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FOR COLLEGE ONLY

BIO TECHNOLOGY
M.A. M.Sc. Exam May/June-2018 2018
Second/Fourth Semester
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401. EMERGING TRENDS IN BIOTECHNOLOGY

UNIT I

1. Stem cell technology
2. Manipulation of stem cells and applications in medicine
3. *In vitro* fertilization: Principle, Methods, applications and ethics
4. Cloning of animals: Methods and applications

UNIT II

1. Genome & Genomics: Concept and methods of genome analysis
2. Transcriptome & Transcriptomics: Concept and methods
3. Proteome and Proteomics: Concept and methods
4. Metabolome and Metabolomics

UNIT III

1. Nano biotechnology: Introduction and biological materials-example and uses
2. DNA nanotechnology:-Structural DNA assembly
3. Nanoparticles-biological arrays-nano probes for analytical applications
4. Nano biosensors-nano scale organization-characterization-quantum size effects-sensors of the future

UNIT IV

1. Biochemical diagnostics: Biochemical markers for disease diagnosis
2. Concept of Molecular Diagnostics: DNA diagnostics
3. Microarray Technology, Array-based diagnostics, SNP's (Single Nucleotide Polymorphism) and GMS (Genome Mismatch Signals) and diagnostic significance
4. Western blot diagnostics, Phage display concept and applications of phage display

UNIT V

1. Biosensors: Concept, principle and types
2. Biosensors in Health and medicine
3. Biosensors in Food technology and environmental monitoring
4. Bacterial biosensors; array biosensors

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Practical Exercises

Appropriate exercises based on theory

Reference Books

1. DNA Microarrays and gene expression by P. Baldi & GW Hatfield
2. Protein - Protein Interactions by Erica Golemis
3. A passion for DNA (Genes, genomes and Society) By JD Watson
4. Modern Genetic analysis by Anthony JF Griffiths et al.
5. Nanobiotechnology- next big idea by Mark, Ratner, Daniel Ratner
6. Gene cloning by TA Brown
7. Latest information on academic Web sites.

Note: All books are of latest editions

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402: BIOINFORMATICS AND ENTERPRENUERSHIP IN BIOTECHONOLOGY

UNIT I

1. Overview of Bioinformatics: Merger of life sciences with computers
2. Search engines: Google Scholar, Pub Med, NCBI, EMBL
3. Protein and DNA databases: Swiss prot, PIR etc. and their applications
4. Softwares for bioinformatics and web based analysis

UNIT II

1. Sequence Databases: Human Genome Databases, Plant Genome Databases
2. Retrieving and installing a program (Tree Tool), multiple sequence alignment Program- Clustal W & X
3. Genome analysis programs: BLAST and FASTA
4. Phylogenetic analysis: Phylogenetic reconstruction, distance matrices, Parsimony, Phylip

UNIT III

1. Methods of structure predication of proteins and DNA
2. Computer aided drug designing: Basic principles, docking
3. Functional genomics: EST clustering gene discovery, ORF prediction
4. Use of genome analysis programs, primer designing tools

UNIT IV

1. Sequence comparison and cluster analysis
2. Homology modeling, protein structure prediction
3. Molecular energy minimization, molecular dynamics simulation
4. Tagging of genes and molecular modeling

UNIT V

1. Government schemes for commercialization of technology (Eg. Biotech Consortium)
2. Public policy, regulatory and ethical challenges facing in entrepreneurship
3. Biotech enterprises: Small, Medium and Large, Kaizen Quality control in Biotech industries
4. Business development for medical products & consumable products.

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