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|  | **Course title: CLINICAL BIOCHEMISTRY I** | | |
| **Level: Undergraduate** | **Year:**  **IV** | **Semester:**  **VIII** | **ECTS credits:**  **7** |
| **Status:**  **Obligatory** | **Number of hours weekly: 4+4**  **(Lectures + practical classes)** | | **Total hours of teaching: 120** |
| **Teaching staff:** | Responsible professor: Associate professor Maja Malenica. PhD Other teaching staff: Dr. Sci. Tamer Bego, Tenure professor Adlija Čaušević PhD, teaching assistant Neven Meseldžić | | |
| **1. Course objectives** | To provide students with the necessary knowledge about fundamental principles and the diagnostic significance of laboratory tests performed routinely in the clinico biochemical laboratories. Consequently, student will acquire the practical experiences and achieve a high level of competence in the interpretation of laboratory findings. | | |
| **1.1. Curriculum**  **a) Lectures:**  Introduction to the principles and methods used to determine the various clinically relevant constituents that are routinely determined in biological samples (blood, blood derivatives, urine). The course presents the biochemical, physiological and pathophysiological basis related to the application of the specific diagnostic test, gives an overview of the clinical significance of the tested results, including the quality of control and the notion of normal and reference values. The course includes basic laboratory techniques, knowledge of safety in the laboratory and processes materials related to electrolytes, water transport, oligoelements, regulation of ABS, proteins, carbohydrates, lipids, enzymes, hemoglobin, porphyrins, NPN compounds, vitamins and tumor markers.  **b) Practical classes**  The practical lessons are designed to follow theoretical instruction. This enables the student to become competent in the knowledge of the type of diagnostic tests used and how to select them. At the same time, the student can solve typical cases related to these problems that require a high level of analytical skills. Solving such cases is a great challenge for students, where they are faced with the responsibility of working with biological samples through practical work. Practical work covers many very important segments of laboratory work, obtaining the typical samples used in daily routine clinical work, the types of errors that can occur in this process, detailed analysis of preanalytical, analytical and postanalytical errors.  The student is also acquainted with the method of obtaining reference values, testing standards and calibrators, the type of instruments used in laboratory work, quality control and the method of obtaining pool samples. During the practical work, the student must constantly use basic statistics and working formulas, as a part of computational exercises covering buffers, enzymatic activity, catalytic content of enzymes, the catalytic activity of enzymes, application of the Beer-Lambert law and clearance. The analytical part of the practicum covers the analysis of cations and anions (flame photometry) and spectrophotometric determinations of chloride, iron, hemoglobin according to Drabkin, porphyrin, bilirubin, glucose, cholesterol and triglycerides, urea and creatinine, uric acid, and a detailed examination of urine with special reference to urine sediment. All of these methods test the performance of the analytical procedures and the performance of the students themselves. | | | |
| **1.2. Learning outcomes** | Based on the acquired knowledge, the student will be:  -able to integrate the knowledge gained in biochemistry and pathophysiology and relate it with diagnostic tests used in a daily practice.  -able to answer how and why different pathological conditions lead to changes reflected in the sphere of laboratory findings  -familiarize yourself with the importance of maintaining homeostasis (ph blood-gases), and changes related to fluid circulation compounds, proteins, glucose, lipids, oligoelements, tumor markers.  -know the analytical principles underlying the process of determining the individual constituents mentioned above, with the same understanding the importance of the process of quality control in laboratories and know basic sources of errors in laboratory work.  -able to choose the right lab tests which are used for testing the changes in metabolism.  -able to see how the results of laboratory tests can be  used in diagnostics and be able to interpret basic laboratory findings  -know basic literature in the specified field | | |
| **2. Course organisation** | | | |
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| **2.1. Structure of the course** | 1. Theoretical lessons  2. Pratical lessons | | 1. 50%  2. 50% |
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| **2.2. Grading** | 1. Midterm exam  2. Quizzes  3. Attendance and participation in class  4. Final Exam | | 1. 30 %  2. 25 %  3. 5 %  4. 40 % |
| **3. LITERATURE** |  | | |
| Mandatory:  1. Adlija Jevrić-Čaušević: ,,Praktikum iz kliničke biohemije sa teoretskim osnovama”,1999.  2. ,,Radna sveska za vježbe iz kliničke biohemije”, 2015.  3. Dubravka Čvoriščec, Ivana Čepelak: ,,Štrausova medicinska biokemija”, 2009.  Additional:  1. Nessar Ahmed: Clinical Biochemistry (Fundamentals of Biomedical Science), 2011.  2. Bishop: Clinical Chemistry, 6th edition, 2010.  3. Elizabeta Topić i saradnici: ,,Medicinskobiohemijska dijagnostika u kliničkoj praksi”, 2004.  4.Stephen Goldberg: Clinical Biochemistry Made Ridiculously Simple”, 2004. | | | |
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