Subject Code : P8BIE4A

APPLIED BIOINFORMATICS

UNIT – I

Commercial bioinformatics – Survey of bioinformatics companies in India and abroad – Economics prospects – pharamainformatics – combinatorial chemistry – HT screening – in silico screening - from lead to commercialization

UNIT II

Sequence assembly and Finishing methods - Sequence assemblers – finishing and visualization programmes - Gene expression analysis - Data collection - Image processing - Measures of expression -Finding significant genes - Clustering approaches – SNP – Types - SNP discovery methods - databases and browsers – genotyping - Comparative genomics – algorithms – viewing - genomic alignments – gene prediction and phylogenetic foot printing

UNIT III

Application of genomics to agriculture - gene discovery and gene function - model systems – technologies -methods to introduce novel genes - Pharmaceutical bioinformatics and drug discovery – Introduction - novel gene discovery - methods for identifying novel targets - protein classification and functional assignments – Disease - target gene relationship - Nanotechnology and its applications - Genomics and proteomics in medicine, diagnostics, drug discovery and target findings

UNIT IV

Intellectual Property Rights(IPR): IPR - Importance of IPR, Organization - WIPO & WTO - Agreements and Treaties - GATT-TRIPS - Types of IPR – patents – copyrights - trademarks and trade secrets - Plant Breeder Rights(PBR) - Geographical Indications - Technology Transfer (TT) - Traditional Knowledge - Importance of patents - Patenting of biological materials - Patenting of biotechnological inventions - Sharing the benefits from biotechnology transfer - IPR in India - IPR impacts on Biotechnology Research in India - significance biotechnological patents in India.

UNIT V

Biosafety & Bioethics: Biosafety - Topics of concern - Hazards of Genetically Engineered Microorganisms – Bioremediation - Framework of biosafety regulations in India (committees, Pressure points for the Biosafety Regulations - Assessment of structural changes.
Ethics – Bioethics - The ethical and social impacts of biotechnology and bioinformatics.

Reference Books

1. T. A. Brown, Genomes, 2nd Edition, BIOS Scientific Publishers, Ltd., Oxford, UK, 2002.

2. Baxevanis D and Ouellette BFF, Bioinformatics: A practical guide to the analysis of genes and proteins (3rd Ed), John Wiley & Sons, Inc., 2005.
3. Sensen CW, 2002. Essentials of Genomics and Bioinformatics, Wiley-VCH.
4. Jenson, O.N., in Proteomics. A Trends Guide (eds Black Stock, Co- and Mann), Elsevier Science, London, 1998.
5. S.R.Pennington and M.J.Dunn, Proteomics, Viva Books Pvt. Ltd., New Delhi, 2002.
4. Relevant papers from Drug Discovery Today - Trends journals
5. N.R.Subbaram, what everyone should know about patents, 2nd Edition, Pharma Book Syndicate, Hyderabad, 2006.
6. Philip W.Grubb, Patents for Chemicals, Pharmaceuticals and Biotechnology-Fundamentals of Global Law practices and strategy, 4th Edition, Oxford University Press, 2006.
7. R.C. Dubey, A Textbook of Biotechnology, S.Chand & Company, 1993.
8. Ben Mepham, Bioethics-an Introduction for the biosciences, Oxford University Press, 2005