MEDBIOT-03: **EXPERIMENTAL PHYSIOLOGY FOR BIOTECHNOLOGISTS**	
GENERAL INFORMATION	
Course Coordinator(s)	Ines Drenjančević, MD, PhD, full prof. with tenure
Associate(s)	Martina Mihalj, MD, PhD, assoc. prof. Ana Stupin, MD, PhD, assist. prof. Ivana Grizelj MD, PhD, assist. prof. Aleksandar Kibel MD, PhD, assist . prof. Anita Matić PhD, assist. prof. Marko Stupin MD, PhD Zrinka Mihaljević PhD Nataša Kozina, BSc
Study Programme	Interdisciplinary Graduate Study Programme in English: Biotechnology
Course Status	Obligatory
Year of Study, Semester	2nd year / 3rd Semester
Credits (ECTS)	**4**
Teaching Method (number of classes)	Lectures: 30; Seminars: 5; Exercises: 20
Expected Number of Students in the Course	25-30
COURSE DESCRIPTION	
Course Aims	
The objective of the course is to enable to students to obtain the knowledge on physiological mechanisms of homeostasis, to introduce students to various experimental approaches in research in animal and human physiology and to get knowledge on in vivo and in vitro research methods. Additional aim is to enable students to acquire practical skills in experiments and to get knowledge and skills of planning and conducting experiments, analysis and interpretation of results of research obtained by learnt methods.	
Prerequisites for Enrolment and the Entry Competencies Required for the Course	
Completed undergraduate university study programme from the area of natural sciences (chemistry, biology) or biotechnical sciences, or biomedicine and healthcare. Completed and passed courses from 1st year of the study.	
Learning Outcomes at the Programme Level Contributed by the Course	
BIOTECH-6; BIOTECH-7; MEDBIOT-1; MEDBIOT-2; MEDBIOT-5	
Learning Outcomes at the Course Level	
After completing the course, the student will be able to: 1. Discuss physiological mechanisms involved in the homeostasis of the human organism 2. Solve practical problems and implement new protocols and methods appropriate for laboratory biomedicine 3. Implement acquired knowledge on planning the experiments, conducting experiments, acquiring and interpretation of results of research with learnt methods. 4. Conduct qualitative and quantitative analysis of biological samples with appropriate research methods 5. Critically evaluate results of various research studies available in scientific and professional literature	
Course Content	
Lectures. General mechanisms of homeostasis. Cell- organisation and function. Organs and organic systems (cardiovascular, resporatory, metabolism, urogenital system, endocrinological system). General principles and methodology in scientific research in physiology. Implementation of laboratory methods in experimental physiology- the principles of good laboratory practice, ethical principles in human and laboratory animals studies. Work with laboratory experimental animal	

models (rats, mice). Flow cytometry. Molecular methods in experimental physiology (Western blot, gene expression). Biochemical methods in experimental physiology (spectrophotometry-enzyme activity, ELISA; oxidative stress measuremenes). Specific methods in cardiovascular physiology.
Seminars. Experimental design, data interpretation.
Exercises. In vitro aortic rings experiments, in vitro isolated pressurized resistance blood vessels. Laser Doppler Flowmetry (human model), flow cytometry. Protein expression analysis by Western blot, gene expression analysis with PCR.

Teaching Methods

Lectures; seminars; laboratory exercises

Students' Obligations

Attendance at all forms of classes is mandatory and the students are obligated to attend all knowledge tests. The students may be absent from 30% (full-time students) and 50% (part-time students) of each of the forms of classes, provided that the absence is justified. An exercise or a seminar which has not been completed must be made up through a midterm exam.

Monitoring the Activity of the Students *(Connecting Learning Outcomes, Teaching Methods, and Grading)*

Class-related activity	ECTS	Learning outcome	Student activity	Evaluation method	Grade points	
					Min.	Max.
Attending classes (lectures, seminars, exercises)	2	1-5	Attendance at classes, Seminar work Laboratory excercises	Keeping records	0 10 10	5 20 25
Final exam	2	1-5	Studying for the final exam	Oral exam	30	50
Total	**4**				**50**	**100**

Evaluation of the written part of the final exam:

Percentage of correct answers (%)	Grade
>95.00	50
90.00-94.99	47
85.00-89.99	45
80.00-84.99	40
75.00-79.99	38
70.00-74.99	35
65.00-69.99	33
60.00-64.99	30

Forming the final grade:
The points granted for the final exam are added to the grade points awarded during class attendance. The grading process is conducted by absolute distribution, i.e. based on total achievements, and 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

Mandatory Literature (available in the library and via other media)

Title	Number of	Availability via

	copies in the library	other media
Rastogi SC: Experimental Physiology. New Age International (P), Limited, 2005.	10	yes
Pflanzer RG: Experimental and Applied Physiology. 8th Ed., McGraw-Hill Science/Engineering/Math, 2005.	10	yes
Additional Literature		
Woodman DA, Tharp GD: Experiments in Physiology, 11th Ed., 2014.		
Quality Assurance Procedures Designed to Ensure the Acquisition of Outcomes and Competencies		
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 and/or the Faculty of Food Technology Osijek.		
Note		
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.		