



<b>Study program:</b> Doctoral Academic Studies in Biomedical Sciences		
<b>Name of the subject:</b> CURRENT ISSUES IN MEDICAL BIOCHEMISTRY		
<b>Teacher(s):</b> Ljiljana N. Andrijević, Karmen M. Stankov, Tatjana N. Čebović, Igor S. Veselinović, Višnja Bogdanović, Jasminka Mrđanović		
<b>Status of the subject:</b> elective		
<b>Number of ECTS points:</b> 20		
<b>Condition:</b>		
Goal of the subject In this course the student is expected to acquire knowledge in the field of medical biochemistry from the molecular point of view. Also, in the research field, the student should learn application of molecular tests such as identification of genes involved in the oncological processes as well as discovery of epigenetic factors and other determinants of cancer. The student will learn modern laboratory methods used nowadays in molecular diagnostics. Therefore, the student is expected to acquire skills for modern instrumental analytical methods, new laboratory diagnostic parameters and application of various molecular-diagnostic tests.		
Outcome of the subject Application of molecular tests, handling instruments and equipment and mastertechniques applicable in the field of scientific-research work, as well as mastering modern laboratory methods and techniques applied in molecular diagnostics of diseases for the purpose of prevention, monitoring and therapy.		
<b>Content of the subject</b>		
<i>Theoretical lectures</i>		
<ol style="list-style-type: none"> <li>1. Molecular basis of nucleic acids: deoxyribonucleic and ribonucleic</li> <li>2. Cell cycle, oncogenes, cytokines, growth factors</li> <li>3. Immunophenotyping (detection of antigens on the surface of the cell membrane) and its application in scientific research</li> <li>4. Theoretical bases of biological material amplification (PCR technique)</li> <li>5. Theoretical bases of fluorescence in situ hybridization (FISH technique)</li> <li>6. Theoretical basis of sequencing (NGS technique) and pyrosequencing</li> <li>7. Cell lines as basic models in scientific research</li> <li>8. Cytotoxicity tests and their application in scientific-research work</li> <li>9. Basics of molecular diagnostics of malignant neoplasms<sup>1</sup></li> <li>10. Immunophenotyping (detection of antigens on the surface of the cell membrane) and its application in clinical work</li> <li>11. Tumor markers and hormones</li> </ol>		
<i>Practical lectures</i>		
<ol style="list-style-type: none"> <li>1. Work on flow cytometer; acquisition and analysis of CD antigens by the Cell Quest program, cell cycle analysis and apoptosis.</li> <li>2. Work in a highly specialized laboratory in sterile conditions; cultivation, passage, counting of cells under a microscope, performing cytotoxicity tests and spectrophotometric reading of the results on a microtiter reader</li> <li>3. Isolation of DNA molecule from different biological material; amplification of the target sequence of a DNA molecule of interest, working on a Real-Time PCR apparatus</li> <li>4. Molecular diagnostics in oncology; molecular testing of specific, targeted oncogenes</li> <li>5. Isolation of DNA molecule from different biological material; amplification of the target sequence of a DNA molecule of interest, working on a Real-Time PCR apparatus</li> <li>6. Determination of tumor markers and hormones by electrochemiluminescence</li> </ol>		
<b>Recommended literature</b>		
<ol style="list-style-type: none"> <li>1. Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics 7th ED, Carl A. Burtis, David E. Bruns, 2014.</li> <li>2. Lehninger Principles of Biochemistry, David L. Nelson and Michael M. Cox, 2012</li> <li>3. Fletcher, Christopher D.M. Diagnostic Histopathology of Tumors 4th ed. Elsevier-Saunders New York, 2013.</li> </ol>		
<b>Number of active classes</b>	<b>Theory:</b> 60	<b>Practice:</b> 45
<b>Methods of delivering lectures</b>		
Theoretical teaching, practical teaching and seminar papers		
<b>Evaluation of knowledge (maximum number of points 100)</b>		
lectures: 10		

practices: 10  
essay: 30  
oral exam: 50