



Course Title: Basics of Molecular Biology
Course Code: GCMB203
Credit Units: 4
Level: UG

L	T	P/ S	FW/S W	TOTAL CREDIT UNITS
3	0	2	0	4

Course Objectives:

Course will emphasize the molecular mechanisms of DNA replication, transcription, protein synthesis, and gene regulation in prokaryotes. We will study the basic techniques and experiments used in molecular biology.

Prerequisites:

Prerequisite courses are Biochemistry and Genetics

Student Learning Outcomes:

- Explain the basic structure of nucleic acids and how ionic, hydrophobic, and hydrogen bonding interactions determine the structure of nucleic acids.
- Describe biological concepts and underlying key molecular mechanisms like replication, transcription and translation.
- Distinguish between basic molecular biology techniques that are used to isolate, separate and study different types of nucleic acids.

Course Contents / Syllabus:	Weightage
Module I : Structure of nucleic acids	10%
Structure of DNA and RNA: <ul style="list-style-type: none">• Pentose sugars• Phosphodiester bond• Glycosidic bond,• A-, B- and Z- forms of DNA	
Module II DNA replication	25%

<ul style="list-style-type: none"> • Enzyme involved in replication in <i>E.coli</i>. • Mechanism of DNA replication in <i>E.coli</i>. • Comparison of prokaryotic and eukaryotic DNA Replication. 	
Module III : Transcription	25%
<ul style="list-style-type: none"> • Concept of gene and operon • Gene structure and control regions, • Mechanism of transcription of prokaryotes: initiation, elongation and termination. • Comparison of prokaryotic and eukaryotic transcription 	
Module IV : Translation	25%
<ul style="list-style-type: none"> • Genetic code • Structure of ribosomes • Process of translation in prokaryotes: initiation, elongation and termination • Comparison of prokaryotic and eukaryotic translation 	
Module V : Gene Expression	15%
<p>Gene expression in prokaryotes:</p> <ul style="list-style-type: none"> • Lac operon • trp operon 	
<p>List of Experiments:</p> <ul style="list-style-type: none"> • Plasmid DNA isolation • Genomic DNA isolation • Agarose gel electrophoresis • Restriction digestion • Ligation 	
<p>Pedagogy for Course Delivery: Lectures: 43 Class Test: 2 Total: 45</p>	

Lab/ Practical details, if applicable:

Practical: 28
 Class Test: 01
 Viva: 01
 Total: 30

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
75	25	70

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					End Term Examination
Components (Drop down)	Mid-Term Exam	Project	Viva	Attendance	
Weightage (%)	10	10	5	5	70

Lab/ Practical/ Studio Assessment:

Components (Drop down)	Continuous Assessment/Internal Assessment				End Term Examination			
	Class test	Lab record	Viva	Attendance	Performance	Lab Record	Viva	Total
Weightage (%)	15	5	5	5	40	10	20	100

--	--

Text:

Genes IX. Lewin,, Benjamin Lewin 2008, Oxford University Press

Molecular Biology of the Gene ,7th Edition. James D. Watson, Tania A. Baker,Stephen P. Bell and Alexander Gann 2013; Pearson Education.

Molecular Cell Biology 7th Edition. Harvey Lodish, Arnold Berk, Chris A. Kaiser and Monty Krieger, 2012; W.H. Freeman and CompanyRemarks and