

<b>Study Program: PhD in Biology</b>				
<b>Course Title:</b> Molecular Mechanisms of Cancerogenesis				
<b>Instructor:</b> Dr. Anđelka Čelić				
<b>Type and Level of Study:</b> Doctoral Studies				
<b>Status:</b> Elective				
<b>ESPB number:</b> 15				
<b>Requirements:</b>				
<b>Learning Objectives:</b> Cancer is a group of diseases characterized by uncontrolled cell growth and invasiveness that allows it to spread from its primary location throughout the whole organism. Although, cancer is a leading cause of death worldwide, and one of the most studied processes in biomedical research, the molecular mechanisms behind cancer remain unclear. Because it is a complex problem, understanding cancerogenesis requires complete understanding of fundamental biological principles and the basis of cell function. The goal of this course, <b>Molecular Mechanisms of Cancerogenesis</b> , is both integration of student knowledge acquired in previous courses (molecular and cellular biology, physiology, genetics, immunology, ...) and introduction of the current state of biomedical cancer research, in order to enable understanding of the molecular, cellular and pathophysiological basis of cancerogenesis.				
<b>Learning Outcomes:</b> Students are expected to master the theoretical basis of cancer, become familiar with current methods and techniques used in the study of cancer and development of cancer therapeutics. Upon successful completion of this course, students will be able to follow and critically evaluate primary scientific literature in this area.				
<b>Syllabus:</b> <i>Theoretical Instruction</i> The following subjects will be covered during lectures: <ul style="list-style-type: none"> <li>- The nature of cancer</li> <li>- DNA structure and stability, relation between mutagenesis and DNA repair</li> <li>- Regulation of gene expression, tumor viruses, growth factors and oncogenes on one side, growth inhibitors and tumor suppressors on the other side</li> <li>- Cell cycle</li> <li>- Apoptosis and P53</li> <li>- Cell immortality and genesis of tumors</li> <li>- Invasiveness and metastasis</li> <li>- Immune systems, infection and inflammation</li> <li>- Stem cells</li> <li>- Drug design, clinical testing, pharmacogenomics</li> <li>- Development of anti-tumor therapies and treatments</li> </ul> Details of the course will be customized in accordance with individual student research interests, in a way that will enable in depth study of areas closely related to their own scientific research.  <i>Practical Instruction</i> One of the course requirements is to write a term paper in which students will apply the theoretical aspects of this course to analyze in depth a topic in membrane biology related to their own doctoral research.				
<b>Literature:</b> <ol style="list-style-type: none"> <li>1. Lauren Pecorino <i>Molecular Biology of Cancer: Mechanism, Targets and Therapeutics</i> 3<sup>rd</sup> ed. Oxford 2012</li> <li>2. Robert A. Weinberg <i>The Biology of Cancer</i> Garland Science 2006</li> <li>3. Lewis J. Kleinsmith <i>Principles of Cancer Biology</i> Benjamin Cummings 2005</li> </ol>				
<b>Weekly Teaching Load</b>				
Lectures: 5	Exercises:	Other forms of teaching:	Student Research: 5	Other
<b>Teaching Methodology</b> Theoretical instruction will include lectures and consultations.				
<b>Grading Method (Out of maximum 100 points)</b>				
Course Activities 30 points				
Term paper with oral presentation 70 points				