University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
BIOL-421	Enzymology	8
Department	**Semester**	**Prerequisites**
Life and Health Sciences	Spring/Fall	BIOL-321. -322 Biochemistry I, II
Type of Course	**Field**	**Language of Instruction**
Life Sciences Elective	Biology, Biochemistry	English
Level of Course	**Year of Study**	**Lecturer**
1st Cycle	3rd or 4th	Dr. Demoliou Catherine
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

The course aims to provide students with further knowledge on what enzymes are, how they work and their importance in life. The main objectives of the course are to:

- Provide an overview of the various classes of enzymes, the basis of enzyme nomenclature and the mechanisms of enzyme regulation in cells.
- Describe the role of cofactors and present the principles of enzyme kinetics and how they are applied to study enzyme stability, activity and inhibition.
- Demonstrate the role of active-site amino acid residues in enzyme catalysis using specific examples from several enzyme families.
- Review biotechnology applications of enzymes in industry and disease diagnosis.

Learning Outcomes:

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

1. Differentiate enzyme categories and names according to enzyme function.
2. Discuss the relationship of structure-function in enzyme catalysis and explain the basis of activation energy, catalysis and the role of cofactors.
3. Use enzyme kinetics parameters (Michaelis-Menten) to solve biochemical problems on enzyme structure, kinetics and mechanisms from simulated experimental data.
4. Differentiate/compare and discuss the types of inhibitions of enzyme activity and calculate enzyme inhibition kinetic parameters.
5. Employ specific examples and illustrate the chemical basis of enzyme catalysis, specificity and control of enzyme activity.
6. Discuss enzyme applications in biotechnology and disease diagnosis.
7. Demonstrate lifelong learning skills.

Course Contents:

1. Introduction to what enzymes are.

2. The structure of enzymes.
3. The naming and classification of enzymes,
4. Bioenergetics, catalysis and kinetics I.
5. Bioenergetics, catalysis and kinetics II
6. Single substrate enzymes-catalyzed reactions.
7. Multi-substrate enzymes-catalyzed reactions.
8. The biosynthesis of enzymes
9. Specificity of enzymes
10. Extraction and purification of enzymes
11. Factors affecting enzyme stability
12. Applications of enzymology I
13. Applications of enzymology II

Learning Activities and Teaching Methods:

Lectures will be complemented with problem solving exercises on enzyme kinetics and with discussions on presentations of case-examples of enzymes from literature papers.

Assessment Methods:

Assignments, Tests and Mid-term Exam; Final Exam

Required Textbooks/Reading:

Authors	**Title**	**Publisher**	**Year**	**ISBN**
N. Price, L.Stevens	Fundamentals of Enzymology: Cell and Molecular Biology of Catalytic Proteins	Oxford University Press	1999, 3rd ed.	**ISBN-10:** 019850229X
Copeland, Robert Allen	Enzymes: a practical introduction to structure,mechanism, and data analysis.	Wiley	2000, 2nd ed.	**ISBN-10:** 0471359297

Recommended Textbooks/Reading:

Authors	**Title**	**Publisher**	**Year**	**ISBN**
J. Polaina, A.P. McCabe	Industrial Enzymes: Structure, Function and Applications	Kluwer Academic Publishers	2007	**ISBN-10**: 1402053762
Wondatir Nigatu Aragaw	Introduction to Enzymology: Enzymes: The Catalysts of Biological Systems	LAP LAMBERT Academic Publishing	2010	**ISBN-10:** 3843364621 **ISBN-13:** 978-3843364621