

Value-added course in Biotechnology

Hands-on Training in Bioinformatics Tools and Advanced Lab Techniques

Course Objective:

- To have an overview of Basic Bioinformatics tools in the research.
- To have hands-on experience in Molecular Biology experiments.

Course outcome

CO No.	Upon completion of this course, the students will be able to:	Knowledge Level
1	The applications of bioinformatic tools in analysing biological data.	K3
2	Understand the fundamentals molecular biology techniques	K2
3	Illustrate the approaches and techniques in rDNA technology	K2
4	Understand the various procedures in Biotech industries and research industries	K3

Knowledge Levels: K1-Remembering; K2-Understanding; K3-Applying; K4-Analyzing; K5-Evaluating; K6-Creating.

Bioinformatics (6 hrs)

Theory

1. A brief introduction to biological databases
2. Sequence alignment
3. Multiple sequence alignment
4. Phylogenetic analysis

Practical

1. Nucleotide sequence databases - NCBI.
2. Nucleotide sequence alignment – BLASTn
3. Protein sequence alignment - BLASTp.
4. Pairwise Sequence alignment
5. Multiple sequence alignment- CLUSTAL X, CLUSTAL W
6. Construction of phylogenetic tree using MEGA software

Molecular Biology (24 hrs)

Theory

1. An introduction to different types of PCR
2. Primer Designing

Practical

1. Gradient PCR
2. PCR
3. Colony PCR
4. cDNA synthesis and RT-PCR
5. Real-time PCR (Demo)

References

1. Molecular Cloning A Laboratory Manual, Cold Spring Harbor Laboratory Press,U.S.; 4th Edition