

Department of Liberal Education
Era University, Lucknow
Course Outline
Effective From: 2023-24

Name of the Program	B.A. / B.Sc. (LIBERAL EDUCATION)			Year/ Semester:	2nd / 4th
Course Name	Molecular Biology and Microbial Genetics	Course Code:	MB202	Type:	Theory
Credits	04			Total Sessions Hours:	60 Hours
Evaluation Spread	Internal Continuous Assessment:	40 Marks		End Term Exam:	35 Marks
Type of Course	<input type="radio"/> Compulsory	<input checked="" type="radio"/> Core	<input type="radio"/> Creative	<input type="radio"/> Life Skill	
Course Objectives	<p>This module will help students to understand following;</p> <ol style="list-style-type: none"> a. DNA organization in prokaryotes & eukaryotes b. DNA replication in prokaryotes & eukaryotes c. Post process modification d. Regulation of transcription & translation e. Plasmid types, replication & curing f. Genetic mutation g. DNA repair mechanism 				
Course Outcomes (CO): After the successful course completion, learners will develop following attributes:					
Course Outcome (CO)	Attributes				
CO1	Learners will be able to distinguish in prokaryotic cellular structure and functional components of cells, as well as the dissimilarities in genome organization between prokaryotes and eukaryotes.				
CO2	Students will be able to describe the DNA replication, regulation, transcription & translation mechanisms in prokaryotes and eukaryotes.				
CO3	The components of plasmids in prokaryotes and eukaryotes, its replication and partitioning.				
CO4	They will describe the processes that lead to mutations and other genetic changes.				
Pedagogy	Interactive, discussion-bases, student-centered, presentation.				
Internal Evaluation Mode	Mid-term Examination: 20 Marks Class test: 05 Marks Online Test/Objective Test: 05 Marks Assignments/Presentation: 05 Marks Attendance: 05 Marks				
Session Details	Topic			Hours	Mapped CO
Unit 1	Overview of the genome organization <ul style="list-style-type: none"> • DNA double helix structure salient features, types of DNA 			15	CO1

	<ul style="list-style-type: none"> • RNA Structure. Denaturation and renaturation, cot curves • DNA topology: linking number, topoisomerases. DNA organization in prokaryotes, viruses, eukaryotes • DNA Replication in Prokaryotes and Eukaryotes: Bidirectional and unidirectional replication, semi-conservative Mechanism of DNA replication 		
Unit 2	Transcription, Translation and Regulation of gene expression in prokaryotes and eukaryotes <ul style="list-style-type: none"> • General transcription process in prokaryotes and eukaryotes • Post-Transcriptional modification in eukaryotes • Alternative splicing mechanism, RNA interference • Ribosome structure, tRNA structure and processing, • Mechanisms of translation in both prokaryotes and eukaryotes • Genetic code, Wobble hypothesis, Fidelity of translation • Regulation of gene expression • Transcription and Translation control mechanisms 	15	CO2
Unit 3	Plasmids in prokaryotes; eukaryotes <ul style="list-style-type: none"> • Plasmid replication and partitioning • Host range • Plasmid incompatibility • Plasmid amplification • Regulation of plasmid copy number • Curing of plasmids • Types of plasmids 	15	CO3
Unit 4	Mutations, mutagenesis and repair <ul style="list-style-type: none"> • Types of mutations • Physical and chemical mutagens • Loss and gain of function mutants • Reversion and suppression • Uses of mutations • Ames Test • DNA repair mechanism 	15	CO4

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1			1			2			1	1			1	
CO2			1							1			1	
CO3			2	1	1	1	3		2	2			2	1
CO4			2	2	3	1	2		3	2	2		2	2

Strong contribution-3, Average contribution-2, Low contribution-1,

Suggested Readings:

Text- Books	1. T A Brown.2001. Essential Molecular Biology. Oxford University Press, USA.
Reference Books	1. Watson, J. et. Al. 2004. Molecular Biology of the Gene, 5th Edition, CSHL Press, New York. 2. Conn, E., & Stumpf, P. 2009. Outlines of Biochemistry, 5th Ed. Wiley India Pvt. Limited. 3. T A Brown.2001. Essential Molecular Biology. Oxford University Press, USA
Para Text	Unit 1: 1. https://www.classcentral.com/tag/microbiology http://www.mooc.list.com/tag/molecular-biology

	Unit 2: 2. http://www.mooc.list.com/course/microbiology.sayloro Unit 3: 3. https://lipidnanostructuresgroup.weely.com/ http://www.mooc.list.com/microbial Unit4: 4. https://open.umn.edu/opentextbooks/textbooks/biochemistry-free-for-all-ahern	
Recapitulation & Examination Pattern		
Internal Continuous Assessment:		
Component	Marks	Pattern
Mid Semester	20	Section A: Contains 10 MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries 0.5 mark . Section B: Contains 07 descriptive questions out of which 05 questions are to be attempted. Each question carries 03 marks .
Class Test	05	Contains 05 descriptive questions . Each question carries 01 mark.
Online Test/ Objective Test	05	Contains 10 multiple choice questions . Each question carries 0.5 mark.
Assignment/ Presentation	05	Assignmet to be made on topics and instruction given by subject teacher
Attendance	05	As per policy
Total Marks	40	

Course created by: Dr.Manaal Zahera

Signature:

Approved by: Dr. Amita Jain

Signature: