

# Foundation Biotechnology and Molecular Biology Module

(Course duration: 180days)

## COURSEWORK

Introductory Bioinformatics & overview of Biological Research with Bioinformatics  
Molecular Biology concepts, Biological databases & Database Searching  
Bioinformatics & Functional Proteomics  
Bioinformatics & Structural Proteomics  
Bioinformatics & Expression proteomics  
Pairwise and Multiple Sequence analysis (BLAST, FASTA and CLUSTAL W)  
Motif and Domain Assignments  
Phylogenetic Analysis in Bioinformatics  
Mass spectrometry in Proteomics  
Homology Modeling  
Structural Bioinformatics  
Rational Drug Design  
Visualization Tools, Drug Targeting & Design  
Introduction to cheminformatics  
Chemical Databases and Software  
Small molecule hits  
Designing chemical structures  
Lead design and optimization  
Toxicity Prediction  
Pharmacophore analysis  
Chemical patents  
Computer simulations Studies  
FDA in drug trials  
Reverse Vaccinology  
Antigenicity and Immunogenicity  
Accessing Genome Agencies, Antigen presentation  
Computational vaccinology  
Vaccine Screening  
Immunoinformatics Core  
MHC binding & Vaccine design  
Basics of DNA Extraction procedures  
Isolation of DNA from plant tissue (C-TAB)  
Isolation of DNA by SDS method

**Yeast genomic DNA isolation & quantification**  
**Extraction of Genomic DNA from Prokaryotes**  
**Isolation of Plasmid DNA**  
**Agarose gel electrophoresis (Theory & Practical)**  
**Bacterial transformation**  
**Basic concepts of Antigen-Antibody interactions**  
**Blood Grouping and Rh typing**  
**HIV Tridot test, Widal test**  
**Immuno diffusion principles**  
**ODD test, RID test, ELISA**  
**Basics of Enzyme technology and importance of biocatalysts**  
**Extraction of enzyme, Quantitative estimation of Protein**  
**Enzyme assay**  
**Enzyme kinetics**  
**a. Temperature**  
**b. Substrate conc.**  
**c. Inhibitor**  
**Live Project (1)**  
**Internal Assignment (2)**  
**Industrial Project (1)**