

Lesson Plan

Name of the Faculty : Dr. Virender Singh

Discipline : Biotechnology

Semester : 4th

Session : April 2021 to Aug. 2021

Subject : Molecular Biology (Theory code- BTE 202A; Practical code: BTE-212LA)

Lesson Plan Duration : 15 weeks

****Work Load (Lecture/Practical) per week (in hours): Lecture 03; Practical: 3**

Week	Theory		Practical	
	Lecture Day	Topic(including assignment /test)	Practical Day	Topic
1 st	1 st	DNA/RNA as the genetic material	1 st	Isolation of genomic DNA from eukaryotic cells.
	2 nd	-do-		
	3 rd	Double helical structure of DNA. Types of DNA		
2 nd	4 th	Super coiling and periodicity of DNA. Linking number of DNA. Nature of multiple alleles	2 nd	-do-
	5 th	Cis acting sites and Trans-acting molecules. Euchromatin and heterochromatin, Nucleosomes		
	6 th	-do-		
3 rd	7 th	Organelle DNA- Mitochondrial and chloroplast DNA.	3 rd	Isolation of RNA from eukaryotic cells.
	8 th	Origin of DNA replication, Bacterial and eukaryotic replicons.		
	9 th	DNA polymerases. Mechanism and regulation of DNA replication in prokaryotes and eukaryotes.		
4 th	10 th	-do-	4 th	Isolation of proteins from eukaryotic cells.
	11 th	Class Test		
	12 th	Various RNA species and their properties- tRNA as an adapter and turnover of mRNA.		
5 th	13 th	Transcription in Prokaryotes: RNA polymerases. Mechanism of transcription- initiation, elongation and termination. Role of sigma factor in transcription.	5 th	Isolation of genomic DNA from prokaryotic cells
	14 th	--do-		
	15 th	Transcription in Eukaryotes: RNA Polymerases. Downstream and upstream promoters. Techniques to define promoters- foot		

		printing experiment		
6 th	16 th	-do-	6 th	Isolation of plasmid DNA from Prokaryotic cells
	17 th	Mechanism of transcription, Interaction of upstream factors with basal apparatus. Role of enhancers.		
	18 th	-do-		
7 th	19 th	Post-transcriptional modifications of various RNA species. Transcription in mitochondria and chloroplast	7 th	Restriction mapping of plasmid DNA: This experiment involves single and double digestion of the plasmid with restriction enzymes
	20 th	-do-		
	21 st	The Operon: Positive and negative control of transcription		
8 th	22 nd	Repressor-inducer complex, catabolite repression	8 th	Gel electrophoretic separation of DNA and molecular wt. determination
	23 rd	Attenuation		
	24 th	Regulation of Transcription: DNA binding domains- zinc finger motif, helix loop helix, leucine zippers and homeodomains.		
9 th	25 th	Demethylation and gene regulation	9 th	Gel electrophoretic separation of RNA.
	26 th	Class Test		
	27 th	Evidence for triplet code. Properties of genetic code, Wobble hypothesis		
10 th	28 th	-do	10 th	Gel electrophoretic separation of proteins.
	29 th	Structure of prokaryotic and eukaryotic ribosomes and their role in protein synthesis. Mechanism of initiation, elongation and termination of protein synthesis.		
	30 th	-do-.		
11 th	31 st	Regulation of translation in prokaryotes and eukaryotes.	11 th	Transblot analysis of DNA.
	32 nd	Post translational modifications of proteins		
	33 rd	Role of molecular chaperones.		
12 th	34 th	Class Test	12 th	Gel Extraction of DNA
	35 th	Lariat formation, SnRNAs, cis-splicing and trans-splicing reactions.		
	36 th	-do-		
13 th	37 th	Catalytic RNA- Ribozymes- Ribonuclease P	13 th	PCR amplification of

	38 th	Small RNAs, group I & II introns.		DNA: Visualization by gel electrophoresis
	39 th	-do-		
14 th	40 th	Revision	14 th	
	41 st	Revision		
	42 nd	Revision		
15 th	43 rd	Revision	15 th	
	44 th	Revision		
	45 th	Revision		

Faculty Signature