Semester	**V**
Course	**Major 3**
Paper Title	RECOMBINANT DNA TECHNOLOGY
Paper Code	C3BT230532T/P
No of Credits	4 (3+1)
Theory /Practical /Composite	Composite
Minimum No. of preparatory hours per week a student has to devote	4
Number of Modules	2
Syllabus	**MODULE A [30 Marks]** **UNIT I:** Molecular tools and applications- DNA modifying enzymes: ligases, polymerases (DNA and RNA), alkaline phosphatases, polynucleotide kinases, inhibitors Gene Recombination and Gene transfer. **UNIT II:** Applications of Polymerase chain reaction (PCR): RT-(Reverse transcription) PCR; Inverse PCR, Nested PCR, RACE (5' and 3'), Real time PCR, Site-directed mutagenesis, Primer extension. **UNIT III:** Construction and comparison of genomic and cDNA library; Artificial chromosomes; Yeast two hybrid assay; Phage Display **MODULE B [15 Marks]** **UNIT IV**: Vectors: Different types of cloning vectors (Plasmids, Bacteriophage λ-based vectors, Cosmids, M13 bacteriophage-based vectors, BACs, YACs, Expression Vectors and Shuttle Vectors), therapeutic products produced by recombinant DNA technology, construction of synthetic cells **PRACTICAL** **[40 marks; End-Sem (8 marks) + CA (30 marks) + Attendance (2 marks)]** 1. Making of competent cells 2. Transformation of competent cells and Calculation of transformation efficiency. 3. Plasmid Isolation and agarose gel electrophoresis 4. Restriction digestion of plasmid DNA 5. Isolation of chromosomal DNA from bacteria 6. Qualitative and quantitative analysis of DNA using spectrophotometer. 7. Recombinant expression of protein in bacteria: IPTG induction and SDS PAGE.
Learning Outcomes	1. Students will be introduced to the basics and applications of recombinant DNA technology. 2. They will learn various aspects about generating clones and screening recombinant DNA using relevant techniques.

	3. Students will be provided with an overview of the application of molecular tools and Polymerase chain reaction (PCR). 4. Students will be provided with further knowledge about viral vectors (in continuation of the knowledge imparted in General Microbiology Module (Semester III). 5. In practical module the students will be given hands on training of some of the techniques discussed in theory classes. The module seeks to make students well versed with the technological aspects of the knowledge about recombinant DNA technology.	
Reading / Reference List	1. Principles of Gene Manipulation & Genomics-Primrose & Twyman. 2. Molecular Cloning- Sambrook et al.	
Evaluation	**Theory** CIA- 10 Assignment – 02 Attendance - 03 Semester Exam- 45	**Practical** CA- 30 Attendance - 02 Semester Exam- 08
Paper Structure for Theory Semester Exam	**Module A (30 marks)** • Compulsory: 1 question of 10 marks (2 x 5 = 10 marks) 4 out of 6 questions to be answered of 5 marks each (4 x 5= 20 marks). **Module B (15 Marks)** • Answer any three of the five questions given, each carrying 5 marks (Part questions will not be less than 1 mark and more than 5 marks).	