Lecture Plan

Name of the college: Government College of Arts, Science and Commerce, Sanquelim, Goa.

Name of Faculty: Ms. Shubha Shivdas Kauthankar	**Subject:** Botany	
Paper code: BOT 304- PLANT TISSUE CULTURE	**Program: T.Y.B.Sc.**	**Division: -**
Academic year: 2025- 2026	**Semester: VI**	**Total Lectures: 45**

Course Objectives: 1) To study the concepts and basic Plant Tissue Culture techniques for regeneration of plants from cells and tissue

2) To acquire knowledge about applications of plant tissue culture in various fields.

Course Outcome: 1) Acquire knowledge about the concepts in plant tissue culture, sterilization techniques, Preparation of media (MS) and techniques used in plant regeneration.

2) Understand the applications of plant tissue culture in conservation.

Student Learning Outcome: 1) Understand the principles of Plant Tissue Culture.

2) Familiarize students with plant tissue culture laboratory setup including preparation of culture media.

3) Acquire knowledge about various in-vitro culture techniques for plant regeneration.

4) Understand various applications of plant tissue culture including in-situ and ex-situ conservation.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
December 2025	01/12/2025	06/12/2025	3	Module 1: Introduction to Plant Tissue Culture: concept and history. Plant tissue culture: pioneering work and significant achievements of Indian Scientists. Plant Tissue culture Laboratory design	To list Indian scientists in Plant tissue culture	Powerpoint presentation	Bhojwani, S.S. and Razdan, M.K. 1996. Plant Tissue Culture: Theory and Practice Razdan, M.K. 2003. An Introduction to Plant Tissue Culture De, K.K. 1992. Plant Tissue Culture
December 2025	08/12/2025	13/12/2025	3	Basic requirements and sterilization practices in Plant tissue culture. Plant Tissue culture techniques: packing and sterilization of glassware. Composition and types of media in plant tissue culture	-	Powerpoint presentation	
December 2025	15/12/2025	20/12/2025	1	Preparation and sterilization of culture media in plant tissue culture Selection, isolation, surface sterilization and inoculation of explants; establishment of invitro cultures.	To study methods of sterilization in PTC		

				Ideal conditions for incubation of cultures, maintenance of cultures and subculture; regeneration of plantlets.			Kumar, U. 2011. Methods in Plant Tissue Culture Nair, L.N. 2010. Methods in Microbial and Plant Biotechnology
December 2025	22/12/2025	23/12/2025	2	Acclimatization of tissue cultured plantlets in greenhouse/polyhouse. Module 2: Cellular Totipotency and Differentiation- Concept	To study the role of plant growth regulators in PTC		
January 2026	01/01/2026	03/01/2026	2	Role of meristems in tissue culture Characteristics of callus tissue, Somaclonal variation Organogenesis and embryogenesis			
January 2026	05/01/2026	10/01/2026	2	Preparation of synthetic seeds Types of cultures- protocol and application of callus culture	To study the concept of synthetic seeds		
January 2026	12/01/2026	17/01/2026	3	Protocol and application of meristem culture ISA 01 Anther and pollen culture and micro-propagation			

January 2026	19/01/2026	24/01/2026	3	Cell suspension culture: method of isolation of single cells, viability test Cell suspension culture protocol Types of cell suspension culture (batch and continuous), growth pattern of cells in batch culture	To study the method of cell suspension culture		
January 2026	26/01/2026	31/01/2026	2	Methods for measurement of growth of cells in suspension culture Applications of cell suspension cultures.	-		
February 2026	02/02/2026	07/02/2026	3	Module 3: Somatic hybridization- concept and role of enzymes in protoplast isolation Mechanical and enzymatic method of protoplast isolation, Testing viability of isolated protoplasts ISA 02	To list the steps involved in protoplast isolation		
February 2026	09/02/2026	14/02/2026	3	Spontaneous fusion of protoplasts Induced fusion of protoplasts Selection of hybrid protoplasts			

February 2026	16/02/2026	21/02/2026	3	Culture of hybrid protoplasts, Applications of somatic hybridization Cybrids and their application	To study the concept of cybrids in PTC		
February 2026	23/02/2026	28/02/2026	3	Applications of plant tissue culture - concept, PTC for crop improvement in agriculture PTC in horticulture and forestry PTC for production of secondary metabolites in culture	To enlist the application of PTC in crop improvement		
March 2026	02/03/2026	07/03/2026	3	Cryopreservation Cryopreservation Germplasm conservation (in-situ and ex-situ methods)	To study the method of cryopreservation		
March 2026	09/03/2026	14/03/2026	3	Role of Plant growth regulators in tissue culture ISA 03			
March 2026	16/03/2026	21/03/2026	3	Embryo and root culture			
March 2026	23/03/2026	31/03/2026	3	Revision	-		

*** Assessment Rubrics**

Component	Max Marks
ISA 1	7.5
ISA 2	7.5
ISA 3	7.5
Practical	25
Project	-
Semester End Exam	60