MEDBIOT-E04: **PHARMACOGENETICS AND PHARMACOGENOMICS**	
GENERAL INFORMATION	
Course Coordinator(s)	Martina Smolić, MD, PhD, Assoc. Prof.
Associate(s)	Ines Bilić-Ćurčić, MD, PhD, Assoc. Prof. Stana Tokić, PhD, Assist. Prof. Marijana Jukić, PhD Vjera Ninčević, MD Tea Omanović Kolarić, MD
Study Programme	Interdisciplinary Graduate Study Programme in English: Biotechnology
Course Status	Elective
Year of Study, Semester	2nd Year /4th Semester
Credits (ECTS)	**4**
Teaching Method (number of classes)	Lectures: 15; Seminars: 15; Exercises: 15
Expected Number of Students in the Course	25-30
COURSE DESCRIPTION	
Course Aims	
To elaborate the role of genes that determine how people respond to medication and how innate variation determines response to drug therapy and metabolism. Introduce students to analyses that elucidate the complex picture of the metabolic pathways of drugs and the enzymes tested and the risks of drug interactions and analyzes of the therapy procedure.	
Prerequisites for Enrolment and the Entry Competencies Required for the Course	
Completed and passed courses from 1st year of the study.	
Learning Outcomes at the Programme Level Contributed by the Course	
BIOTECH-2; BIOTECH-4; BIOTECH-7; BIOTECH-10; MEDBIOT-2; MEDBIOT-5	
Learning Outcomes at the Course Level	
After completing the course, the student will be able to: 1. Interpret the impact of individual genetic variation on individual differences in pharmacokinetics and pharmacodynamics of drugs 2. Interpret the association between SNPs and other polymorphisms and clinical phenotypes of therapeutic response 3. Demonstrate levels of genetic polymorphisms with functional significance in pharmacogenetics 4. Apply genotyping methods 5. Recognize the possibilities and limitations in the clinical application of pharmacogenetic testing. 6. Apply acquired knowledge when planning experiments, conducting experiments, collecting and interpreting research results by learned methods.	
Course Content	
Lectures: Demonstration of the development of pharmacogenetics / pharmacogenomics, the human genome and the modern application of DNA-related drug. Ethical issues related to personal genetics data. Introduction and research of analysis of pharmacogenetic data, data quality, prediction and confirmation of different drug responses caused by pharmacogenetic particularities. **Seminars**: Polymorphisms of single nucleotides and other genetic variations and their potential impact on the pharmacodynamics, pharmacokinetics of drugs, the occurrence of drug interactions and adverse reactions. Interpreting the results of population genetics studies, genomic association studies in individual variability in drug administration. Application of pharmacogenomics in clinical practice: **practicums and discussion** of specific case	

reports. Possibilities and limitations of implementing pharmacogenomics into clinical practice.

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	0.2	1-5	Attendance at classes	Keeping records	2	5
Seminar work	0.6	1-5	Seminar preparation and presentation	Presentation	3	15
Laboratory exercises	0.8	4, 6	Laboratory exercises	Report	5	20
Final exam	2.4	1-6	Studying for the final exam	Written exam	40	60
Total	**4**				**50**	**100**

Evaluation of the written part of the final exam:

Percentage of correct answers (%)	Grade
>95.00	60
90.00-94.99	58
85.00-89.99	55
80.00-84.99	52
75.00-79.99	49
70.00-74.99	46
65.00-69.99	43
60.00-64.99	40

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 copies in the library	Availability via other media
Höppner W., Primorac D.: Pharmacogenetics in Cinical Practice BioGlobe GmbH, Hamburg, 2016.	6	

Altman R., Flockhart D., Goldstein DB., Principles of Pharmaco-genetics and Pharmacogenomics. Cambridge University Press, 2012.	10	
Additional Literature		
Cohen N., Pharmacogenomics and Personalized Medicine-Methods in Pharmacology and Toxicology. Humana Press, 2010.		
Quality Assurance Procedures Designed to Ensure the Acquisition of Outcomes and Competencies		
Anonymous, quantitative, standardized 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.		