

CLINICAL BIOCHEMISTRY WITH LABORATORY TECHNOLOGIES II	
GENERAL INFORMATIONS	
Course coordinator	Asst. Prof. Vatroslav Šerić, MMedBiochem, PhD
Assistant/Associate	Asst. Prof. Vesna Horvat, MMedBiochem, PhD Asst. Prof. Dario Mandić, MMedBiochem, PhD Asst. Prof. Sanja Mandić, MMedBiochem, PhD Marija Milić, MMedBiochem, PhD Tihana Pavošević, MMedBiochem Maja Grabić, MMedBiochem Maja Lukić, MMedBiochem
Study Programme	Undergraduate University Study of Medical Laboratory Diagnostics
Status of the course	mandatory
Year of study, semester	3 rd year, 5 th semester
ECTS	6
Workload (hours)	Lectures: 30; Seminars: 5; Laboratory exercises: 45
Expected number of students	30 - 35
COURSE DESCRIPTION	
Course objectives	
Familiarize students with the development of medical biochemistry and types of biological material which is the subject of analysis in laboratory diagnostics and laboratory tests used in the diagnosis of individual organs. Demonstrate to students the procedures used to create individual biochemical tests as well as laboratory sample processing in selected diagnostic problems.	
Course requirements and required competences	
Attended courses in the 2 nd year of the study program.	
Learning outcomes relevant to the study program	
1.1, 1.2, 2.1, 2.2, 2.3, 2.6, 3.1, 3.2	
Expected learning outcomes at the course level	
After attending lectures and exercises, self-learning and successfully passing the exam, the students will be able to: <ol style="list-style-type: none"> 1. explain mechanisms that may affect laboratory test results during the pre-analytical, analytical and post-analytical phase 2. link analytical interferences to changes in laboratory test results 3. explain the procedure for creating reference values for different populations 4. explain laboratory tests, analyzer application and bedside healthcare 5. perform the determination of individual analytes in serum, cerebrospinal fluid, urine and blood 6. use the laboratory information system. 7. explain the principles of validation of analytical methods related to imprecision, inaccuracy and linearity. 	
Course content	
<p>Lectures: Automation of pre-analytical, analytical and post-analytical phases of laboratory work. Division of biochemical analyzers, operating and handling principles. Laboratory information systems – purpose and application. Introduction of a quality system in a clinical laboratory. Creating reference values. Pre-analytical phase. Tumor markers. Laboratory tests in intensive care. Acute phase proteins. Immunochemical methods. Immunochemical reactions interference. TDM and toxicology. Laboratory diagnosis of heart disease – myocardial infarction. Laboratory diagnosis of kidney disease, newer indicators (NGAL).</p>	

Seminars: Emergency patient. Point-of-care testing.

Exercises: Acid-base status, the importance of pre-analytical phase. Cerebrospinal fluid – emergency tests. Proteinuria typing. Determining tumor markers. Cerebrospinal fluid – special tests. Toxicology – screening and confirmatory methods. Analytical method validation – imprecision, inaccuracy, linearity. Development of quality system documentation.

Form of instruction

Lectures; seminars; exercises.

Student obligations

Attending all forms of instruction is mandatory, and the student must sit for all exams. A student can be excused from 30% of every form of instruction. Missed exercises must be compensated by sitting for an exam.

Monitoring student learning (Interconnectedness of learning outcomes, teaching methods and grading)

Type of exam: written exam.

Curricular activities	ECTS	Learning outcome	Student participation	Assessment methods	Grade points	
					Min.	Max.
Attendance (lectures)	1	1-4, 7	Class attendance,	Records	1	5
seminars			Active participation in seminars;		4	15
exercises)		5,6	Completed exercise and an accepted report		15	30
Final exam	3	1-7	Preparation for the final exam	Written exam	30	50
Total	6				50	100

Valuation of the written part of the final exam

Percentage of correctly solved tasks (%)	Grade points
60.00-64.99	30
65.00-69.99	33
70.00-74.99	36
75.00-79.99	39
80.00-84.99	41
85.00-89.99	43
90.00-94.99	47
95.00-100	50

Formulation of the final grade:

Points achieved in class are combined with points achieved on the final exam. The grading shall be carried out by using absolute distribution, i.e. shall be based on the final achievement and compared to the numerical system as follows: A – excellent (5): 80-100 points; B – very good (4): 70-79.99 points; C – good (3): 60-69.99 points; D – sufficient (2): 50-59.99 points.

Mandatory reading (available in the library or in other mediums)

Title	Number of copies in the library	Availability in other mediums

Čvorišćec D., Čepelak, I. Štrausova medicinska biokemija [Štraus Textbook of Medical Biochemistry]. Medicinska naklada, Zagreb, 2009	7	
<i>Topić, E., Primorac, D., Janković, S., Štefanović M. et al. Medicinska biokemija i laboratorijska medicina u kliničkoj praksi [Medical Biochemistry and Laboratory Medicine in Clinical Practice]. Medicinska naklada, Zagreb, 2018</i>	7	
Additional reading		
<ol style="list-style-type: none"> 1. Čvorišćec D., Stavljenić-Rukavina A. Priručnik u procjeni laboratorijskih nalaza iz medicinske biokemije [Handbook for the Assessment of Lab Results in Medical Biochemistry]. Medicinska naklada, Zagreb, 1993 2. Štraus B., Stavljenić-Rukavina A., Plavšić F. Analitičke tehnike u kliničkom laboratoriju [Analytical Techniques in a Clinical Laboratory]. Medicinska naklada, Zagreb, 1997 3. Čepelak I., Štraus B., Dodig S., Labar B. Medicinsko biokemijske smjernice [Medical Biochemistry Guidelines], Medicinska naklada, Zagreb, 2004, selected chapters 4. Gaw A., Murphy M., Cowan R., O'Reilly, Stewart M., Shepherd J. Clinical Biochemistry 3rd Edition. Elsevier, Oxford, 2004, partly available at http://intl.elsevierhealth.com/gaw. 		
Quality monitoring methods ensuring the acquisition of competences upon completion		
An anonymous, quantitative, standardized student survey on the course and the work of professors conducted by the Quality Assurance Office of the Faculty of Medicine Osijek.		