

Level: bachelor			
Course title: Introduction to Biochemistry II, B-203			
Status: obligatory			
ECTS: 5			
Requirements: none			
Learning objectives (1) to provide students with fundamental knowledge of enzymes and basic kinetics of enzyme reactions; (2) to provide students with knowledge of the basic principles of bioenergetics and types of energy transfer in biological systems; (3) to enable students to understand the mechanisms of transport through the cell membrane and signal transduction; (4) to develop students' practical skills and abilities to apply the standard experimental method in the analysis of biological material; (5) to introduce students to ethical principles related to biochemical research and the impact of these research on society and the environment.			
Learning outcomes After successful completion of the course, students will be able to: (1) demonstrate the basic knowledge of the enzyme activity, the importance of enzymes in a living system and the kinetics and thermodynamics of enzyme-catalyzed reactions, (2) explain the mechanism of transport through the cell membranes, (3) demonstrate basic signaling pathways from the extracellular environment into the cell and identify groups of biomolecules that participate in this process, (4) search biochemical literature (books, journals and resources from the Internet) and independently write simple texts on the selected topic in the field of biochemistry, (5) use chemical and biochemical methods in solving the set of practical problems in biochemistry, and also to interpret the obtained experimental results.			
Syllabus <i>Theoretical instruction:</i> Enzymes and basic kinetics of enzyme reactions. Basic principles of bioenergetics and "high-energy" compounds. Role of ATP molecule in energy transfer and metabolic reactions. The role of the redox systems in energy transfer. Ion pumps. Biological membranes. Membrane proteins. Lipoproteins. Transport through the membrane. Polynucleotides - structure and properties. The hierarchy of the structure of nucleic acids. Signal transduction. Signal transducers: G-proteins, adenylyl-cyclase, phosphatidylinositol-4,5-bisphosphate. Membrane receptors, receptor tyrosine kinases. Proteins as clotting factors. Immunoglobulins in the immune response, safeguards of the cells and tissues. Antibody-antigen interactions, biochemistry of blood groups. Biochemical communication: hormones and neurotransmitters. Water soluble vitamins. Vitamins A, D, E, and K - structure and biological function. The biochemical basis of the visual processing. <i>Practical instruction:</i> Laboratory work follows theoretical instruction.			
Weekly teaching load			Other:
Lectures: 2	Exercises: 2	Other forms of teaching: –	