



KUVEMPU UNIVERSITY

Jnanasahyadri, Shankaraghatta – 577451

SEP SYLLABUS FOR B.Sc., COURSE IN BIOCHEMISTRY

SEMESTER IV

SKILL/PRACTICAL - IV

COURSE TITLE	BIOINFORMATICS
COURSE CREDITS	02
TOTAL CONTACT HOURS	4 Hours/ Week
DURATION OF ESA	03
FORMATIVE ASSESSMENT MARKS	10
SUMMATIVE ASSESSMENT MARKS	40

Course outcome:

- Students will be able to navigate and utilize public databases (NCBI, UniProt, PDB) and apply computational tools for data retrieval and analysis.
- Students will be able to Conduct nucleotide and protein sequence alignment using tools like BLAST and Clustal Omega.
- Students will be able to Predict gene structure and protein domains using bioinformatics software and interpret 3D protein structures from databases such as Protein Data Bank.
- Students will be able to understand the application of computational methods to solve complex biological, biomedical, or pharmaceutical problems, including drug discovery.
- Students will be able to Execute bioinformatics workflows independently and present results in a scientific format.

PRACTICALS

1. Exploration of the resources available in NCBI and PUBMED
2. Retrieval and analysis of nucleotide sequences from GenBank
3. Finding the official Symbol, alias name, chromosome number and ID for gene using NCBI
4. Retrieval and analysis of protein sequence from protein database
5. Primary structure analysis of a protein
6. Sequence similarity searches using BLAST.

7. Secondary structure analysis of a protein
8. Tertiary protein structure retrieval and analysis using PDB database and RASMOL
9. Multiple sequence alignment and phylogenetic tree construction using ClustalW
10. Pair-wise sequence alignment using EMBOSS NEEDLE and EMBOSS WATER
11. Conversion of Gene Sequence into its Corresponding Amino Acid Sequence
12. Primer designing

REFERENCES:

1. Bioinformatics – Principles and Applications, 1st ed. Ghosh, Z. and Mallick, B., Oxford University Press (India),
2. M. Michael Gromiha, Protein Bioinformatics: From Sequence to Function, Academic Press.
3. Bioinformatics: Sequence and Genome Analysis 1st ed., Mount, D.W. Cold Spring Harbor Laboratory Press (New York)
4. Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins, 3rd ed., Baxevanis, A.D. and Ouellette, B.F., John Wiley & Sons, Inc. (New Jersey).

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