

		The Maharaja Sayajirao University of Baroda Faculty of Science Department of Microbiology Phone : 02652794396			ACADEMIC YEAR 2020-2021	
M.Sc. Microbiology Regular						
YEAR	II	CORE			CREDIT	3
SEMESTER	III	MBY2301C01 Molecular Biology-II			HOURS	45
OBJECTIVES		To familiarize students with fundamental aspects of Molecular Biology, Eukaryotic genome organization, transcription, splicing and RNA processing will be covered in detail				
COURSE CONTENT/SYLLABUS						
UNIT-I	Mutations, transposable elements and DNA damage & repair					15 hrs.
	Chemical and physical bases of mutations and mutagenesis; Types of mutations spontaneous, induced, reverse, suppressor & adaptive mutations, Mutations and disease; Site directed mutagenesis Classification of transposable elements, IS elements, composite transposons, TnA mechanism of transposition DNA damage and repair: Types, mechanism and genetics					
UNIT-II	Genome organization and transcription eukaryotes					20 hrs.
	The nucleus and chromatin; The nucleosome; Chromatin structure, modifications and regulation; Position effect variegation; Polycomb group and Trithorax group complex and cell memory; DNA methylation and imprinting General features of transcription, Structure assembly and function of eukaryotic RNA polymerase, II, III; and associated Eukaryotic promoters and enhancers; General Transcription factors; TATA binding proteins (TBP) and TBP associated factors, DNA elements; Transcriptional assembly and regulation in eukaryotes; Salient classes of binding proteins					
UNIT-III	RNA processing					10 hrs.
	Post transcriptional RNA modification, Splicing of hnRNA, tRNA, rRNA, Organellar mRNA and organelle rRNA, Splicing 5'-Cap formation; 3' end processing; polyadenylation; mRNA stability; RNA editing; Catalytic RNA, Role of maturases, Intron evolution, mobile intron, exon shuffling, RNA editing, Non coding RNA, RNA silencing					
REFERENCES						
1. An Introduction to Genetic Analysis A. J. F. Griffiths, S. R. Wessler, R. C. Lewontin, W. D. Fox & S. B. Carroll, 9 th edition; 2008 W. H. Freeman and Co.						
2. Molecular Genetics of Bacteria L. Snyder & W. Champness, 2 nd ed. 2003 ASM press						
3. Microbial Genetics S R. Maloy, J E. Cronan & D. Freifelder, 2 nd ed 1994 Jones and Bartlett						
4. Molecular Biology R. Weaver, 5 th ed. 2012 McGraw-Hill.						
5. Molecular Biology, Genes to Protein B. E. Tropp, 3 rd ed. 2008 Jones and Bartlett						
6. Molecular Biology of the Gene J.D. Watson, T.A. Baker, S.P. Bell, A. Gann, M. Levine & R. Losick, 5 th ed. 2004 Benjamin Cummings						
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YEAR	II	CORE		CREDIT	3
SEMESTER	III	MBY2302C02 Bioprocess Engineering and Fermentation Technology		HOURS	45
OBJECTIVES	The objective of this course is to educate students about the fundamental concepts of bioprocess technology and its related applications, thus preparing them to meet the challenges of the present and emerging areas of biotechnology industry				
COURSE CONTENT/SYLLABUS					
UNIT-I	Fermentation principles and microbial processes				15 hrs.
	Principles of fermentation; Bioprocess optimization for production; Fermentation media; Bioreactor design and its modifications; Large scale plant and animal cell culture Screening and strain improvement; Production optimization; Downstream processing Recombinant DNA products				
UNIT-II	Scale Up				15 hrs.
	Sterilization of air and fermentation media; Aeration and agitation in bioprocesses; Scale up of fermentation processes; Instrumentation and process control in bioprocesses				
UNIT-III	Industrial fermentations				15 hrs.
	Amino acid production and regulation; Industrial production of glutamate; Fermentative kinetics; Production of penicillin, streptomycin, citric acid, ethanol etc. Industrial enzyme technology; production, recovery and formulation of bacterial and fungal enzymes like amylases, proteases, penicillin acylase and glucose isomerase				