



SHARDA
UNIVERSITY
Beyond Boundaries

SHARDA SCHOOL OF AGRICULTURAL SCIENCES



COURSE

**Plant Tissue Culture
and Micropropagation
Lab to Land Exposure
(VAA 100)**

VALUE ADDED
COURSE BROCHURE
2024-25

ABOUT THE UNIVERSITY

Sharda University is a leading Educational institution based out of Greater Noida, Delhi NCR. The University has established itself as a high quality education provider with prime focus on holistic learning and imbibing competitive abilities in students. The University has multi-discipline campus, spread over 63 acres in the NCR and is equipped with world class facilities.

ABOUT SCHOOL

Sharda School of Agricultural Sciences is dedicated to providing high quality education and training in the field of Agricultural Sciences following curricula underpinning multidisciplinary approach by integrating technological advancements. The School strives to meet international standards as well generate technologies and motivated trained human resource to foster sustainable agricultural production, protection and processing systems as envisaged by Indian Council of Agricultural Research, UGC and the NEP-2020 of the Government of India. The School currently offers 4-year B.Sc. (Hons.) Agriculture, 2-year M.Sc. (Agriculture) Agronomy and Ph.D. degree programmes.

ABOUT COURSE

Course : **Plant Tissue Culture and Micropropagation – Lab to Land Exposure**

Plant Tissue Culture is an important branch of Agriculture that ensures the optimized micropropagation of desired flora for both basic and applied aspects of Plant Biotechnology as well as for its commercial applications. This technique is widely known for the production of large number of genetically identical plantlets, and it exhibits several advantages over conventional propagation methods. Technique is skill based and upon systematic learning a person can be effectively equipped to utilize the knowledge in the areas like basic research, environmental issues, sustainability, and commercial applications. It is a valuable tool for research on morphogenesis, cell signalling, physiology, molecular biology, as well as crop improvement programme. This course offers a comprehensive hands-on training and inputs for learning the basics with an understanding on laboratory practices along with exposure to “lab-to-land” practice.

Practical Training

- Hands on Experience on Tissue Culture Laboratory Design and Operation of Equipments.
- Hands on Training on Techniques of Plant Tissue Culture for Micropropagation.
- Knowhow on Low-Cost Methods of Clonal Micro-propagation.

Teaching methods

- Online/offline presentations with photograph, videos, etc.
- Demonstrations and interactive teachings
- Practical exercises

COURSE SCHEDULE

Week	Content	Duration Hrs.
1.	Introduction to plant tissue culture	6 h
2.	Tissue culture lab set-up	6 h
3.	Handling of explant tissue, nutrient composition and establishing the culture	6 h
4.	Commercial applications	6 h
5.	Hardening of micro-plants, commercial tissue culture facility and strategies for cost reduction	6 h

PROFILE

Dr. Ramesh Joshi

Dr. Ramesh Joshi has a total research experience of 31 years in the area of Plant Tissue culture and Molecular Biology. He completed his doctoral degree from Jodhpur University, Rajasthan and started his professional career in Tata Energy Research Institute (TERI), New Delhi in the year 1991. Dr. Joshi started working as Professor in Sharda School of Agricultural Sciences after teaching in the Department of Botany in Colleges within Rajasthan for several years. He has published a number of research papers in the journals of international repute. He is presently a member of Society of In-vitro Biology (SIVB) and American Society of Horticultural Sciences (ASHS).

School: SSBS	Batch : 2021-2025	
Program: UG	B.Sc. (Hons.) Agriculture Current Academic Year: 2024-25	
Branch:	Agricultural Sciences Semester: VII	
1. Course Code	VAA 100	
2. Course Title	Plant Tissue Culture and Micropropagation – Lab to Land Exposure	
3. Credits		
4. Contact Hours (L-T-P)	30 Hours	
Course Type	Value added course	
5. Course Objective	To provide basic and applied training in the subject for development of skills for a successful career in entrepreneurship, generate technically-trained human resource to propagate plants on commercial scale using Tissue Culture Technique.	
6. Course Outcomes	CO1: The student will be able to understand scope, principles, and importance of plant tissue culture technique CO2: The student will be able to establish their own labs and understand basic laboratory setup CO3: The student will be able to handle explant tissue, learn nutrient composition, and establish the culture with incubation CO4: The student will be able to express knowledge on commercial applications such as crop improvement and production of virus free plants and study secondary metabolite production CO5: The student will be able to demonstrate in-vitro as well as in-vivo hardening of micro-plants CO6: The student will be able to generate cost-effective processes for tissue cultured plantlets for economic sustainability	
7. Course Description	This course will impart a comprehensive knowledge and hands-on training on the basics of Plant Tissue Culture with an understanding on laboratory practices along with exposure to “lab-to-land” practice.	
8. Outline syllabus	Introduction	CO Mapping
Unit 1	Introduction to plant tissue culture	
A	Cell theory and concept of totipotency and pluripotency	CO1
B	History of plant tissue culture techniques	CO1
C	Importance and applications of plant tissue culture technique in agriculture, horticulture and forestry	CO1
Unit 2	Tissue culture lab set-up	
1.	Basic design of tissue culture research and mass scale production facilities	CO2
2.	Principles of basic equipments used in plant tissue culture technique	CO2
3.	Structure and functioning of basic equipments for plant tissue culture	CO2
Unit 3	Handling of explant tissue, nutrient composition and establishing the culture	
1.	Selection of mother plant, collection of suitable explants	CO3
2.	Surface sterilization of explants	CO3
3.	Nutrient media preparation. Aseptic inoculation.	CO3
Unit 4	Commercial applications	
1.	Crop improvement	CO4, CO6
2.	Production of virus free plants	CO4, CO6
3.	Secondary metabolites production	CO4, CO6
Unit 5	Hardening of micro-plants, commercial tissue culture facility and strategies for cost reduction	
1.	Process of in vitro and in vivo hardening	CO5
2.	Fabrication of commercial tissue culture facility and upscaling	CO5, CO6
3.	Strategies to produce low cost in-vitro plantlets	CO6
Mode of examination	Presentation and Viva-Voce	