Semester	**IV**
Course [*1]	**Major-1**
Paper Code	**C2BT230411T**
Paper Title	**Prokaryotic Molecular Biology**
No. of Credits [*2]	**4**
Theory / Practical / Composite	**Full Theory**
Minimum No. of preparatory hours per week a student has to devote	4
Number of Modules	2
Syllabus	**Module A: (35 marks)** **(2 classes per week)** **UNIT I: Supercoiling:** DNA supercoiling – linking number, negative and positive supercoilng, topoisomerases. **UNIT II: Prokaryotic Replication:** Characteristics - semiconservative, discontinuous, single origin, bidirectional replication forks; DNA polymerases; Replication complexes - preprimming proteins, primosome and replisome; Initiation, elongation and termination of replication; Fidelity of replication; Rolling circle and looped rolling circle modes of replication, **UNIT III: Homologous Recombination:** Mechanism – Holliday intermediate; Repair of damaged replication forks – single or double stranded breaks. **Module B: (35 marks)** **(2 classes per week)** **UNIT IV**: **Prokaryotic transcription:** RNA polymerase, role of sigma factor, promoter, initiation, elongation and termination of RNA chains; Regulation of gene expression in prokaryotes - Operon concept (inducible and repressible system). Intricate transcriptional regulation of bacteriophage λ infection of *E. coli*. **Unit V: Prokaryotic Translation:** Discovery of genetic code and its characteristics; Ribosome structure and assembly; Charging of tRNA (aminoacyl tRNA synthetases); Mechanism of initiation, elongation and termination of polypeptides; Fidelity of translation; Inhibitors of translation.
Learning Outcomes [*3]	• Students will be introduced to topological property of DNA that leads to supercoiling. • The major biological processes – replication, transcription and translation in a prokaryotic system will be dealt in detail. • The students will be exposed to intricate regulation of gene

	expression. • Special emphasis will be given to transcription regulation of bacteriophage λ life cycle in E coli.	
Reading/Reference Lists *[4]	• Lehninger Principles of Biochemistry - Cox & Nelson. • Molecular Biology – Weaver. • Biochemistry - Voet and Voet. • Biochemistry – Berg, Tymoczko & Stryer.	
Evaluation	**Theory (100)** CIA- 20 Assignment – 05 Attendance - 05 Semester Exam- 70	
Paper Structure for Theory Semester Exam	**Module A: (35 marks)** • 1 Compulsory Question – objective-type: 1 × 10 = 10 marks •Any 2 out of 3 questions; each of 12½ marks, with subparts (no sub-part will be less than 1 mark): 2 × 12.5 marks = 25 marks **Module B: (35 marks)** •1 Compulsory Question – objective-type: 1 × 10 = 10 marks •Any 1 out of 2 questions; each of 10 marks, with subparts (no sub-part will be more than 5 marks, and less than 1 mark): 1 × 10 marks = 10 marks •Any 3 out of 5 questions; each of 5 marks, with subparts (no sub-part will be more than 4 marks, and less than 1 mark): 3 × 5 marks = 15 marks	