

Study Programme : PhD in Biology				
Degree level: Doctoral degree				
Course Title: Cell Determination and Differentiation				
Professor: Milica Matavulj				
Required/Elective Course: Elective Course				
Number of ECTS: 7				
Prerequisites: Course of Cell Biology and Histology and Embryology				
Course Objective: This course has goal to provide detailed insight in mechanisms of animal cell determination and differentiation and, also, in specific mechanisms regarding morphogenesis and growth of animal tissues and organs gave introduction to theory and application of tissue culture technologies.				
Course Outcome: On successful completion of the course, students will be able to <ul style="list-style-type: none"> • to provide an understanding of mine mechanisms of animal cell determination and differentiation • demonstrate understanding of the techniques used in tissue culture and critically evaluate cell culture as an <i>in vitro</i> model • demonstrated the basis of the main procedures of cell line development, cell engineering, cell banking, cell characterisation and media formation • describe the equipments used on tissue culture • understand the safety procedures need for tissue culture 				
Course Content: <i>Theoretical part</i> Determination of embryonic cells. Properties of the determined state. Fate mapping. Potency of embryonic cells. Localized cytoplasmic determinants. General principles of cell differentiation. Cell communication. Cell-cell adhesion. The extracellular matrix of animals. Integrins. The cytoskeleton and cell behavior. Gen expression during differentiation. Differentiation of liver cells. Differentiation of blood cells. Differentiation of germe cells. Differentiation of sceletal muscle. Differentiation of carilage and bone cells. Control of cell differentiation. Organisation cells in tissues. Tissue culture. Steam cells. Stem cell engineering. Measurmemnt and mechanisms of growth. Growth hormones and growth factors.Cell cycle control. Cancerogenesis. Tumor-releated genes. <i>Practical part</i> Animation/video of distinct cell types differentiation and maturation. Cells growing in tissue culture. Chick embryo culture. Proliferation, differentiation and evolution of cell line. Cell counting and cell viability. Staining and morphological changes during the cell cycle. Transformed cells: growth patterns, growth in soft agar, and aggregate formation. Chemoluminescent assays for cell proliferation. Transfection of cells.				
Reading List: 1. Kalthoff, K. Analysis of Biological Development McGrow Hill, New York, 2001. 2. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., Walter, P. Molecular Biology of the Cell. Garland Science, 2002				
Total hours:				
Lectures: 2	Practicals: 2	Other:-	Student research work:	
Methods of instruction: Lectures, laboratory practice, seminars				
Assessment (maximum number of points 100)				
Seminar.....10				
Pre-exam testing20				
Practical exam.....30				
Oral exam.....40				