



University of Management & Technology
School of Science
Department of Life Science

Advanced Enzymology

Lecture Schedule	Tuesday 6:30 PM to 09:30 PM	Semester	Spring 2021
Pre-requisite	---	Credit Hours	3
Instructor	Dr. Asma Irshad	Contact Moodle link	Asma.irshad@umt.edu.pk
Office	Additional offices North Block	Office Hours	See office window
Course Description	<p>The contents of the course are in such a way to help students understand the principles underlying isolation, purification, mechanistic and kinetic studies involving enzymes. Steady state enzyme kinetics and transient kinetic methods are considered to gain further insight into the reaction mechanism of enzymes, substrate/products models and reaction schemes. Chemistry of enzyme catalysis, regulation of enzyme activity and synthesis, regulatory enzymes, molecular models for allosterism, multienzyme complexes, enzyme assays, criteria for determining purity of enzymes, enzyme reconstitution, and recent advances in Enzymology are also considered. The students will understand the importance of enzyme regulation and the various devices employed to achieve regulation. Also, they will be able to describe the mechanisms and kinetics of enzyme action, generate kinetic data, analyse kinetic data and give appropriate interpretations</p>		
Expected Outcomes	<p>The general objective of the course is describe and carry out the techniques of enzyme assay methods and the principles of enzyme kinetics which involve generating and analyzing kinetic data and the regulatory roles of enzymes.</p> <p>At the end of the course, the students should be able to</p> <ul style="list-style-type: none">• Describe the various laboratory procedures for the isolation, purification and characterization of enzymes.• Identify some criteria for determining the purity of enzymes.• Describe the various laboratory procedures that measure the rate of enzyme reactions.• Describe special techniques employed in the study of enzymes kinetics.• Explain the mechanisms and kinetics of enzyme-catalysed reactions for both single substrate and bisubstrate enzymes.		

	<ul style="list-style-type: none"> Describe general features characterizing regulatory (genetic, covalently and non-covalently regulated) enzymes and proposed models for allosteric behaviour of enzymes. Describe multienzyme complexes and mechanistic advantages offered by them. <p>Describe membrane and enzyme reconstitution techniques and advantages</p>
Textbook(s)	<ol style="list-style-type: none"> Fundamentals of Biochemistry (2008) 3rd Ed. by D. J. Voet, G.J. Voet and C. W. Pratt. J. Wiley & Sons Inc. USA. Bisswanger⁴, H. (2008) Enzyme kinetics. Principles and Methods. 2nd Ed. Wiley-VCH Verlag. Lehninger Principles of Biochemistry. (2012) 6th Ed. By David L. Nelson, Michael M. Cox . W.H. Freeman; VY, USA <p>Biochemistry. 7th Ed. By Jeremy M. Berg, John L. Tymoczko and Lubert Stryer. (2011). 7th revised international ed edition. Palgrave MacMillan; NY, USA.</p>
Grading Policy	<ul style="list-style-type: none"> Sessional 40% Quizzes 62.5% Assignment 25% Presentation 12.5% Final Exam: 60% Viva 20% Open Book exam 20% Term paper 20%

Course Schedule

Week	Lecture #	TOPICS
1	1 2	Structural Components of Enzymes,
2	1 2	Enzyme Classification,
3	1 2	Criteria for enzyme production and Purification
4	1 2	Enzyme Assay and Characterization
5	1 2	Chemical Mechanism in Enzyme catalysis

6	1 2	Regulation of enzymatic activity
7	1 2	Application of Microbial enzymes
8	1 2	Application of Microbial enzymes
9	1 2	Enzyme-Ligand interaction
10	1 2	Allosteric enzymes
11	1 2	Enzyme reaction with multiple substrate
12	1 2	Inhibition
13	1 2	Enzyme reconstruction
14	1 2	Molecular Modelling of Enzymes
15	1 2	Recent Advances in Enzymology

HEC COURSE CONTENTS

ADVANCE ENZYMOLOGY:

Course Objectives:

The contents of the course are in such a way to help students understand the principles underlying isolation, purification, mechanistic and kinetic studies involving enzymes.

Course Contents:

Structural Components of Enzymes, Enzyme Classification, Criteria for enzyme production and Purification, Enzyme Assay and Characterization, Chemical Mechanism in Enzyme catalysis, Regulation of enzymatic activity, Application of Microbial enzymes, Application of Microbial enzymes, Enzyme-Ligand interaction , Allosteric enzymes, Enzyme reaction with multiple substrate, Inhibition, Enzyme reconstruction, Recent Advances in Enzymology, Molecular Modelling of Enzymes