

<b>Study program: Master in Reproductive Biology</b>				
<b>Study level:</b> Master's studies				
<b>Course title: Stem cell biology</b>				
<b>Course code: RB11</b>				
<b>Teacher: dr Andjelka Čelić</b>				
<b>Course status: elective</b>				
<b>ECTS: 5</b>				
<b>Requirements: none</b>				
<b>Course objectives:</b> The course will provide students with knowledge of wide-ranging topics related to stem cell and regenerative biology.				
<b>Learning outcomes</b> Students will learn how and from what sources researchers obtain stem cells, what are the properties that define stem cells and their potential therapeutic uses. Students will also be able to apply knowledge acquired over the duration of the course to their own scientific research as well as to form their own opinions about the political and ethical issues surrounding the stem cell debate.				
<b>Syllabus</b> <i>Lectures</i> History of stem cell biology and nuclear transfer: definitions, classifications, introduction of terms toti-, pluri-, multi- i unipotent. What makes a stem cell a stem cell: transcription factors, chromatin structure, DNA methylation and epigenetics. Embryonic and fetal stem cells: .Adult stem cells: hematopoietic, mesenchymal, neural..Induced pluripotent stem cells: fibroblast reprogramming, disease modeling. Stem cells and cancer. Therapeutic uses of stem cells in: current and potential treatments of diabetes ( $\beta$ -cells from embryonic and iPS cells), cardiovascular disease (cardiomyocyte transplantation), brain and spinal cord trauma, neurodegenerative diseases (Alzheimer's, Parkinson's and Huntington's diseases, multiple sclerosis). Stem cells in fertility treatments: culture, selection and transfer of human embryos, reprogramming adult cells to gametes. Genome editing and disease modeling: ZFN, TALEN, CRISPR/Cas9 strategies. Ethical issues concerning stem cells.  <i>Other forms of teaching</i> Preparation and presentation of term papers representing themes presented during lectures. Students will select from a list of available topics (or one of their choosing if relevant), conduct critical analysis of one or more primary scientific publications, prepare a presentation of their conclusions to be given in front of their fellow classmates and participate in class discussions on each topic.				
<b>Literature</b> 1. Essentials of Stem Cell Biology, 3 <sup>rd</sup> edition by Robert Lanza and Anthony Atala, Elsevier 2014 2. Developmental Biology, 9 <sup>th</sup> edition by Scott F. Gilbert, Sinauer Associates, Inc 2010 3. <a href="http://www.stembook.org/">http://www.stembook.org/</a>				
<b>Weekly teaching load</b>				
Lectures: 3	Teaching laboratory: -	Other forms of teaching: 1	Research activities: -	Other: -
<b>Teaching methods</b> Lectures and discussions of primary scientific literature.				
<b>Evaluation of knowledge (maximum score 100)</b>				
<b>Pre-exam obligation</b>	<b>Points</b>	<b>Final exam</b>		<b>Points</b>
Student engagement in lectures		Test/Written exam		30
Seminar	20	Oral exam		30
Tests	2x10			
Practical laboratory				