

Module 1: Tools in Genetic Engineering and Microbiology

Course Content:

- Good laboratory practices and Biochemical calculations
- Laboratory instruments, principle and use
- Aseptic techniques
- Media preparation, Plating, Spreading, Streaking, Inoculation, etc
- Phage Titration
- Restriction Digestion
- Agarose Gel electrophoresis
- Isolation of plasmid DNA & Quantitation
- Ligation
- Transformation
- Cloning
- Polymerase chain reaction (PCR)

Module 2: Cloning and Expression of Gene and Bioinformatics

Course Content:

- Biochemical calculations
- Laboratory instruments, Principle and use
- Data mining using GENBANK
- Blasting sequences
- Preparation of insert DNA
- Preparation of vector DNA
- Purification of vector and insert DNA from agarose gel
- Choice of vector and host systems
- Dephosphorylation
- Ligation
- Preparation of competent cells
- Bacterial Transformation
- Screening of clones using
 - Retardation check
 - Restriction digestion
- Southern Hybridization

- Variants of PCR
 - Amplification of a gene
 - RT-PCR
 - RAPD

Module 3: Immunotechnology

Course Content:

- Biochemical calculations
- Ouchterlony Double Diffusion
- Radial Immunodiffusion
- Counter-Current Immunoelectrophoresis
- Rocket Immunoelectrophoresis
- Immunoelectrophoresis
- Quantitative precipitin assay
- Latex Agglutination technique
- Dot ELISA
- Indirect ELISA
- SDS-PAGE
- Western Blotting



Module 4: Protein Purification Techniques

Course Content:

- Biochemical calculations
- Buffer preparation
- Precipitation techniques
- Column Chromatography
 - Purification of enzyme using ion exchange chromatography
 - Gel filtration chromatography for separation of biomolecules
 - Purification of enzyme using affinity chromatography
- Protein concentration techniques
- Dialysis
- Enzyme unit determination
- Determination of specific activity
- Protein stabilization
- Purity checks
- SDS-PAGE
- Western Blotting

Module 5: Polymerase Chain Reaction and Hybridization Techniques

Course Content:

- Biochemical calculations
- DNA isolation from
 - Blood
 - Bacteria
 - Plant
- Primer design
- Amplification of gene
- RAPD fingerprinting
- Nested PCR
- RT-PCR
- PCR-RFLP
- Alu-PCR
- XX-XY determination,
- Southern Hybridization



Module 6: Enzymology

Course Content:

- Enzyme Kinetics
- Native PAGE
- SDS
- Zymography
- Protein Silver Staining
- Polymerase Chain Reaction(PCR)
- PCR-RFLP
- AFLP-Fingerprinting
- Site Directed Mutagenesis
- SSCP Analysis