INSTITUTE	**FACULTY OF SCIENCE**
PROGRAM	**BACHELOR OF SCIENCE (MICROBIOLOGY)**
SEMESTER	**5**
COURSE TITLE	**BASICS OF MOLECULAR BIOLOGY**
COURSE CODE	**02MB0306**
COURSE CREDITS	**4**

Objective:

1 To provide a comprehensive insight of various aspects of the Central Dogma of Molecular Biology and its application in Genetic Engineering

Course Outcomes: After completion of this course, student will be able to:

1 Learn about historical perspectives of central dogma of molecular biology.

2 Explain how genetic information is maintained and encoded in cell.

3 Differentiate between the function of various process involved in Central Dogma of Molecular Biology.

4 Justify the application of molecular biology techniques in gene expression and regulation.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	**Replication and DNA Repair** Historical perspective of DNA as genetic material; Overview of The Central Dogma of Life. DNA replication in E. coli; Origin of replication; Initiation, Elongation and Termination; Enzymes involved in DNA replication; Eukaryotic DNA replication; DNA repair mechanisms.	15
2	**Transcription and Post Transcriptional Modification** Factors involved in transcription; Mechanism of Transcription: initiation, elongation and termination; Types of Eukaryotic RNA polymerases. Post Transcriptional modification in prokaryotes and eukaryotes.	15

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Contents : Unit	Topics	Contact Hours
3	**Translation of the Genetic Code** Historical perspectives of genetic code, Characteristics of genetic code, t-RNA; Modified bases in t-RNA; Changing of t-RNA; Prokaryotic and eukaryotic ribosomes; Mechanism of Translation: Initiation, Elongation and termination; Post Translational Modification.	15
4	**Gene expression, regulation and analysis** Principles of gene regulation and expression in prokaryotes and eukaryotes, positive and negative gene regulation, concept of operons, Principle of Polymerase Chain Reaction (PCR) and its application, Variants of PCR; Principle and applications of Real-Time PCR.	15
Total Hours		**60**

Textbook :

1 Molecular Biology, Weaver R, McGraw Hill Science, 2007

2 Molecular Biology of the Cell, 2. Bruce Alberts, Dennis Bray, Julian Lewis, Martin Raff, Keith Roberts, and James D. Watson , Garland Publishing, 2004

References:

1 Genes IX, Genes IX, Benjamin Lewin, Bartelett Publishers Inc, 2008

2 Molecular Biology of the Gene, Molecular Biology of the Gene, Watson James D., Tania Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard Lodwick, Pearson Education, Inc, 2004

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
5.00	10.00	30.00	30.00	20.00	5.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, Quiz, brainstorming, etc.

2 The internal evaluation will be done based on continuous evaluation of students in the classroom in the form of attendance, assignments, presentations, verbal interactions etc.

3 Students will use supplementary resources such as online videos, ebooks, ppts etc.

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Supplementary Resources:

1 https://www.youtube.com/watch?v=-WL2OjJLQ_A

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