Course Name: Ph.D /M.Phil. Course Work Biochemistry

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UNITS	CONTENTS	Contact Hrs.
I	Enzymes: DNA polymerase, restriction endonucleases, topisomerase I and DNA ligase, reverse transcriptase, kinase, alkaline phosphatase, nuclease, RNAse H. Vectors: plasmids;(Ti/Ri), Cosmids, bacteriophage, M13 vectors, BAC, YAC and synthetic plasmids. DNA sequencing dideoxy chain termination and Sanger's +/- method. cDNA library – screening by oilgonucleotide probe, nick translation, site directed mutagenesis, linkage analysis. Gene cloning- General strategy for gene cloning, transformation. Application of gene technology, Gene Silencing, Geneknock out and gene therapy	**15 Hrs**
II	Complement fixation, structure and classes of antibodies, genetic basis of antibody diversity. MHC I and II: structure and antigen presentation. T and B lymphocytes activation and role in humoral and cell mediated immunity. Vaccines live and attenuated, killed, multi-subunit and DNA vaccines. Hypersensitivity and auto immune diseases. ELISA, RIA, Hybridoma Technology.	**15 Hrs**
III	Animal Culture: Media requirements and sterilization techniques, primary and established cell lines. Culture methods: hanging drop, monolayer and suspension. Advantages and disadvantages. Scale up methods. Roux tubes roller bottles. Stem cells: adult and embryonic, applications to tissue engineering. Applications of animal cells. Plant tissue culture: Cell and callus culture, anther culture. Micropropagation, somatic cell hybridization,protoplast fusion, cybrids, artificial seeds, Agrobacterium mediated gene transfer and use of Ti plasmid. Applications of plant tissue culture engineering, pathogen resistance (BT gene), herbicide tolerance, salt tolerance, production of secondary metabolites and transgenic plants.	**15 Hrs**
IV	Symbiotic free nitrogen fixers, asymbiotic free nitrogen fixers, algal, phosphate solublizing, mycorrhizae and green manure. (a) Recent advances in Bacterial Taxonomy – Identification of Procaryotes A phylogenetic backbone and taxonomic framework for prokaryotic systems A road map to the use of the current Bergey's Manual Computer taxonomy 16s rRNA fingerprinting and lipid profile by GLC (b) Microbial sources of pharmaceutically important compounds (c) Microbial sources of pharmaceutically important compounds (d) Biosensors – living biosensors for the management and manipulation of microbial consortia	**15 Hrs**

REFERENCE BOOKS :		
1	BIOCHEMISTRY and PHYSIOLOGY of ANIMAL with PRACTICAL	B.D. SINGH, TRIPURARI MISHRA, R.K. PANDEY
2	Fundamentals of Biochemistry	J L Jain, Nitin Jain, Sunjay Jain
3	Bergey's Manual of Systematic Bacteriology(2nd Ed.), Volumes1 to 4	Bergey
4	The Physiology and Biochemistry of Procaryotes	D. White. Oxford University Press