

**B.Tech Biotechnology: Semester-II**  
**BBT-203 – Advanced Biotechnology**

Teaching Scheme	Examination Scheme
Lectures: 2 hrs/Week	Internal Marks – 25 Marks
Tutorials: 1 hr/Week	
Credits: 3	End Semester Exam – 50 marks

**Course Objective:**

At the end of this course the students will learn and systematically analyze the complexities defining regulation of various metabolic pathways. They will be able to design and learn strain-engineering strategies to alter cellular behavior, metabolic flux, and product formation. They will also appreciate the vast industrial applications of metabolic engineering in the field of medicine, energy and environment.

**Course Learning Outcomes:**

After completing the course, the student shall be able to:

- CO1: To explain about the Introduction Genes & Genome
- CO2: To create a model on. Introduction to Recombinant DNA technology: Restriction enzymes, vectors, how to isolate and clone a desired gene, Applications of RDT
- CO3: To develop understanding of plant tissue culture

**UNIT-I: ANIMAL CELL CULTURE**

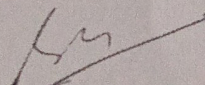
**Animal Cell Culture:** History of Animal Cell Culture, Characteristics of animal cell, metabolism, regulation and nutritional requirements, Culture Media and Growth Conditions, Development of Primary Culture and Cell Lines, Suspension Culture, Characterization and maintenance of cell lines, Cryopreservation, Common Cell Culture Contaminants, Marker Gene Characterization, Transfection and Transformation of Cells **Growth and Scale Up:** Need for scaling-up of cells for vaccine or antigen or pharmaceutical protein production, Hybridoma Technology, Cell culture reactors, Scale-Up in suspension and monolayer cultures, Factors affecting cell growth, Growth Monitoring, MassTransfer.

**UNIT- II: ANIMAL BIOTECHNOLOGY**

**Animal Biotechnology:** Concept of transgenic animals, Methods of transgene delivery, Microinjection of recombinant DNA into fertilized eggs/stem cells, Animal Pharming, Organ Culture, Regenerative Medicine, Human Embryonic Stem Cell research, Ethical Concerns and Biosafety. **Crop Improvement:** The need of crop improvement. Conventional methods of crop improvement, selection, mutation, polyploidy and clonal selection. Green revolution in India. Introduction to marker assisted breeding and selection

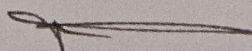
**UNIT- III: PLANT TISSUE CULTURE**

**Plant tissue culture:** History of plant tissue culture, plasticity and totipotency. Laboratory setup for a typical plant tissue culture facility. Sterilization methods used in plant tissue culture. Types



Head

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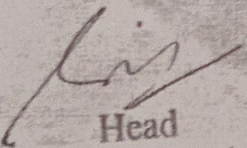


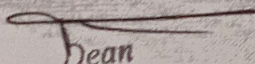
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of nutrient media and plant growth regulators in plant regeneration. Pathways for invitro regeneration: organogenesis, somatic and gametic

**Suggested Readings:**

- H.S.Chawla, "Text book of Plant Biotechnology"
- B.D.Singh, "Biotechnology " (Kalyani Publishers)
- R.C.Dubey, "Text book of Biotechnology" ( S.Chand and company)
- William J. Thieman , " Introduction to Biotechnology", Michael A. Palladino, Publisher: Benjamin Cummings
- Colin Ratledge, " Basic Biotechnology Publisher": Cambridge University Press

  
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