

Study program: REPRODUCTIVE BIOLOGY			
Course title: Laboratory methods and practical skills			
Teacher: Danijela Kojić, Edward Petri, Jelena Marković, Miodrag Stojković			
Course status: obligatory			
ECTS: 5			
Requirements:			
Course objectives The aim of the course is for students to acquire knowledge and skills necessary to performing basic laboratory analyses and understand advanced laboratory methods, enabling them to be able to work in a laboratory for <i>in vitro</i> fertilization or other related laboratories.			
Learning outcomes After the course, students will be able to successfully apply acquired knowledge and skills in laboratory work, as well as explain, analyze and perform advanced methods in work with cell and tissue cultures.			
Syllabus <i>Theoretical part</i> Organization of laboratory work and general principles of laboratory biosafety. Solutions and medium used in assisted reproduction. Basic types of centrifugation (differential, isopycnic, zonale). Basic concepts of electrophoresis - agarose gel electrophoresis, native and SDS PAGE, IEF, 2DE. Overview of basic principles of spectroscopic methods – spectrophotometry. Principles of immunochemical techniques (immuno-electrophoresis, RIA, Western blot, ELISA). Principles of light microscopy- bright-field and fluorescence microscopy. Basic techniques for sample preparation for light microscopy. Staining methods in microscopy (histochemistry, immunohistochemistry, immunofluorescence,). Cell culture - work in cell culture laboratory for cell culture; primary cultures and continuous cell lines; the use of cell lines and primary cultures. Protein-protein interactions involved in fertilization. Experimental methods for stem cell research - flow fluorocytometry analysis of cell phenotype; quantification of antigen/antibody by ELISA .Theoretical basics of cryopreservation- cryoprotectants and procedures of cryopreservation. <i>Practical laboratory</i> Solution preparation and work with the pH-meter. Density gradient centrifugation. Used spectroscopic methods for quantitative analysis. SDS electrophoresis on polyacrylamide gels. Immunoblotting. Tissue preparation for light microscopy. Differential staining of cell organelles and tissue components. Techniques of microscopy. Flow cytometry. ELISA method. Cell culture –basic equipment used in cell culture laboratory, work in sterile conditions, subculture of cell lines.			
Literature 1. Laboratory biosafety manual (2004), 3rd ed., World Health Organization, Geneva 2. Manual of assisted reproductive technologies and clinical embryology, Pankaj Talwar (Ed.), Jaypee Brothers Medical Publishers, 2012. 3.Graham J. (2001): Biological Centrifugation, Production Editor: Paul Barlass, N Yorks, UK 4.Boyer, Rodney, F. (1993): Modern Experimental Biochemistry , 2nd ed., Benjamin/Cummings Publishing Company, Inc, CA, USA 5. Butler M. (2004) Animal Cell Culture and Technology. BIOS Scientific Publishers, London and New York. 6. Freshney R.I. (2010), Culture of animal cells: a manual of basic technique and specialized applications, 6th ed. Wiley-Blackwell.			
Weekly teaching load		Lectures: 1	Practical lectures: 0+3+0
Teaching methods Lectures, laboratory practicals, consultations			
Evaluation of knowledge (maximum score 100)			
Pre-exam obligation	Points	Final exam	Points
Student participation in lectures	-	Test/Written exam	50
Continuous assessment of student practical work	50	Oral exam	