**Biochem-717**

**RECOMBINANT DNA TECHNOLOGY AND GENE MANIPULATION**

**3(2-1)**

**THEORY**: Introduction, tools, enzymes, vectors and hosts. Cloning strategies. Isolation of DNA from living materials, Recombinant selection and characterization. Hybridization, cDNA synthesis, Nick translation. and *in vitro* translation. DNA sequencing and synthesis. Probes: synthesis and detection. Genomic and cDNA libraries. Techniques for introducing recombinant plasmids into suitable host. Cloning in mammalian cells, vectors for cloning in plant cells. Polymerase chain reaction (PCR). RT-PCR. DNA fingerprinting and its application in forensic sciences. Antisense RNA technology and its application in regulation of transcription. Application and uses of genetic engineering in agricultural and biochemical research. Bioinformatics tools for the study of gene structure and function.

**PRACTICAL**

1. Detection and quantitative determination of DNA.
2. Simple cloning experiments using *E. coli* as host.
3. Isolation and qualitative detection of plasmid DNA (miniprep.).
4. Digestion of DNA with restriction enzymes and separation of different sized fragments on agarose gel.
5. PCR-RFLP.
6. Study of transformed bacteria on the basis of antibiotic resistance. DNA amplification by polymerase chain reaction.

**SUGGESTED READINGS**

1. Alberts, B., D. Bray, J. Lewis, M. Raff, K. Roberts and J. D. Watosn. 1989. Molecular biology of the cell. 2nd edition. Garland Publishers, Inc., N.Y.
2. Ausubel, F., R. Brent, R.E. Kingston, D. D. Moore, J.G. Seidman, J.A. Smith and K. Struhl. 1992. Short protocols in molecular biology. 2nd edition. Greene publishing associates and John Wiley & Sons. N.Y.
3. Brown, T. A. 2001. Gene cloning and DNA analysis: An introduction. 4th Edition. Blackwell science Ltd., U.K.
4. Micklos, D. A., G. A. Freyer and D. A. Crotty. 2003. DNA science: A first course. 2nd edition. Cold spring harbor laboratory press, N. Y.
5. Nelson, D.L and M.M. Cox. 2008. Lehninger Principles of Biochemistry. 5th ed. Worth Publishers, New York
6. Sambrook, J. F., Russell, D. W. and Irwin, N. 2000. Molecular cloning: A laboratory manual, 3rd edition, Cold Spring Harbor Laboratory press, Cold Spring Harbor, N.Y.

Weaver, R. F. 2008. Molecular Biology. 4th edition. McGraw Hill Higher Education.