



**GOVT. COLLEGE FOR WOMEN PARADE
GROUND JAMMU (Autonomous)
(*Erstwhile Maharani Mahila College*) Estd 1944
Affiliated to University of Jammu**

SEMESTER-5

Course Title: Bioinformatics -III

Course Code: (UBTTS-511)

Course Credits: 02+02

UNIT- I

Metagenomics

Metagenomics: Introduction, metagenome, shotgun metagenomics (pyrosequencing). Tool's in metagenomics, Application: Gene survey, Environmental genomes, Microbial diversity. Concept of metabolome and metabolomics. Phylogenetics: Introduction to Phylogenetics, Distance and Character based methods for phylogenetic tree construction: UPGMA. Chemical Structure Representation (SMILE). Chemical databases, ChemBank, hazardous chemical database, PUBCHEM. Metabolic pathway database (KEGG pathway database).

UNIT II

Introduction to biostatistics

Measure of central tendency and dispersion: Mean, median, mode, range, standard deviation. Variance and coefficient of variation. Correlation and Regression. Statistical software: types and applications. Basic bio-statistical analysis using SPSS. Introduction to R.

PRACTICALS

1. Phylogenetic analysis: Phylogenetic tree ; Construction of a Phylogenetic tree
2. Multiple sequence alignment
3. Pair wise alignment
4. Primer Designing
5. Restriction Mapping
6. Exercises Related to SPSS



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SEMESTER-6

Course Title: Bioinformatics -IV

Course Code: (UBTTS-611)

Course Credits: 02+02

Unit-1

Protein Structure and Modelling

Protein Structure Basics, Visualization, Prediction of Secondary Structure and Tertiary Structure, Homology Modeling, Structural Genomics, Molecular Docking principles and applications, Lipinski's rule of five. Natural product, Drugs; principles of drug Development. Bioinformatics in drug development, Chemoinformatics and Pharmacoinformatics, Applications of Drug Discovery and In-Silico Drug Designing, Area influencing drug discovery; Molecular Biology, pharmacogenomics and pharmaco-proteomics.

Unit-2

Ligand-based drug designing and docking

Introduction, Ligand-based drug designing approaches: Lead Designing, ADME property. Introduction to docking methods to generate new structure; Tools and Molecular docking programs.

PRACTICALS

1. Ligand and Macromolecule Preparation
2. Protein-protein Docking
3. Ligand-receptor Docking
4. Antigen-Antibody Docking
5. Retrieval of small Molecules from zinc Database/Pubchem
6. Drug likeliness of compound



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BOOKS RECOMMENDED

1. Introduction to Bioinformatics by Teresa Attwood, David Parry-Smith, 1999, 1st edition; Prentice Hall
2. Baxevanis, A.D. and Francis Onelle, B.F. (2001). Bioinformatics. Wiley Interscience. John Wiley and Sons Inc. New York.
3. Biostatistics: A Manual Of Statistical Methods For Use In Health, Nutrition And Anthropology. K. VisweswaraRao. Jaypee Brothers Medical Publishers (P) Ltd.
4. Fundamentals of Biostatistics. by Irfan A Khan.
5. An introduction to Biostatistics. by PSS Sunder Rao.
6. Introduction to the Practice of Statistics by Moore and McCabe
7. Veer BalaRastogi (2006) Fundamentals of Biostatistics, New Delhi, Ane Books India.
8. Dhar, M.K. and Kaul, S. (1997). Statistics in Biology. Malhotra Brothers, Jammu.
9. Snedecor, G.W. and Cochran, W.G. (1989). Statistical methods. Iowa State University Press, Ames.
10. Ye, Q. S. (2008). Bioinformatics: A practical approach. Champman& Hall/ CRC.
11. Tramontano Anna (2008). Introduction to Bioinformatics. Chapman & hall/ CRC