

Study programme: BSc in Biology			
Level: Bachelor degree			
Course title: Cell and Tissue Culture			
Lecturer: Slobodanka Pajevic			
Status: elective			
ECTS: 5			
Requirements: -			
Learning objectives			
The main goal of this course is to provide students with basic theoretical knowledge as well as experimental experience in areas of primary culture establishment, cellular propagation in the culture, kinetics of growth of cellular lines, transformation, clone propagation and genetic transformations.			
Learning outcomes			
With successful completion of pre-exam and exam obligations, students will become familiar with the working environment of a tissue culture laboratory, and with basic equipment used. They will understand the meaning and application of clone propagation, and with haploid production methods, isolation and fusion of protoplasts, and with genetic transformation.			
Syllabus			
<i>Theoretical instruction</i>			
Plant cell and tissue culture: Organogenesis, somatic embryogenesis. Components and preparation of nutrient basis and the effect of different hormone groups on development of explantations in <i>in vitro</i> conditions. Processes of organogenesis and somatic embryogenesis, ways in which explantations develop after their placement on nutrient base and the factors which affect them. Animal cell and tissue culture: Maintaining of cellular lines – cellular culture vessels, mediums of cellular growth in culture, buffers, growth factors, cellular subculture, processes of cellular freezing and de-freezing. Isolation and selection of cells, establishment of primary culture, cellular propagation within the culture, kinetics of cellular lines growth, transformation and immortalisation, cloning and selection of specific cell types by usage of various techniques. Immunomagnetic separation. Viability tests (colour rejection test, release of LDH). <i>Practical instruction</i>			
Plant cell: preparation of the base and sterilization of plant material. Following the development of different explantations on different bases. The influence of different hormone content on callus formation, influence of hormones on forming the root during micro propagation, the affect of explantations on the speed in which outgrowth forms. Induction of organogenesis (somatic embryogenesis), micro propagation, embryo culture, anther culture, isolation and electrical fusion of protoplasts.			
Animal cell: extraction of lymphocyte of peripheral blood on velocity gradient. Cellular count, determination of cell concentration, preparation of smear. Subculture of cellular lines. Freezing and de-freezing of cellular lines. Determining cell viability. Measurement of proliferation of cells with a colorimetric test with tetrasolium salts. Determination of cytotoxic activity with a colorimetric test.			
Literature			
Freshney R I . Culture of animal cells-A manual of basic technique.5 th Ed. Indianapolis: Wiley; 2005. Masters JRW, Palsson BO. Human Cell Culture: Volume I. New York: Springer;1998. Masters JRW, Palsson BO. Cancer Cell Lines - Pt. 1. Norwell: Kluwer Academic Publishers; 1998. Health and Safety at Work Act, UK. Available from: www.rbkc.gov.uk/EnvironmentalServices/HealthAndSafety/hs_1974act.asp			
Weekly teaching load			Other:
Lectures: 2	Exercises: 2	Other forms of teaching:	Student research:
Teaching methodology			
Grading method (maximal number of points 100)			
Pre-exam obligations	points	Final exam	points
Colloquia	30	Oral exam	
Seminar	15	Written exam	50
attendance	5	(other)	