



University of Nicosia, Cyprus

Course Code BIOL-321	Course Title Biochemistry I	ECTS Credits 8
Department Life and Health Sciences	Semester Fall	Prerequisites BIOL-205 and -206 Human Anat. and Physiol. I and II, CHEM-245, Organic Chemistry
Type of Course Required	Field Biology	Language of Instruction English
Level of Course 1 st Level	Year of Study 3 rd	Lecturer Dr. Evdokia Kastanos-Kassini
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

This course is an upper division course for life science majors, offered in two parts. In this part of the course the aim is to cover comprehensively the fundamental biochemical concepts of proteins and nucleic acid structures, properties and function.

The main objectives of this course are to:

- Discuss the chemical structure and functional groups of proteins, nucleic acids, lipids and carbohydrates in relation to their biological properties and role.
- Present the principles that determine the three-dimensional structure of biological macromolecules and how structure enables function.
- Demonstrate the biochemical basis of genetic inheritance and protein expression.
- Discuss the chemical and thermodynamic principles underlying biochemical reactions and the relationship of enzyme structure to catalysis and regulation.
- Describe in detail the cell membrane structure, its components and their role in cell communication.
- Introduce some general aspects of metabolism.

Learning Outcomes:

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

1. Describe the chemical components and three-dimensional structure of proteins, and associate protein structure to function and regulation in a physical, chemical and biological context using specific examples.
2. Define allosteric proteins and explain how they function and are regulated using hemoglobin as an example.
3. Describe and explain the chemical and thermodynamic principles that underlie biochemical catalysis and the role of enzymes.
4. Explain the chemical basis of gene coding, how genetic information flows from DNA to RNA and to Proteins, and describe the chemical methods used for protein sequence determinations.
5. Appraise the structure and components of cell membranes and their role in cell signaling and communication, and differentiate the function of membrane channels and pumps.
6. Identify and define the structure of the major carbohydrate molecules.

Course Contents:

1. Biochemistry: An Evolving Science
2. Protein Structure and Composition
3. DNA, RNA, and the Flow of Genetic Information
4. Hemoglobin: Portrait of a Protein in Action
5. Enzymes: Basic Concepts and Kinetics
6. Catalytic Strategies
7. Regulatory Strategies
8. Carbohydrates
9. Lipids and Cell Membranes
10. Membrane Channels and Pumps
11. Metabolism: Basic Concepts and Design

Learning Activities and Teaching Methods:

Lectures, Discussions, Review of literature papers, Cooperative learning

Assessment Methods:

Assignments, Two Mid-term Exams, Final Exam

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
J.M. Berg, J.L.	Biochemistry, 6/e	W.H. Freeman	2008	ISBN-10: 1-4292-3502-0

Tymoczko , and L. Stryer		and Co.		ISBN-13: 978-1-4292- 3502-0
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Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
1. D.J. Voet, J.G. Voet and C.W. Pratt	Principles of Biochemistry, 3/e	Wiley	2008	ISBN-13: 978-0470- 23396-2
2. T.M. Devlin	Biochemistry with Clinical Correlations, 6/e	Wiley	2006	ISBN-10: 0- 471-67808-2 ISBN-13: 978-0-471- 67808-3