University of Kerala

Discipline	**BOTANY**				
Course Code	**UK4SECBOT203**				
Course Title	**BASICS OF PLANT TISSUE CULTURE**				
Type of Course	**SEC**				
Semester	**IV**				
Academic Level	**200 - 299**				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	03	02 Hours	-	02 Hours	04 Hours
Pre-requisites	No Pre requisites				
Course Summary	The SEC will make the student capable to become an entrepreneur. It deals with basic aspects and opportunities of plant tissue culture.				

Detailed Syllabus:

Module	Unit	Content	Hrs
I		**Introduction to Plant Tissue Culture**	04
	1	History and Basic concept of Plant Tissue Culture	
	2	Laboratory requirements, Tools and techniques	
	3	Laboratory contaminants- it's control and measures.	
II		**Media and Culture Preparation**	04
	4	Media preparation- pH, Temperature and Solidifying agents	
	6	Role of Micro and macro nutrients, Growth regulators, Vitamins and carbon source in tissue culture	
	5	Composition of commonly used culture media - MS Media	
III		**Prerequisites for Plant Tissue Culture**	05
	8	Explants selection, sterilization and inoculation	
	9	Micropropagation through various explants (Leaf and Node)	
	10	Culture media-MS Medium, composition and preparation	
IV		**Culture techniques**	05
	11	Micropropagation – steps -Innoculation – Subculture, Callus and suspension culture, meristem culture	
	12	Somaclonal variation- Somatic embryogenesis and organogenesis.	
	13	Production of haploids – pollen culture, anther culture – protoplast culture – somatic hybrids – cybrids - Synthetic seeds	
V		**Future Prospects of Plant Tissue Culture**	12
	14	Somatic embryogenesis and production of synthetic seeds	
	15	Application of tissue culture in forestry and agriculture	
	16	Tissue and cell culture technology in India, and its prospects	
	17	Biosafety and ethical issues	

Practicals		
	1. Preparation of culture media and sterilization 2. Inoculation of explants and micropropagation 3. Visit to a well-equipped tissue culture laboratory to familiar with the use of equipments and glasswares. 4. Encapsulation of seeds	**30**

Suggested Readings:

1. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms. VikasPublicationHouse Pvt. Ltd., New Delhi. 5th edition.
2. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
3. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications ofrecombinant DNA. ASM Press, Washington.

References

1. Pullaiah. T. and M.V.Subba Rao. (2009). Plant Tissue culture. Scientific Publishers, New Delhi.
2. Razdan M. K. (2016) An introduction to Plant Tissue Culture ,Oxford and I B Hpublishers
3. Reinert J. and Bajaj Y. P. S (1982). Plant cell, Tissue and Organ Culture, WC Brown publishers.
4. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons, U.K. 5th edition.
5. Stewart, C.N. Jr. (2008). Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.

Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Understand basics of plant tissue culture techniques	R	PSO-1
CO-2	Familiarize about the components and preparation of culture media	U	PSO-1, 6
CO-3	Know the sterilization techniques, inoculation of explants, induction of callus and morphogenesis	Ap	PSO-1, 6
CO-4	Analyse applications of tissue culture in different fields	An	PSO-1, 11

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: Basics of Plant Tissue culture
Credits: 2:0:1 (Lecture:Tutorial:Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)

CO-1	1		R	F	T	
CO-2	2		U	C	T	
CO-3	3		Ap	P		P
CO-4	4		An	P	T	

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics :

	Internal Exam	**Assignment**	**Project Evaluation**	**End Semester Examinations**
CO 1	✓			✓
CO 2	✓	✓		✓
CO 3				✓
CO 4			✓	✓