



# BIOENGINEERING: AN INTERFACE WITH BIOLOGY AND MEDICINE

**PROF. SANJEEVA SRIVASTAVA**

Department of Biotechnology  
IIT Bombay

**TYPE OF COURSE** : Rerun | Core | UG

**COURSE DURATION** : 8 weeks (24 Jan' 22 - 18 Mar' 22)

**EXAM DATE** : 27 Mar 2022

**INTENDED AUDIENCE** : Standard X, XI and XII, First Year Engineering (BE/B.Tech) Students, B.Sc students, Science Background; but course is open to all.

**INDUSTRIES APPLICABLE TO** : GE healthcare, Pall Life Science, ThermoFisher Scientific

## **COURSE OUTLINE :**

This is a basic biology course for students of engineering background. Course would provide basic understanding of biological concepts and also motivate students why understanding biology is crucial for several applications.

## **ABOUT INSTRUCTOR :**

Prof. Sanjeeva Srivastava is the Leader of the Proteomics Laboratory at the Indian Institute of Technology Bombay India (IITB). He obtained his Ph.D. from the University of Alberta and further did post-doc from the Harvard Medical School in the area of proteomics, stress physiology and has specialized in the applications of data-enabled sciences in global health, developing countries and resource-limited settings. Current research in his group centers on biomarker and drug target discovery and deciphering the protein interaction networks in complex human diseases (e.g., gliomas) as well as infectious diseases (e.g., malaria) with the use of high throughput proteomics, nanoproteomics, protein microarrays, DIGE and mass spectrometry.

## **COURSE PLAN :**

- Week 1** : Why biology for engineers: Part-I, Why biology for engineers: Part-II, Life processes & Cell, Cell and its properties, Clinician's Perspective-I
- Week 2** : DNA Tools-Gene cloning, DNA Tools-Gene cloning-II, DNA Tools & Biotechnology, DNA Tools & Biotechnology-II,
- Week 3** : DNA Tools & Biotechnology-III, DNA Tools & Biotechnology-IV, DNA Tools & Biotechnology-V, DNA Tools & Biotechnology-VI, Clinician's Perspective-III
- Week 4** : Genetics-I, Genetics-II, Genetics-III, Genetics-IV, Clinician's Perspective-IV
- Week 5** : Chromosomal basis of inheritance, Linkage, chromosomal disorders, Classical Genetics experiments, Bacteria and Viruses, Clinician's Perspective-V
- Week 6** : Cell cycle, Cell cycle dysregulation & Cancer, Developmental Biology, Principles and application of Animal Cloning, Evolution & Bioinformatics
- Week 7** : Amino acids & proteins, Proteins & Proteomics, Techniques to Study Protein & Proteome-I,II,III
- Week 8** : Techniques to Study Protein & Proteome-IV, Protein Interactions & Microarrays, Protein interactions & Systems biology, Bioinformatics, Ethics in Research and Publications