

**Course Name: Recent trends in Biotechnology****Course Code: RCW-4-21**

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**COURSE OBJECTIVES**

UNITS	CONTENTS	Contact Hrs.
I	Microscopy, camera Lucida, Electrophoresis, Calorimeter and Spectrophotometer, PCR, ELISA, Centrifugation. (b) Fixation and sectioning of tissue, embryos and cells; Immunohistochemistry; Immunofluorescence; Histochemical staining; RIA; Southern, Western and Northern Blotting.	12 Hrs
II	Principles and methods of genetic engineering; application in health, agriculture and industry; transgenic animals; primary culture, cell lines, cell clones, micro-propagation embryogenesis; somatic hybridization; IVF-in vitro fertilization and embryo transfer. (b) Recombinant DNA technology in prokaryotes and eukaryotes.	12 Hrs
III	Animal cell and tissue culture: General introduction, concept of cellular differentiation and totipotency. □ Cloning vectors, Enzymes used in DNA technology, □ Application of PCR in cloning, □ Role of molecular markers and nucleic acid probes in gene analysis,	12 Hrs
IV	Good laboratory practices, Isolation, purification and characterization of proteins, analysis of biomolecules using TLC, gel filtration, adsorption chromatography, ion exchange chromatography, affinity chromatography, GLC, HPLC, electrophoretic techniques, one and two dimensional gel electrophoresis, UV/visible spectrophotometry, fluorescence spectrophotometry, NMR spectroscopy, X-ray diffraction; mass spectrometry. Antibody production, ELISA, western blot, immunoprecipitation, and immunofluorescence, FISH, flow cytometry. Properties of different types of radioisotopes, detection, measurement and uses in biologicals	12 Hrs
V	Isolation, purification and analysis of DNA, RNA and plasmid, restriction enzymes and their applications, properties of cloning and expression vectors (plasmid, phage), cloning and expression of DNA in bacterial, animal and plant systems; generation of genomic and cDNA libraries; DNA sequencing methods, methods for analysis of gene expression at RNA, blotting techniques, PCR techniques RFLP, RAPD and AFLP techniques and their applications, genome sequencing, micro array techniques.	12 Hrs

**REFERENCE BOOKS :**

1.	Bioinformatics Methods and Applications Genomics, Proteomics, and Drug Discovery	(S. C. Rastogi, N. Mendiratta, and P. Rastogi).
2.	Methods of Protein and Nucleic acid Research	Osterman Vol I – III
3.	A Textbook of Biotechnology	R. C. Dubey , S Chand & Co Ltd