Genomics and Proteomics (BT346)	03	00	02	Nil

Course Objective:

To impart knowledge of basic techniques in functional genomics, proteomics, and interact omics

Course Outcome (CO):

1 To appraise various DNA sequencing and genome editing technologies

2 To understand the fundamentals of transcriptomics and to appraise various gene expression profiling and knock out techniques

3 To comprehend genome-wide protein analysis and protein engineering techniques

4 To get insight into various techniques for isolation and analysis of DNA-protein and protein-protein complexes

5 To appraise the concept of personalized medicine based on pharmacogenomics

S.No.	Content	Contact Hours
Unit 1	**Tools in Genomics and Genome Editing:** Next Generation Sequencing techniques; Genome sequencing; DNA fingerprinting; Crispr-Cas9, ZFN, TALEN	**8**
Unit 2	**Transcriptomics & Functional Genomics Tools:** Sequence alignment; Expressed Sequence Tag; Serial Analysis of Gene Expression; Total Gene Expression Analysis; DNA microarray technology; Oligonucleotide synthesis; Arabidopsis knock out strategies; Real time PCR	**10**
Unit 3	**Techniques in Proteomics and Protein Engineering:** Protein sequencing; 2D gel electrophoresis; Mass spectrometry; Protein engineering: Rational protein design, Directed evolution	**8**
Unit 4	**Interactomics:** Methods for detecting DNA-protein interactions: Chromatin immunoprecipitation assay, Gel retardation assay, DNase I footprinting, Modification interference assay, DNA pull-down assay, Microplate capture and detection assay, Reporter assays; Methods for detecting protein-protein interactions: Coimmunoprecipitation, Yeast two-hybrid system and variants, Phage display, GFP tagging, Intein splicing; TAP tagging; Protein chips; Synthetic lethal screens; Yeast genome-wide interaction studies	**10**