



# UNIVERSITY OF NICOSIA

## ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ

<b>Course Code</b> PHAR-120	<b>Course Title</b> Biochemistry and Metabolism/Βιοχημεία και Μεταβολισμός	<b>Credits (ECTS)</b> 5
<b>Department</b> Life & Health Sciences	<b>Semester</b> Spring	<b>Prerequisites</b> None
<b>Type of Course</b> Required	<b>Field</b> Pharmacy	<b>Language of Instruction</b> Greek/English
<b>Level of Course</b> 1 <sup>st</sup> Cycle	<b>Year of Study</b> 1 <sup>st</sup> year	<b>Lecturer</b> Maria Mastorikou/Zacharia Lefteris
<b>Mode of Delivery</b> face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

### Objectives of the Course:

The aim of the course is to introduce students to the basic principles of biochemistry with great emphasis on biological macromolecules and enzymes catalysis. The course will enable students to understand the chemical reactions important to biology, and how enzymes catalyze these reactions.

### Learning Outcomes:

After completion of the course students are expected to

1. Define the structure and activity of all biomolecules and correlate structure with activity.
2. Define how genetic information flows from DNA to RNA and then to proteins.
3. Understand the thermodynamics and kinetics involved in the function and interactions of biological macromolecules and enzymes.
4. Be able to define and explain the mechanisms of catalysis and regulation of enzymes.
5. Define allosteric proteins (hemoglobin) and explain their function and regulation.
6. Define the structure and role of proteins
7. Define and explain the structure and role of carbohydrates
8. Define the structure of lipids and their roles in cell membranes.
9. Understand the catabolism and anabolism of all biomolecules (proteins, fats, carbohydrates)
10. To understand the reciprocal regulation of catabolic and anabolic pathways.

## Course Contents:

- The molecular logic of life/ bionergetics
- Structure and activity of proteins (Amino acids – structures, peptides, peptide bonds) Primary secondary, tertiary quaternary structures.
- Studyingproteins- isolatingandpurifyingproteins (methods), tertiarystructure, peptidesynthesis, sequencingproteins, methods for studying proteins (western blot etc)
- DNA, RNAand the flow of genetic information
- Enzymes: Basic principles and catalysis. MichaelisMentenequation, Lineweaver-Burke plots, inhibition and kinetics of inhibition, Different types of enzyme inhibition ,
- Strategies for catalysis
- Regulation strategies: enzymes and heomoglobin.
- Carbohydrates
- Lipids and cell membranes
- Biological membrane transport (ion channels and pumps. )

### Laboratory exercises:

1. *Competitive/noncompetitive inhibition, use of Lineweaver-burk plots (modelling)*

### Protein analysis:

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

3. Protein electrophoresis

### Enzyme activity

4. Effect of pH on enzyme activity

5. Effectoftemperatureonenzymeactivity

## Learning Activities and Teaching Methods:

Lectures, class discussion, assignments

## Assessment Methods:

Final Examination, Course work

## Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
J. M .Berg , J. L Tymoczko , L. Stryer.	Biochemistry, Part I	Μετάφραση Πανεπιστημιακές Εκδόσεις Κρήτης	2002	

**Recommended Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
Nelson D., Cox M	Lehninger Βασικές Αρχές Βιοχημείας	ΕΚΔΟΣΕΙΣ ΠΑΣΧΑΛΙΔΗΣ		
Woodbury CP.	Biochemistry for the Pharmaceutical sciences	Jones and Barlett learning		