



<b>Study program:</b> Integrative academic studies in Medicine
<b>Course title:</b> Clinical Biochemistry
<b>Teacher:</b> Karmen M. Stankov, Jasmina N. Katanić
<b>Course status:</b> elective
<b>ECTS Credits:</b> 3
<b>Condition:</b> Medical Biochemistry; Patophysiology
<p><b>Course aim:</b></p> <p>The aim of teaching clinical biochemistry is to enable medical students to integrate knowledge of General biochemistry, Physiology and Pathophysiology, to see the practical application and importance of determining both basic and important specialized biochemical parameters used in laboratory diagnostics. In an era of increasing number of analyzes, thanks to the rapid development of technical sciences and methods that we can use, a better and more in-depth understanding of clinical biochemistry will certainly influence the development of the ability to rationally select the laboratory parameters necessary to diagnose, monitor the course and outcome of the disease. Acquaintance with new methods that have not yet come to fruition in routine practice but are certainly the basis of personalized medicine that we all strive for.</p>
<p><b>Expected outcome of the course:</b></p> <p>Knowledge of biological phenomena at the molecular level and understanding the essence of many diseases. Knowledge of specific biochemical processes of individual organs and tissues and their importance for the functioning of the whole organism. Biochemical basis of functional testing of individual organs.</p> <p>Proper sampling of biological material for biochemical analysis. Method of use of certain analytical procedures and apparatuses in specialized biochemical laboratories. Using the results of biochemical analysis, normal and reference values, measurement units. Investigation of the metabolism of the most important ingredients of the body based on measurements of biological samples.</p>
<p><b>Course description:</b></p> <p>Teaching in clinical biochemistry is realized through 30 hours of theoretical and 15 hours of practical teaching (10 laboratories, 5 seminars). In addition to working in the laboratory on determining basic biochemical parameters and analyzing the results obtained, students will also be introduced in small groups to work in routine and specialized clinical-biochemical laboratories.</p> <p><i>Theoretical education</i></p> <ol style="list-style-type: none"> <li>1. Introduction to clinical biochemistry. Place of clinical / medical biochemist in the health care system of the Republic of Serbia.</li> <li>2. Monitoring the quality of work in the laboratory. Determination of method reliability factors. Reference values. Causes of variability in laboratory analysis results.</li> <li>3. Types of samples for biochemical analyzes, adequate selection, collection, transportation. Preanalytical phase errors.</li> <li>4. Biochemical markers</li> <li>5. Laboratory diagnostics of heart and blood vessel diseases (troponin, BNP, H-FABP, IMA...)</li> <li>6. Laboratory diagnostics of liver disease. Importance of determining metabolites, enzymes, proteins.</li> <li>7. Laboratory diagnostics of gastrointestinal tract diseases, H.Pylori infections, biochemical markers of malabsorption syndrome, gluten enteropathy and others.</li> <li>8. New markers of laboratory diagnosis of kidney disease.</li> <li>9. Laboratory diagnostics of neurological diseases.</li> <li>10. Biochemical Aspects of Bone Diseases. Biochemical markers of bone remodeling.</li> <li>10. Laboratory immunodiagnosics of autoimmune diseases (ANA, ANCA, ACPA...)</li> <li>11. Biochemical Aspects of Pregnancy. Prenatal screening.</li> <li>12. Chromosomopathy screening, determination of free circulating fetal DNA (cffDNA).</li> <li>13. Methods of "omics", proteomics, lipidomics, genomics and others as an introduction to personalized medicine.</li> <li>14. Liquid biopsies", significance and opportunities.</li> <li>15. POCT - patient bedside laboratory.</li> </ol> <p><i>Practical education</i></p> <ol style="list-style-type: none"> <li>1. Introduction. Statistical evaluation of the reliability of the results of clinical biochemical analyzes. Verification of precision, accuracy, Laboratory quality control. Clinical quality control and clinical correlation of biochemical analysis results.</li> <li>2. Laboratory analysis-analytics and interpretation of findings of glucose concentration, protein, lipid parameters and others.</li> </ol>

Interpretations of certain pathological conditions by analysis of "paper patients". Rational interpretation of the results obtained. Work in specialized clinical-biochemical laboratories at the Paediatric Clinic and at the Clinic for Gynaecology and Obstetrics.

**Literature**

*Compulsory*

1. Rifai N, Horwath R A, Wittwer C. Tietz Textbook of Clinical chemistry and molecular diagnostics, Elsevier, St. Louis, Missouri, 2018.

**Number of active classes**

**Theoretical classes: 30**

**Practical classes: 15**

**Teaching methods**

Lectures for small groups with the use of multimedia didactic materials. Practical work: work in medical laboratories.

**Student activity assessment (maximally 100 points)**

<b>Pre-exam activities</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>
Lectures	8	Written	15
Practices	12	Practical	
Colloquium	15	Oral	40
Essay	10		