5th Semester	RBT5D003	Functional Genomics	L-T-P 3-0-0	3 Credits

Module I: **(8 Hours)**

Introduction to genomics: Orientation and structure of genomes, subdividing the genome, assembling a physical map of a genome.

Module II: **(6 Hours)**

Sequencing methods and strategies, genome annotation and information from web, Genome sequencing Microbes, plants and animals; Accessing and retrieving genome project Reverse genetics, epigenetics, epigenetic landscape

.**Module III:** **(10 Hours)**

Genome editing approaches, Transcriptomics, Mapping protein interaction and applications: Global expression profiling, comprehensive mutant libraries, mapping protein interactions, applications of genome analysis and genomes.

Module IV: **(8 Hours)**

DNA Sequencing Techniques and applications Second generation Sequencing techniques – Pyrosequencing, Virtual Terminator Sequencing, Introduction to third generation Sequencing Techniques – Nanopore and Ion torrent, Applications - Personal Genomics, Metagenom

Module V: **(8 Hours)**

Conceptualizing Functional Genomics, Trancriptomics and Proteomics Concepts of forward and reverse genetics; Transcript Sequencing vs. Hybridization; Functional Genomics using RNAi; High throughput transcriptomic techniques – Real Time analysis, Microarray, SAGE, RNASeq, ChIPSeq, The ENCODE project; High-throughput Cloning and applications; Biological Networks.

Books:

[1] Genomics: Fundamental and application, Supratim Choudhury and David B Carlson

[2] Introduction to genomics Arthur M. Lesk

Digital Learning Resources:

Course Name: Functional Genomics

Course Link: https://nptel.ac.in/courses/102/104/102104056/

Course Instructor: Prof. S. Ganesh, IIT Kanpur