



UNIVERSITI TEKNOLOGI MARA

BMS535: PROTEINS AND ENZYMES

Course Name (English)	PROTEINS AND ENZYMES APPROVED
Course Code	BMS535
MQF Credit	3
Course Description	This is a course in the biochemistry proteins and enzymes. This course incorporates all aspects of protein and enzyme biochemistry including protein structure and functions, protein synthesis and purification, enzyme structure, kinetics and mechanism of enzyme activities.
Transferable Skills	The lab work will give the students practical experience of protein purification techniques introduced in the lectures. These hands on skills can be helpful for student's research project.
Teaching Methodologies	Lectures, Blended Learning, Practical Classes, Tutorial, Presentation
CLO	CLO1 Explain the mechanisms of protein synthesis, protein folding and conformation and how it relates to their functions. CLO2 Perform basic laboratory experiments on enzyme kinetics and protein purification. CLO3 Illustrate the mechanisms related to enzyme function, kinetics and industrial applications.
Pre-Requisite Courses	No course recommendations
Topics	
1. Protein structure 1.1) Classes of amino acids 1.2) Peptide bond 1.3) Reactions of amino acids	
2. Protein functions 2.1) Level of protein structures 2.2) Super secondary structures (Motifs) 2.3) Forces responsible for tertiary and quaternary proteins 2.4) Protein folding 2.5) Functional proteins	
3. Protein purification 3.1) Cell lysis techniques 3.2) Salting out 3.3) Chromatography: Ion exchange, Size exclusion, Affinity 3.4) Electrophoresis 3.5) SDS PAGE 3.6) Isoelectric focusing 3.7) 2D electrophoresis	
4. Protein characterization 4.1) Crystallization 4.2) Protein structure determination 4.3) Peptide analysis	
5. Protein Synthesis: Transcription 5.1) Prokaryotic transcription 5.2) Eukaryotic transcription 5.3) Post transcriptional RNA modification	

6. Protein Synthesis: Translation

- 6.1) Prokaryotic translation
- 6.2) Eukaryotic translation
- 6.3) Posttranslational modification of protein

7. Enzyme structure and functions

- 7.1) Enzymes as biological catalyst
- 7.2) Enzyme substrate complex model
- 7.3) Cofactor
- 7.4) Enzyme classes
- 7.5) Isozyme

8. Enzyme kinetics and inhibition

- 8.1) Enzyme inhibition: competitive and non competitive inhibition
- 8.2) Michaelis Menten equation
- 8.3) Lineweaver Burk plot

9. Industrial applications of proteins and enzyme

- 9.1) Enzyme production
- 9.2) Immobilize enzyme technology
- 9.3) Large-scale Enzyme Applications

Assessment Breakdown	%
Continuous Assessment	50.00%
Final Assessment	50.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	The topic for the assignment is on industrial applications of proteins and enzymes.	15%	CLO3
	Group Project	Mini Lab Project assesses students understanding in key points presented in lectures. The students' ability to report and analyze results on protein purification and protein characterization lab works, and general laboratory skills will be evaluated.	15%	CLO2
	Test	Test will cover the following topics; Protein structure, protein functions, and protein synthesis	20%	CLO1

Reading List	Recommended Text
	<ul style="list-style-type: none"> • Campbell, M. K., Farrell, S. O., & McDougal, O. M. 2018, <i>Biochemistry</i> • McKee, T., & McKee, J. R. 2017, <i>Biochemistry: The molecular basis of life.</i>, Oxford University Press. Oxford • Walsh, G. 2014, <i>Proteins: Biochemistry and biotechnology.</i>, John Wiley & Sons Inc. Chichester, West Sussex. • Ochs, R. S. 2014, <i>Biochemistry.</i>, Jones & Bartlett Learning. Burlington, MA

Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources