

DEPARTMENT OF MOLECULAR BIOLOGY & BIOTECHNOLOGY
LESSION PLAN
SESSION 2023-24
SEMESTER – III

NAME OF TEACHER: MS. UPASANA DAS

PAPER ALLOTTED: MLBGCOR03T OR MLBHGE03T (FUNDAMENTALS OF MOLECULAR BIOLOGY -THEORY) & MLBGCOR03P OR MLBHGE03P (FUNDAMENTALS OF MOLECULAR BIOLOGY -PRACTICAL) & MLBSSEC01M (FUNDAMENTALS OF BIOSTATISTICS AND BIOINFORMATICS)

Month	Paper	Topic	No. of classes
September 2023 (25.09.2023)	MLBGCOR03T OR MLBHGE03T	Unit3: DNA Damage, Repair and Mutation: Definition of mutation, gain of function and Loss of function mutation, Forward and Reverse mutation, Point mutation (Transitions, transversions, Missense mutation, Nonsense mutation, silent mutation, Frame shift mutation),	2
	MLBGCOR03P OR MLBHGE03P	Quantitative estimation of DNA by diphenylamine reaction using colorimeter.	4
	MLBSSEC01M	Unit 1: Introduction to Biostatistics: Keywords and terms used in biostatistics. Concept of frequency distribution (frequency distribution table, simple and group frequency distribution, data presentation),	3
October 2023	MLBGCOR03T OR MLBHGE03T	Spontaneous mutation and Induced mutation. Mutagen – physical (Ionizing radiation, UV radiation), chemical (Base analogs, Nitrous acid, Acridine dyes, Alkylating agents), Ames test. Causes and types of DNA damage.	6
	MLBGCOR03P OR MLBHGE03P	Quantitative estimation of DNA by diphenylamine reaction using colorimeter. Quantitative estimation of RNA by orcinol method using colorimeter.	12
	MLBSSEC01M	mean, median, mode, standard deviation; Simple problems on mean, median, mode and standard deviation. Unit 2: Statistical Distribution: Normal, binomial,	9
		PUJA VACATION (19.10.2023 to 15.11.2023)	

November 2023	MLBGCOR03T OR MLBHGE03T	DNA repair-Photo reactivation, mismatch repair, base excision and nucleotide excision repair, SOS repair. Unit4: Gene Expression and Regulation: Genetic code: Features of Genetic code, Wobble hypothesis.	4
	MLBGCOR03P OR MLBHGE03P	Extraction of chromosomal DNA from <i>E. coli</i> or from plant tissue.	8
	MLBSSEC01M	poisson's distribution. Unit 3: Introduction to Bioinformatics: Idea of Computational Biology and it's need in biological study. Nucleic acid and protein sequence database and information retrieval;	6
1 st to 3 rd Week of Dec 2023	MLBGCOR03T OR MLBHGE03T	Translation in prokaryotes: Role of m-RNA, t-RNA and r-RNA in protein synthesis. Ribosome structure and assembly, Charging of t-RNA, aminoacyl t-RNAsynthetases, initiation, elongation and termination of protein synthesis in bacteria, Action of antibiotics that act as protein synthesis inhibitors - Streptomycin, Tetracyclin, Kanamycin, Chloramphenicol and Puromycin.	6
	MLBGCOR03P OR MLBHGE03P	Study of absorption spectra of DNA and protein using UV-Visible spectrophotometer. Determination of Purity of DNA using UV-Visible spectrophotometer (A260/ A280measurement).	12
	MLBSSEC01M	sequence file formats - FASTA & GENBANK. Sequence alignment - pairwise and multiple sequence alignment. Pairwise alignment tool - BLAST and multiple sequence alignment tool - Crustal W. Protein and nucleic acid structure database: The Protein Database (PDB); information retrieval from structural database.	9
4 th week of Dec 2023 to 1 st week of Jan 2024		Internal Examination & Class for Slow Learners	6
Jan – Feb 2024		END SEMESTER EXAMINATION	
Total Classes			87

NAME OF TEACHER: DR. INDRANI DATTA

PAPER ALLOTTED: MLBGCOR03T OR MLBHGE03T (FUNDAMENTALS OF MOLECULAR BIOLOGY -THEORY)

Month	Paper	Topic	No. of classes
September 2023 (25.09.2023)	MLBGCOR03T OR MLBHGE03T	Unit 1: Structure and Organization of The Genetic Material: Nucleic acids: Structure of Nucleotides, Nucleotides as source of energy, component of coenzymes, second messengers. DNA structure – Watson-Crick model. A, B & Z forms of DNA, Supercoiled and relaxed DNA, quardruplex DNA.	3
October 2023	MLBGCOR03T OR MLBHGE03T	Denaturation and renaturation of DNA, melting temperature (T _m), UV absorption and hyperchromic effect. Nucleosome structure and Genome organization. Structure of major types of RNA. DNA as a store of information: Genes are mutable units. One gene-one protein hypothesis. DNA is the almost universal genetic material (Griffith's experiment, Avery, MacLeod and McCarty's experiment, Hershey-Chase experiment), Central Dogma of Molecular Biology.	9
		PUJA VACATION (19.10.2023 to 15.11.2023)	
November 2023	MLBGCOR03T OR MLBHGE03T	Unit2: Replication of DNA: Semiconservative nature of DNA replication (Messelson and Stahl's experiment), Mechanism of bidirectional DNA replication in prokaryotes, Bacterial DNA Polymerases, Pre-priming proteins,	6
1 st to 3 rd Week of Dec 2023	MLBGCOR03T OR MLBHGE03T	Primosome and Replisome. Unit4: Gene Expression and Regulation: Transcription in prokaryotes with <i>E. coli</i> as model system: RNA polymerase, initiation, elongation and termination of transcription, rho dependent and independent termination. Inhibitors of transcription - Actinomycin D and α - Amanitin. Regulation of transcription: Operon model of gene regulation, negative and positive regulation in prokaryotes, <i>lac</i> operon.	9
3 rd to 4 th Week of Dec 2023		Internal Examination & Class for Slow Learners	4
Jan – Feb 2024		END SEMESTER EXAMINATION	
Total Classes			31