

BTPC2004 – Molecular Biology

Discipline: B.Tech in Biotechnology

Semester: 4th

Subject: BTPC2004 – Molecular Biology

No. of Days/Week: 3

Name of the Teaching Faculty: Dr. Smarita Lenka

Week	Class Day	Theory Topics
1st	1st	DNA as genetic material: Experimental proof & importance
	2nd	Structure and function of DNA
	3rd	Nucleosome and DNA packaging into chromosomes
2nd	1st	DNA replication in prokaryotes
	2nd	DNA replication in eukaryotes
	3rd	Mechanism of replication and accessory proteins
3rd	1st	Rolling circle replication
	2nd	Fidelity of replication and proofreading
	3rd	DNA damage and repair overview
4th	1st	Types and mechanisms of DNA repair
	2nd	Homologous recombination
	3rd	Site-specific and transposition recombination
5th	1st	Prokaryotic transcription mechanism
	2nd	Operon concept: lac and trp operons
	3rd	Processing of tRNA and rRNA
6th	1st	Eukaryotic transcription and RNA polymerases
	2nd	Post-transcriptional modifications: capping and polyadenylation
	3rd	RNA splicing
7th	1st	Genetic code and its properties
	2nd	Prokaryotic and eukaryotic translation
	3rd	Charging of tRNA

8th	1st	Mechanism of translation: initiation, elongation, termination
	2nd	Post-translational modifications
	3rd	Overview and integration of transcription and translation
9th	1st	Signaling molecules and cell surface receptors
	2nd	G-protein coupled receptor mechanism
	3rd	TGF- β and Cytokine receptor signaling
10th	1st	JAK-STAT pathway
	2nd	Receptor tyrosine kinases and Ras pathway
	3rd	MAP kinase pathways and cross-talk
11th	1st	Case study-based discussion on signal transduction
	2nd	Application in cancer and genetic disorders
	3rd	Integration of signaling and gene expression
12th	1st	Revision of Modules I–III
	2nd	MCQ Practice & Concept Mapping
	3rd	Class test on initial modules
13th	1st	Revision of Modules IV–V
	2nd	Case studies and experimental approaches
	3rd	Group presentations/discussions
14th	1st	CO Mapping and Doubt Clearing
	2nd	Quiz and mock test
	3rd	Recap of molecular techniques (PCR, Gel Electrophoresis etc.)
15th	1st	Internal Assessment / Final Class Test
	2nd	Previous Year Question Paper Discussion
	3rd	Course wrap-up and student feedback

