

BHARATHIAR UNIVERSITY: COIMBATORE-641046
M.PHIL./Ph.D. BIOCHEMISTRY

Note : There is no change in the existing syllabi (except Part I - Paper I & Paper II) from October 2011 batch onwards.. The revised syllabus for the Paper I & Paper II is furnished below:

PAPER- I RESEARCH METHODOLOGY

UNIT I: Biostatistics

Scientific writing - Writing methodology, results and discussion.

Correlation & regression.

Sampling distribution- students T test, χ^2 test.

Experimental design – CRD,RBD.

Analysis of experimental results- ANOVA, Duncan's Multiple range test.

UNIT II: Immunotechnology

Fluorescent antibody assay- Histochemical localization

ELISA techniques - Principles and applications.

Immuno radiometric Assay - Principles and applications.

Natural Products- Detection of bioactive molecules by gas chromatography.

Bioassays- chemotherapeutic assays, assays using animals, enzymatic assays.

UNIT III: DNA Technology

Flow cytometry- Principle, abnormal chromosome analysis, karyotyping, COMET assay

DNA fragmentation analysis.

PCR Methodology- designs of primers- RTPCR, PCR in genomic analysis and diagnostic application.

PFGE- Principles, techniques & applications.

UNIT IV: Protein Technology

Mass spectrometry - Principles and application.

HPLC and HPTLC - Principle, instrumentation and application.

Capillary Electrophoresis- Principles, instrumentation and application.

Emission spectroscopy- Fluorescence, phosphorescence and chemiluminescence.

X-ray, NMR & their uses in protein structure prediction

Flow injection Analysis- Principles, and application.

UNIT V: Bioinformatics

Biological data bases – DNA sequence data bases & protein sequence data bases

SRS- Similarity searching BLAST, FAST A

Multiple sequence alignment- Phylogeny.

Structure database- Secondary structure prediction, Choufeat passman, Neural network methods.

Predicting 3 dimensional folds (Threading).

REFERENCE:

1. S.P. Gupta(2004). Statistical methods.Sulthan chand & sons, Educational publishers, New Delhi.
2. Janis Kuby(2000) Immunology 3rd edition.
3. Richard A.Goldsby (2000) 5th edition. Immunology W.H.Freeman & Co. Newyork
4. D.A.Skoog & J.J. Leary, 1992. Principles of Instrument analysis 4th edition, Saunders college Pub.
5. Rastogi C.S.(2003)Bioinformatics- Concepts, skills and applications. CBS Publishers.
6. David Freifelder (2003). Molecular biology 2nd edition. Narosa publishing house, New Delhi.

PAPER- II ADVANCED PAPER IN BIOCHEMISTRY

UNIT I

Metabolism

Carbohydrate metabolism: TCA cycle, glycolysis, HMP, gluconeogenesis,

Lipid metabolism: Fatty acid synthesis and beta oxidation and chain elongation

Nucleic acid metabolism: Purine and Pyrimidine metabolism

protein metabolism urea cycle, aliphatic and aromatic amino acid metabolism

UNIT II

Cell Biology and Molecular Biology

Replication, transcription and translation in pro and eukaryotes.

RNA editing, mi RNA and RNAi, and its applications.

Antisense RNA technology,signal sequence..hypothesis protein glycosylation,

Protein degradation- ubiquitin pathway.

General principles of cell communication G- Protein-coupled receptors-structure and functions, cAMP and others second messengers –phosphotidyl inositol, diacyl glycerol,inositol1,4,5 triphosphate Ca²⁺; Receptor Tyrosine Kinases- structure and functions, importance of Ras, MAP Kinase cascade.

UNIT III

Genomics and Proteomics

Human Genome project - history, techniques and applications; Anatomy of Prokaryotic and Human Genome; Genetic mapping and genetic markers- RFLP, Mini- and Micro satellite, STS and EST, SSCP,R APD, AFLP, SNPs. Analyzing Gene expression - DNA micro array.

Proteome analysis- 2D gel electrophoresis; Protein-protein interactions- yeast two hybrid system and protein microarrays.

UNIT IV

Plant Biotechnology

Tissue culture media, composition and preparation primary culture, cell lines, cell clones, callus and suspension cultures, somaclonal variation, Micro propagation, Organogenesis, somatic embryogenesis, artificial seeds, Haploidy: Protoplast fusion and Somatic hybridization.

UNIT V

Animal Biotechnology

Media: Natural media, balanced salt solution and simple media, serum and protein free chemically defined media. Primary cell culture (Chick, mouse and human biopsy) and methods of desegregation of tissues; continuous or established cell culture, tissue culture, organ culture; three Dimensional culture; Feeder layer; cell separation; cell synchronization; cryopreservation and revival.

REFERENCE:

1. Geoffrey Zubay (1993), Biochemistry, 3rd edition, Columbia University. Wm.C.Brown publishers., England.
2. Gerald Karp (2000). Cell and Molecular Biology, concepts and Experiments. 4th editions, John Wiley & sons, New York.
3. Lodish et. al (2000) Molecular Cell Biology, 5th edition, W.H. Freeman and company, New York.
4. D.Balasubramanian (1996). Concept in Biotechnology, Universal press India.
5. Freshney R.I(2000). animal Cell Culture, A practical Approach, John Wiley Publications, New York.
6. David W.Mount, (2001), Bioinformatics sequence and genome analysis, cold spring Harbor Laboratory press.
7. Pennigton S.R and Dunn .M.J(2002), Proteomics, viva books pvt ltd.