

Subject Code: 2SC2000202	Subject Title: Molecular Biology
COURSE TYPE: CORE COURSE	

Course Objective:

Molecular biology is the interface between biology and chemistry which is applied in biotechnology, genetic engineering or biomedicine. The course offers fundamental knowledge, ranging from general scientific knowledge in chemistry and biology to microbiology, Biotechnology, cell biology, molecular biology and genetics.

Teaching scheme (hours) per week		Credit			Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	Total	Uni. Assessment	Cont. Assessment	Uni. Assessment	Cont. Assessment	
4	-	4	-	4	60	40	-	-	100

Unit	Content	Lectures	Weightage
1	Genome organization in prokaryotes and eukaryotes DNA replication: Prokaryotic & Eukaryotic DNA polymerase, replication origin and replication fork, fidelity of replication, End replication problem: role of telomerase, DNA damage and repair mechanisms Homologous and site-specific recombination	12	30%
2	RNA synthesis : Promoters and Regulatory sequences(Enhancers, silencers, transcriptional activators) , transcription factors and machinery, RNA polymerases, formation of initiation complex, elongation, and termination RNA processing: capping, RNA editing, splicing, and polyadenylation, RNA transport	10	25%
3	Genetic Code, Key features of Ribosome and t RNA, Protein Synthesis: formation of initiation complex, initiation factors and their regulation, elongation and elongation factors, termination, aminoacylation of tRNA and translational proof-reading Overview of Protein targeting and modifications, Post- translational modification of proteins	8	20%
4	Gene Expression Regulation: Control of gene expression at transcription and translation level, phages and viruses, catabolic repression, role of chromatin remodeling in regulating gene expression and gene silencing Transposable Genetic Elements: Historical Perspectives of Transposable Genetic Elements, Insertion Sequences: IS Elements, Transposons, Mechanism of Transposition in Tn3	10	25%

Learning Outcome: Research in molecular biology not only generates knowledge but also offers new opportunities for the development of diagnostic tools and new strategies for improving agricultural production,

animal health, and human health. Just as in any other scientific programme, students of molecular biology have to have a general interest in the natural sciences and be able to work precisely.

LIST OF TEXTBOOKS:

Books Recommended

1. Meyers, R. A., Molecular Biology and Biotechnology, Wiley-VCH, 2000.
2. Lodish, H. Molecular Cell Biology, 6th Edition, W. H. Freeman and Co., NY, USA.
3. Rose, P. Molecular Biotechnology, Panima, 2000.
4. Brown, T. A., Molecular Biology, Vol. I and II, Academic Press, 2000.
5. B. Lewin, Genes IX, 9th Edition, Jones and Barlett Pub., USA, 2007.
6. Watson J. D. Molecular Biology of the Gene, Benjamin Cummings; 6th Edition, 2007.
7. Benjamin Lewin, *Genes viii*
8. R. M. Twymen, *Advances in Molecular Biology*
9. Syndeer and Champness. *Molecular genetics of bacteria*
10. Maloy, *Microbial genetics*
11. Malacinski, *Essential of molecular biology*