FUNCTIONAL GENOMICS

PROF. S. GANESH
Department of Biological Science and Bioengineering
IIT Kanpur

PRE-REQUISITES : Basic level of understanding in cell and molecular biology is expected

INDUSTRIES APPLICABLE TO : Industries that will recognize this course Biotechnology, medical and pharma companies, paramedic clinical centers, and educational institutes

INTENDED AUDIENCE

Students interested in pursuing research in genomics and biotechnology field.

Medical students and practicing clinicians interested in genomics and molecular medicine. Students interested in careers in biotechnology and biopharma fields.

Technical staff /scientists working in biotechnology, biopharma and molecular diagnostic laboratories/industry

COURSE OUTLINE :

With the emergence of high throughput DNA sequencing technologies, the complete genome sequences of many organisms are deciphered and are being analyzed. Despite the progress, understanding the cellular functions of most the genes thus identified remains a challenge. The emerging field of "Functional Genomics" aims at providing comprehensive approaches to understand the genome functions, to develop and promote high throughput and large scale approaches to investigate the function of the genomes, their products and the interactions between the two. This course thus will provide an overview of the concept of Functional Genomics and contemporary approaches used to understand the genome function.

ABOUT INSTRUCTOR :

Prof. S. Ganesh teaches biology, genetics and genomics at IIT Kanpur. His research interests include human molecular genetics and neuroscience. He works on genetic forms of neurodegenerative disorders in humans to understand their genetics and disease mechanisms, and to develop therapeutics.

COURSE PLAN :

Week 01 : Introduction to Functional Genomics: Pre- and post-genomic era; major advancements in genomic approaches; epigenetics and metagenomics; forward versus reverse genetics

Week 02 : Genome Analyses - Part 1 : Genome editing approaches and their applications; gene expression analyses and applications

Week 03 : Genome Analyses - Part 2 : Methods for DNA/RNA sequencing, sequence analysis and their applications

Week 04 : Comparative Genomics : Genomic insight into evolution; power of comparative genomic analysis