

Online Short Term Course on "Principles and Advances in Genetic Engineering"



10 - 14 August, 2020

Centre for Continuing Education (CCE)

Indian Institute of Science, Bangalore, India - 560012

Course Content:

Growth and maintenance of recombinant bacterial strains. Transformation and transfection methods. Vectors used in molecular cloning and expression of genes. DNA, RNA, and protein isolation, purification, and fractionation methods. Enzymes used in genetic engineering. Radioactive and nonradioactive labelling of nucleic acids and proteins, and its detection. Nucleic acids hybridisation methods. Gene and cDNA cloning methods. Construction of genomic DNA and cDNA libraries. Detection and characterisation methods for genes and chromosomes. Nucleic acids sequencing methods including Next Generation Sequencing. Methods for protein analysis, protein-nucleic acid and protein-protein interactions. Site-specific mutagenesis. Polymerase chain reaction, Real time Quantitative PCR. and applications. Antisense technology and RNA silencing techniques. Recombinant protein production in bacteria, yeast, and mammalian cells, Genome editing approaches such as Cas9/CRISPR technology. Exome Sequencing- ChIP Sequencing. Generation of Lentiviral, retroviral and Adenoviral vectors and Gene therapy, Genetic Engineering of mammalian stem cells, Generation of induced pluripotent stem (iPS) cells, Mitochondrial genome editing, Somatic cell nuclear transfer, Generation of transgenic and mutant *Caenorhabditis elegans* –Generation of knock-out mice (isolation and culture of embryonic stem (ES) cells, Gene targeting construct design, Transfection, Homologous recombination in ES Cells, Positive and negative selection; Breeding of germ-line chimeras Cre/lox and Flp/FRT system for inducible transgenic mice – Chemically inducible transgene expression systems. Use of transgenic technology in the modeling of human diseases, including cardiovascular disease, diabetes, obesity, cancer, atherosclerosis, neurodegenerative diseases, muscle degeneration and aging.

Participants:

College students (Life sciences, Medical, Veterinary, Pharmacy, Biotechnology &), Industry (Pharmaceutical Companies & Biotech Companies) – Researchers, Postdocs and Students in the field of Biological Sciences

Minimum Qualification Required:

Students either studying or completed, BSc (research), MSc, B.Tech, B.Pharm., BVSc., MBBS, B.Pharm., MS (Biotech), or Equivalent

Prerequisites:

Basic knowledge in Life Sciences

Course Coordinators:

- Dr. N. Ravi Sundaresan, Microbiology and Cell biology Department, Indian Institute of Science, Bangalore - 560012
email: rsundaresan@iisc.ac.in

Registration: This course can be attended only by registration. The registration will be accepted on a first-come first-served basis.

Apply online at: <http://cce.iisc.ac.in/ssp-stc.html>

Duration: 5 days (10 – 14 August, 2020)

The registration fee:

INR 5000+18% GST for Students and INR 10000 +18% GST for others

Last Date to Apply: 30 July 2020

Note: Classes will be conducted through Microsoft Teams/Google Meet