



Course Syllabus

Course Code	Course Title	ECTS Credits
IMPH-120	Biochemistry and Metabolism/ Βιοχημεία και Μεταβολισμός	6
Prerequisites	Department	Semester
None	Health Sciences	Fall/Spring
Type of Course	Field	Language of Instruction
Compulsory	Pharmacy	English/Greek
Level of Course	Lecturer(s)	Year of Study
1 st Cycle	Dr Louiza Papazachariou	1 st
Mode of Delivery	Work Placement	Corequisites
Face-to-Face	N/A	N/A

Course Objectives:

The main objectives of the course are to:

- introduce students to the basic principles of biochemistry with great emphasis on biological macromolecules and enzymes catalysis
- enable students to understand the chemical reactions important to biology, and how enzymes catalyse these reactions

Learning Outcomes:

After completion of the course students are expected to be able to:

- Outline the structure and activity of all biomolecules
- Define how genetic information flows from DNA to RNA and then to proteins.
- Specify the thermodynamics and kinetics involved in the function and interactions of biological macromolecules and enzymes
- Define and explain the mechanisms of catalysis and regulation of enzymes
- Define allosteric proteins (i.e., haemoglobin) and explain their function and regulation
- Define the structure and role of proteins
- Define and show the structure and role of carbohydrates
- Define the structure of lipids and their roles in cell membranes

Course Content:

- The molecular logic of life/ bioenergetics
- Structure and activity of proteins (amino acids, peptides, peptide bonds - primary, secondary, tertiary, quaternary structures)
- Studying proteins – isolation and purification of proteins (methods), tertiary structure, peptide synthesis, protein sequence, methods for studying proteins (western blot, etc.)
- DNA, RNA and genetic information flow
- Enzymes: Basic principles and catalysis. Michaelis-Menten equation, Lineweaver-Burk plots, inhibition and kinetics of inhibition, Different types of enzyme inhibition
- Strategies for catalysis
- Regulation strategies: enzymes and haemoglobin
- Carbohydrates
- Lipids and cell membranes
- Biological membrane transport (ion channels and pumps)

Laboratory exercises:

1. *Competitive/non-competitive inhibition, use of Lineweaver-Burk plots (modelling)*

Protein analysis:

2. Spectrophotometry: Beer's Law, Standard Curves and Protein Concentration

3. Protein electrophoresis

4. Enzyme activity

5. Effect of pH on enzyme activity

6. Effect of temperature on enzyme activity

Learning Activities and Teaching Methods:

Lectures, class discussion, assignments, laboratory

Assessment Methods:

Final exam, Midterm exam, Lab reports

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Biochemistry, Part I	J. M. Berg, J. L. Tymoczko, L. Stryer.	Μετάφραση Πανεπιστημιακές	2017	978-960-524-495-8

		Εκδόσεις Κρήτης		
Lehninger Βασικές Αρχές Βιοχημείας	Nelson D., Cox M	ΕΚΔΟΣΕΙΣ ΠΑΣΧΑΛΙΔΗΣ	2011	978-960-489- 220-4
Biochemistry for the Pharmaceutical sciences	Woodburry CP.	Jones and Barlett learning	2012	9780763763848