

<b>Study program: REPRODUCTIVE BIOLOGY</b>			
<b>Course title:</b> Introduction to the techniques of gamete micromanipulation			
<b>Teacher:</b> Sonja Kaišarević			
<b>Course status:</b> obligatory			
<b>ECTS:</b> 5			
<b>Requirements:</b> -			
<b>Course objectives:</b> The course objectives are to, using different experimental models, acquire theoretical and practical knowledge on work on micromanipulator and basic procedures in gametes micromanipulation, and to gain knowledge on techniques for isolation and analyses of spermatozoa and oocytes.			
<b>Learning outcomes:</b> After they successfully complete the course, students will be able to apply their knowledge and skills related to work on micromanipulator, techniques of gametes micromanipulation, microinjecting, as well as basic procedures related to isolation and analyses of spermatozoa and oocytes in laboratories for assisted reproduction or similar laboratories.			
<b>Syllabus</b>			
<i>Theoretical instruction</i>			
Micromanipulation and microinjection: definition and description of the techniques, types of micromanipulators, micropipettes, application in the techniques of assisted reproduction and other applications. Basic principles of ICSI procedure. Characteristics of spermatozoa, semen analyses. Capacitation and acrosomal reaction. Superovulation.			
<i>Practical laboratory</i>			
Basic principles of micromanipulation. Micromanipulation and microinjection on zebrafish ( <i>Danio rerio</i> ) embryo as a model: microinjection of dye, dechorionisation. Micromanipulation on artificial models. Computer simulation of ICSI procedure – adaptation of techniques of micromanipulation and ICSI procedure in a virtual system. Microscopic analysis of rat spermatozoa (determination of concentration, viability, morphology and motility of spermatozoa, staining of spermatozoa). Induction of acrosomal reaction and evaluation of the acrosome status in rat spermatozoa. Induction of superovulation in female rat, collection and observation of oocytes. Keeping a laboratory notebook.			
<b>Literature</b>			
1. Kaisarevic S., Manual for practical laboratory. Internal material.			
2. Kaisarevic S., Presentations and working material from the lectures.			
3. WHO laboratory manual for the examination and processing of human semen, Fifth edition, World Health Organization 2010.			
4. Reviews and original scientific papers on topics related to the subject matter of the course.			
5. Group of authors: Practicum in Reproduction (material provided within the course „Frontiers in Reproduction“, Marine Biological Laboratory (MBL), Woods Hole, Massachusetts, USA, 2008 и 2010).			
<b>Weekly teaching load</b>			
Lectures: 1		Practical lectures: 0+4+0	
<b>Teaching methods</b>			
Lectures, laboratory work, consultations			
<b>Evaluation of knowledge (maximum score 100)</b>			
<b>Pre-exam obligation</b>	Points	<b>Final exam</b>	Points
Student engagement in lectures		Test/Written exam	
Practical laboratory – <i>continual assessment of practical laboratory work of students</i>	40	Oral exam	40
Practical laboratory – <i>continual assessment of students' laboratory notebook</i>	20		