

## CLINICAL BIOCHEMISTRY WITH LABORATORY TECHNOLOGIES I

### GENERAL INFORMATION

Course coordinator	Asst. Prof. Vatroslav Šerić, MMedBiochem, PhD
Assistant/Associate	Asst. Prof. Vesna Horvat, MMedBiochem, PhD Asst. Prof. Sanja Mandić, MMedBiochem, PhD Vikica Buljanović, MMedBiochem, PhD Maja Lukić, MMedBiochem Tihana Pavošević, MMedBiochem Tara Rolić, MMedBiochem
Study Programme	Undergraduate University Study of Medical Laboratory Diagnostics
Status of the course	mandatory
Year of study, semester	2 <sup>nd</sup> ; 3 <sup>rd</sup> semester
ECTS	6
Workload (hours)	Lectures: 30; Seminars: 10; Lab exercises: 30
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 1st 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:

1. describe biochemical mechanisms that affect the concentration change of individual analytes in the body
2. assess the clinical relevance of certain biochemical indicators
3. apply the principles of good laboratory practice when receiving samples and in the pre-analytical phase of sample processing
4. apply the principles of good laboratory practice in the analytical and post-analytical phase
5. perform a laboratory method for determining individual analytes in a clinical sample
6. interpret the obtained lab results.

#### Course content

**Lectures:** *Introduction to medical biochemistry:* The history and development of the profession. Pre-analytical phase. Different biological material. *Laboratory processing of individual organ systems:* Introduction to proteins; Protein separation techniques; Immunochemical methods; Immunochemical methods with marked Ag/At; Kidney function and kidney disorders; Introduction to routine urine examination; Non-protein nitrogen compounds; Urea, creatinine, uric acid; Introduction to enzymes; Enzymes characteristic of pancreatic disease; Enzymes and myocardial infarction; Lipids and lipoproteins; Liver disease enzyme indicators; Liver function, Bilirubin; Water distribution in the body; Electrolytes; Acid-base status; Trace elements; Hemoglobin; Iron. *Organization of work when carrying out laboratory analyses:* Organization of laboratory work; Division of a laboratory by health protection

levels; Principles of sample reception and safety at work; Electrophoretic separation of serum proteins and lipoproteins; Sample processing and preparation of reagents.

**Seminars:** *Processing selected diagnostic problems:* Laboratory processing of patients with diabetes mellitus; laboratory processing of patients with acute chest pain; laboratory processing of hepatitis patients; laboratory processing of patients with kidney transplantation; laboratory treatment of osteoporosis patients.

**Exercises:** Routine urine analysis; Determination of the concentration of glucose, total protein, urea, uric acid, creatinine; Determination of the concentration of calcium, inorganic phosphorus, magnesium, copper, iron, bilirubin; Determination of the activity of alpha-amylase, alkaline and acid phosphatase, AST, ALT, LDH, CK, GGT; Determination of the concentration of total cholesterol, HDL and LDL cholesterol and triglycerides.

#### 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	Points	
					Min.	Max.
Attendance (lectures, seminars, exercises)		1,2,4	Class attendance, Active participation in seminars;	Records	1	5
		3,5,6	Completed exercise and an accepted paper		4	15
						15
Final exam	3	1-6	Preparation for the final exam	Written exam	30	50
<b>Total</b>	<b>6</b>				<b>50</b>	<b>100</b>

#### Valuation of the written part of the final exam

Percentage of correctly solved tasks (%)	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		
<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>		

**Additional reading**

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.