

EXPERIMENTAL METHODS IN LABORATORY BIOMEDICINE 1	
GENERAL INFORMATIONS	
Course coordinator	Asst. Prof. Barbara Viljetić, MEdBio et Chem, PhD Prof. Ines Drenjančević, MD, PhD
Assistant/Associate	Asst. prof. Katarina Mišković Špoljarić, MEngProc, PhD Asst. Prof. Teuta Opačak-Bernardi, MBiolMol, PhD Asst. Prof. Marijana Leventić, MBiol, PhD Asst. Prof. Zrinka Mihaljević, MEdBiol et Chem, PhD
Study Programme	Undergraduate University Study of Medical Laboratory Diagnostics
Status of the course	Elective
Year of study, semester	2 nd Year /2 nd semester
ECTS	2
Workload (hours)	Lectures: 20; Seminars: 10; Exercises: 30
Expected number of students	30
COURSE DESCRIPTION	
Course objectives	
Acquisition of basic knowledge of the method of cell cultivation and the use of cell cultures in research in various branches of biomedicine (physiology, pharmacology, neuroscience, experimental oncology, biochemistry, molecular biology, etc.). Acquire a basic knowledge of the most common types of experimental animals and the influence of genetic and environmental factors in experimental animals on research results in various branches of experimental biomedicine (physiology, immunology, pharmacology, behavioral neuroscience, etc.).	
Enrolment requirements and entry competencies	
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Learning outcomes at the Programme level	
1.1, 1.2, 2.1, 2.2., 2.6, 3.1, 3.2	
Learning outcomes (5-10)	
After completing lectures, seminars and exercises, independent study and passing the exam, students will be able to: <ol style="list-style-type: none"> 1. explain the method of cell cultivation and its application in research; 2. apply skills in handling sterile conditions and equipment when working with cell cultures; 3. independently conduct a review of the scientific literature in the field of cellular biomedicine; 4. evaluate the most common types of experimental animals used in biomedical research; 5. explain experimental conditions, national legislation and basic ethical issues related to the use of animals for experimental purposes; 6. independently handle live animals (rats, mice). 	
Course content	
Cell culture in biomedical research: Biology of cells growing in culture. Primary, definitive and continuous cell cultures. Laboratory equipment for cell culture. Methods of preparation and sterilization of accessories and equipment. Composition and preparation of media for cell culture. Methods of determining the viability and proliferative capacity of cells in culture. Determination of DNA, RNA and protein biosynthesis in cells. Cultivation and preparation of cells for enzymatic and immunocytochemical studies. Limitations of in vitro methods. Testing potential antitumor drugs in vitro. Application of	

cell culture techniques in molecular medicine and diagnostics.

Experimental animals in biomedical research:

Use of animals in biomedical research. Legislation and animal experimentation. Republic of Croatia - Animal Protection Act. Biology, handling, breeding, nutrition and transport of the most common types of laboratory animals (mammals - mice, rats, guinea pigs, hamsters, rabbits, cats, dogs). Standardization of animal experiments. Genetic standardization - strains (inbred, F1 hybrids, coisogenic, congenic, recombinant inbred, recombinant congenic). Standardization of living environment (ventilation, temperature, humidity, lighting, light-dark cycle, single or group housing, diet, stress exposure). Diseases of experimental animals and risks to human health.

Planning, organization and conduct of animal experiments. Ethical aspects - pain, suffering, euthanasia, surrogate models, and limiting the use of animals in experiments.

Mode of teaching

Lectures, Problem solving seminars, Laboratory exercises

Student obligations

The student is obliged to attend all classes and actively participate in all forms of classes. The student can be absent from 30% of classes per type and must attend all knowledge tests. Successful completion of seminars and exercises requires prior preparation by the student.

Monitoring student work (*Connectivity of learning outcomes, teaching methods and grading*)

Teaching activity	ECTS	Learning outcome	Student activity	Assessment methods	Grade points	
					Min.	Max.
Attending classes	0.2	1-6	Class attendance	Attendance record	4	8
Seminars	0.4	1, 2 4, 5	Preparation of seminar	Seminar presentation	8	16
Exercises	0.4	2, 6	entrance exams, performing exercises, keeping work diary	work diary, entrance exam	8	16
Final exam	1.0	1-6	Studying for the final exam	Written exam	30	60
				Oral exam	50	100
Total	2					

Evaluation of the final written exam:

Percentage of correct answers (%)	Grade points
60.00-64.99	30
65.00-69.99	34
70.00-70.99	38
75.00-79.99	42
80.00-84.99	46
85.00-89.99	50
90.00-94.99	55
95.00-100.00	60

Calculation of final grade:

Grade points earned in the final exam are added to the grade points earned during the course. Grading in the ECTS system is done by absolute distribution, i.e. based on total achievement and is compared to the numerical system in the following manner: A - excellent (5): 90-100 grade points; B - very good (4): 80-89.99 grade points; C - good (3): 65-79.99 grade points; D - sufficient (2): 50-64.99 grade points.

Required reading (available in the library and through other media)

Title	Number of copies in the library	Availability through other media
1. R. Ian Freshney. Culture of Animal Cells - A Manual of Basic Technique and Specialized Applications. Wiley-Blackwell 2015.	4	
2. National Research Council. Guide for the Care and Use of Laboratory Animals: Eighth Edition 8th ed. Edition. National Academies Press 2011.	4	

Additional reading

1. Robert H. Weichbrod, Gail A. Thompson, John N. Norton. Management of Animal Care and Use Programs in Research, Education, and Testing 2nd Edition.
2. Roger Lionel Poulter Adams. Cell Culture for Biochemists (Laboratory Techniques in Biochemistry & Molecular Biology) Revised, Subsequent Edition. Elsevier 1990.

Course evaluation procedures

Anonymous, quantitative, standardised student survey on the course and the teacher's work implemented by the Quality improvement office of the Faculty of Medicine Osijek.

Note /Other

E-learning is not included in the class quota, but it is used in teaching and it contains links to various sites and video and audio materials available on websites.