

Course Code	Course Name	Credits
26BY953	PLANT TISSUE CULTURE	02

Course Description

This course designed to provides hands-on training *in vitro* techniques, including media preparation, sterilization, and micropropagation It develops practical skills required for jobs in biotechnology labs, nurseries, and commercial plant production units The course also builds entrepreneurial ability to establish and manage small-scale tissue culture enterprises.

Course Objectives

- To understand basic concepts and scope of plant tissue culture.
- To learn media preparation and role of plant growth regulators.
- To develop skills in sterilization and aseptic techniques.
- To study different types of cultures (callus, meristem, embryo).
- To understand micropropagation techniques for large-scale production.
- To explore somaclonal variation and genetic improvement.
- To learn germplasm conservation and synthetic seed technology.
- To prepare students for employment and entrepreneurship in biotech labs

Skill Enhancement Outcomes

Upon successful completion of this course, the learner will be able to:

- Prepare and sterilize culture media independently.
- Handling laboratory equipment like autoclave and laminar airflow.
- Competence in aseptic transfer and inoculation techniques.
- Identify and control contamination in cultures.
- Expertise in micropropagation and plantlet regeneration.
- Maintain and record culture growth data.

Course Content and Practical Training

- **Introduction:** History, scope, applications, and basic concepts of tissue culture.
- **Media Preparation:** Composition of MS medium and role of hormones.
- **Sterilization:** Methods (dry heat, moist heat, filtration) and aseptic techniques.
- **Culture Techniques:** Callus culture, suspension culture, meristem culture. Micropropagation: Stages, advantages, and limitations.
- **Somatic Embryogenesis:** Direct and indirect methods, synthetic seeds.
- Preparation of culture media (MS medium) and stock solutions.
- Synthetic seed preparation.
 - Sterilization of glassware and instruments using autoclave.
 - Surface sterilization of explants (leaf, stem, root).
 - Inoculation of explants under laminar airflow chamber.
 - Induction and maintenance of callus cultures.
 - Shoot and root induction for micropropagation.
 - Subculturing and maintenance of tissue cultures.
 - Preparation of Synthetic seeds

Learning Outcome

Students will gain practical skills in plant tissue culture, including media preparation, sterilization, and micropropagation, making them suitable for laboratory and nursery work. They will be able to manage contamination and culture techniques, enhancing employability in biotechnology and research labs. The course prepares students for jobs in plant production industries, horticulture, and commercial tissue culture units. It also supports entrepreneurship by enabling students to establish small-scale plant tissue culture businesses.