Course Unit Descriptor

Study Programme: Bachelor Academic Studies in Biohemistry

Course Unit Title: Enzymology

Course Unit Code: B-303

Name of Lecturer(s): Assistant professor Miloš Svirčev

Type and Level of Studies: Bachelor of Science Degree

Course Status (compulsory/elective): Compulsory

Semester (winter/summer): Summer

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 6

Prerequisites: None

Course Aims: To understand the kinetics and mechanisms of action of enzymes, to become familiar with the basic methods of studying enzymes, and to estimate how individual reactions are controlled and integrated into the metabolic pathways of the cell. Acquired theoretical and experimental knowledge will enable students to find appropriate employment in different development, scientific-research laboratories, or to continue their studies in biochemistry or related disciplines.

Learning Outcomes: Upon successful completion of this course, students should be able to: explain relationship between structure and function of enzymes; explain how enzymes are able to increase speed of a biochemical reaction in a sense of thermodynamics, kinetics and molecular interactions; use catalytic strategies in interpreting mechanisms of enzymatic action; interpret and explain significant mechanisms of regulation of enzymatic action and specify importance of enzymes in regulation of metabolism; apply appropriate methods for determination of catalytic parameters and activity of enzymes and resolve problems considering kinetics and thermodynamics of enzymatic reactions; analyze options for applying enzymes and their inhibitors in medicine and various industries; apply theoretical, practical and statistical knowledge during processing experimental results and their correct interpretation.

Syllabus:

Theory

Introduction to enzymology, basic properties of enzymes. Classification and nomenclature of enzymes. Enzyme kinetics. Inhibition. Influence of temperature and pH on enzymatic reactions. Basics of catalysis. Mechanisms of enzymatic reactions. Regulatory enzymes. Regulation of enzymatic action. Enzymes in organized systems. Ribosomes and abzymes. Databases for enzymes. Use of enzymes in clinical diagnostics, biotechnology, pharmaceutical and food industries.

Practice

Experimental and computer exercises in generating, analysis and processing of kinetic data in accordance with theoretical program of the course.

Required Reading:

1. Cornish-Bowden, A. *Fundamentals of Enzyme Kinetics*, 4th ed.; Wiley-Blackwell, 2012.

2. Copeland, R. A. *Enzymes: A Practical Introduction to Structure, Mechanism, and Data Analysis*, 2nd ed.; Wiley-VCH, 2000.

3. Fersht, A. *Structure and Mechanism in Protein Science: A Guide to Enzyme Catalysis and Protein Folding*, 2nd. ed.; W.H. Freeman and Company, 1999.

Weekly Contact Hours: 90	**Lectures:** 45	**Practical work:** 45
Teaching Methods: Lectures, laboratory work and seminars.		
Knowledge Assessment (maximum of 100 points): 100		

Pre-exam obligations	points	**Final exam**	points
Active class participation	5	written exam	40
Practical work	10	oral exam	25
Homework	10	…….	
Seminar(s)	10		