Level: Bachelor

Course title:: Biochemistry (ZMH-401)

Status: Obligatory

ECTS: 6

Requirements: none

Learning objectives

Understanding the molecular logic of biochemical processes in biological systems, dynamics of synthesis and degradation of biomolecules and regulatory processes in the cell. Mastering the standard methodology for solving problems in biochemical systems. Students will master the important skills that will lead to a successful career in the field of biochemistry, education, research, pharmaceuticals, or biomedicine investigation or to further education upon graduation.

Learning outcomes

Upon successful completion of this course students should be able to: 1. Explain concepts and significance of free energy in biological systems. 2. Analyze the connections between catabolic and anabolic processes. 3. Define the role of enzymes and coenzymes in different metabolic reactions. 4. Explain methods of regulation of different metabolic pathways and cycles. 5. Explain the role of nucleic acids in replication, transcription and translation. 6. Demonstrate technical laboratory skills which are used in studying metabolism. 7. Analyze connections between disorders in biochemical pathways and etiology of human disease and potential use in therapy.

Syllabus

Theoretical instructions

Thermodynamics and metabolism. General overview of metabolism. Metabolism of carbohydrates (glycolysis, gluconeogenesis, glycogenolysis, pentose-phosphate pathway, biosynthesis of carbohydrates). Citrate cycle. Respiratory chain and oxidative phosphorylation. Photosynthesis. Lipid metabolism. Metabolism of amino acids and urea cycle. Metabolism of nucleotides and nucleic acids. Protein metabolism.

Practical instructions:

Experimental and computer exercises are in accordance with theoretical program of the course.

Weekly teaching load				Other: /
Lectures: 3	Exercises: 3	Other forms of teaching:	Student research: /	