microorganisms, with particular focus on human pathogenic and potentially pathogenic species</li> <li>3. apply the acquired knowledge in planning and conducting research in the laboratory;</li> <li>4. analyze data on the research of microbial communities from different samples;</li> <li>5. reach conclusions on the basis of results of experiments involving research of the bacterial and fungal communities in human environment;</li> <li>6. explain the risks for human health and justify the necessity of implementation of the measures of hygiene and sanitation;</li> </ol>					
Course content broken down in detail by weekly class schedule (syllabus)	<p>Lectures:</p> <ol style="list-style-type: none"> <li>1. Introductory lecture - course content, literature and obligations of Students. Sanitary microbiology as a special microbiological discipline. (2 hours)</li> <li>2. Factors of microbial growth and microbial ecology (2 hours)</li> <li>3. Microorganisms around us: the human body (2 hours)</li> <li>4. Microorganisms in water – microorganisms as bioindicators, standards for quality assessment of various types of water (drinking water, river, sea), sources of pollution and health risks (3 hours)</li> <li>5. Microorganisms in the soil- diversity and structure of microbial communities in soil (3 hours)</li> <li>6. Microorganisms in food: basic features, sources and diseases transmitted by contaminated food (3 hours)</li> </ol>					

	<p>Laboratory exercises:</p> <ol style="list-style-type: none"> <li>1. Preparation of culture media and materials. (3 hours)</li> <li>2. Swabs and determination of the hygiene quality of work surfaces, hands and air (3 hours)</li> <li>3. Determination of total bacterial count (CFU-standard plate count) and indicators of faecal contamination (<i>Escherichia coli</i> and fecal enterococci) in different types of water - drinking water, rivers and the sea. (3 hours)</li> <li>4. Determination of total bacterial count (CFU) in the soil. Biochemical Identification of the most important groups of microorganisms detected. (3 hours)</li> <li>5. Determination of the microbiological safety of food. Determination of total bacteria (CFU) in meat. Isolation and identification of pathogenic Gram-positive bacteria in food (<i>Staphylococcus</i> spp., <i>Enterococcus</i> spp., <i>Listeria monocytogenes</i>) and spore-forming bacteria (<i>Clostridium perfringens</i> and <i>C. botulinum</i>).</li> <li>6. Isolation and biochemical identification of different species of Enterobacteriaceae – <i>Enterobacter</i> spp. , <i>Klebsiella</i> spp., <i>Salmonella</i> spp., <i>Escherichia coli</i> O157: H7. (3 hours)</li> </ol>					
Format of instruction	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> <i>on line</i> in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work		<input checked="" type="checkbox"/> independent assignments <input type="checkbox"/> multimedia <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)			
Student responsibilities	<p>Students' presence in the amount of at least 70% of scheduled lectures.          Performed all laboratory exercises.</p>					
Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Class attendance	1.0	Research		Practical training	
	Experimental work	0.5	Report		(Other)	
	Essay		Seminar essay		(Other)	
	Tests		Oral exam	1.0	(Other)	
	Written exam		Project		(Other)	
Grading and evaluating student work in class and at the final exam	<p>Grading will be conducted on the basis of activities in class, practical training in the laboratory, and the final oral exam.</p>					
Required literature (available in the library and via other media)	<b>Title</b>			<b>Number of copies in the library</b>	<b>Availability via other media</b>	
	Kalenić, S., Mlinarić-Missoni, E. i suradnici. 2005. Medicinska bakteriologija i mikologija, Merkur A.B.D., Zagreb			5		

	Duraković, L., Duraković, S. Priručnik za rad u mikrobiološkom laboratoriju 1 : I. dio, knjiga prva, 1997. <a href="#">Durieux</a> , Zagreb	5	
	Duraković, L., Duraković, S. Priručnik za rad u mikrobiološkom laboratoriju: I. dio, knjiga druga, 1997. <a href="#">Durieux</a> , Zagreb	5	
	Krstulović, N., M. Šolić, 2006. Mikrobiologija mora, IOR-Split, Udžbenik Sveučilišta u Splitu.	5	
	Duraković S., Delaš F., Stilinović B., Duraković L.: Moderna mikrobiologija namirnica - knjiga prva. Sveučilišni udžbenik (ured. S. Duraković). Kugler d.o.o., Zagreb, 2002.	5	
	Duraković S., Delaš F., Duraković L.: Moderna mikrobiologija namirnica - knjiga druga. Sveučilišni udžbenik (ured. S. Duraković). Kugler d.o.o., Zagreb, 2002.	5	
Optional literature (at the time of submission of study programme proposal)	Relevant scientific publications		
Quality assurance methods that ensure the acquisition of exit competences	Taking attendance of students during classes; students' survey evaluation of teacher's work; feedback from graduated students on the relevance of the course content		
Other (as the proposer wishes to add)			