

Study program: Integrated academic studies in Pharmacy		
Course title: Clinical Biochemistry		
Teacher: Ljiljana N. Andrijević, Karmen M. Stankov, Jasmina N. Katanić		
Course status: elective		
ECTS Credits: 3		
Condition: Medical Biochemistry; Patophysiology		
Course aim: The aim of Clinical Biochemistry course is to provide the insight into the basic principles of biochemical analysis in modern laboratory diagnostics and to interpret the results of biochemical tests in accordance with the corresponding pathological condition.		
Expected outcome of the course: Knowledge of specific biochemical processes of organs and tissues and their importance for the functioning of the organism as a whole. Biochemical basis of functional testing of individual organs. Proper sampling and the of biological material for biochemical analyzes. The use of analytical procedures and instruments in specialized biochemical laboratories. Testing the metabolism of the most important constituents of an organism based on measurements in biological samples. Proper interpretation of the results of laboratory tests.		
Contents of the course: Course description Teaching in clinical biochemistry is realized through theoretical and practical teaching. In addition to working in a 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. Theoretical education 1. Introduction to clinical biochemistry. Place of clinical / medical biochemist in the health care system. 2. Monitoring the quality of work in the laboratory. Determination of method reliability factors. Reference values. Causes of variability in laboratory analysis results. 3. Types of samples for biochemical analyzes, adequate selection, collection, transportation. Preanalytical phase errors. 4. Biochemical markers 5. Laboratory diagnostics of heart and blood vessel diseases (troponin, BNP, H-FABP, IMA...) 6. Laboratory diagnostics of liver disease. Importance of determining metabolites, enzymes, proteins. 7. Laboratory diagnostics of gastrointestinal tract diseases, H.Pylori infections, biochemical markers of malabsorption syndrome, gluten enteropathy and others. 8. New markers of laboratory diagnosis of kidney disease. 9. Laboratory diagnostics of neurological diseases. 10. Biochemical Aspects of Bone Diseases. Biochemical markers of bone remodeling. 11. Laboratory immunodiagnosics of autoimmune diseases (ANA, ANCA, ACPA...) 12. Biochemical Aspects of Pregnancy. Prenatal screening. 13. Chromosomopathy screening, determination of free circulating fetal DNA (cffDNA). 14. Methods of "omics", proteomics, lipidomics, genomics and others as an introduction to personalized medicine. 15. Liquid biopsies", significance and opportunities. 16. POCT - patient bedside laboratory. Practical education 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. 2. Laboratory analysis analytics and interpretation of findings of glucose concentration, protein, lipid parameters and others. Interpretations of certain pathological conditions by the analysis of case reports. Rational interpretation of the results. Work in specialized clinical-biochemical laboratories.		
Literature <i>Compulsory</i> 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)

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