



PLANT DEVELOPMENTAL BIOLOGY

PROF. SHRI RAM YADAV

Department of Biosciences and Bioengineering

IIT Roorkee

PRE-REQUISITES : Basic knowledge of Biology, Fundamentals of Genetics and Molecular Biology

INTENDED AUDIENCE : PG and PhD students of Life Sciences/Plant Science/Botany/Biotechnology/Agriculture

INDUSTRIES APPLICABLE TO : Plant and food products-based industries

COURSE OUTLINE :

Plant Developmental Biology encompasses the study of how complex multicellular plants are developed from a single zygotic cell. This course will provide an overview of mechanisms underlying the Meristem function during growth and development, Cell specification, Differentiation and Organogenesis in the flowering plants. It also describes the approaches used to study plant development. This course will be highly useful for students to enhance their knowledge and develop their research interest in the field of developmental biology.

ABOUT INSTRUCTOR :

Prof. Shri Ram Yadav is an Associate Professor at Department of Biosciences and Bioengineering, Indian Institute of Technology, Roorkee. Dr. Yadav has over twenty years of research experience in the field of plant development biology. He completed his M.Sc. in Biotechnology from University of Jammu, India and later he earned his PhD at Indian Institute of Science (IISc), Bangalore, India and worked on flower development in rice. He did his postdoctoral research at University of Helsinki, Finland to study cell-cell communication during vascular development in Arabidopsis root. Currently his research group is working on adventitious root development and stem cell maintenance using rice and Arabidopsis as model plants. He has contributed significantly in the field of plant development biology and published several research articles in top-tier international journals.

COURSE PLAN :**Week 1: Introduction :**

Life cycle of an angiosperm plant, Plant growth and development, Embryonic and post-embryonic development, Characteristics of plant development

Week 2: Molecular Genetics of Plant Development :

Generation and characterization of developmental mutants, studying temporal and spatial expression pattern of developmental regulators, Functional genomics, Genetic manipulation of plant for studying development

Week 3: Root development :

Organization and maintenance of root apical meristem, radial patterning during vascular development, Root branching; lateral root development

Week 4: Shoot development :

Organization and maintenance of shoot apical meristem, Organogenesis and organ polarity, Floral transition, Floral organ patterning and determinacy, Cell-to-cell communication during development