

**A
PROPOSAL
For
Certificate Course
in
Plant Tissue Culture
Course Code: CCPTC22
(w.e.f. session 2022-2023)**



**Department of Biotechnology
DAYANAND COLLEGE, HISAR**

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Introduction: Plant Tissue culture is an important tool for both basic and applied aspects of plant biotechnology as well as its commercial applications. As a technique widely known for the production of large numbers of genetically identical plantlets, this technology exhibits several advantages over conventional propagation techniques. All techniques are skill based and upon systematic learning, can equip a person to effectively utilize the techniques in various areas like basic research, environmental issues and commercial applications. It is a valuable tool for research on *In Vitro* propagation, disease resistant plants as well as crop improvement by Biotechnology. This course offers a comprehensive hands-on training for learning the basics with an insight to laboratory practices along with exposure to “lab-to-land” transfers.

Aim: To enhance skill in various techniques of plant tissue culture and development of job-oriented skill of students to work in commercial Plant Tissue Culture laboratories.

Objectives: -

- To know basics of plant tissue culture.
- To study laboratory organization for plant tissue culture.
- To know technique of preparation of Plant tissue culture media
- Knowledge about various aseptic techniques/sterilization of plant tissue culture.
- To generate self -employment.

Structure of Course:

- Paper I: Theory Paper
- Paper II: Practical

Course Duration:

- Theory: 30 Contact hours
- Practical: 06 Contact hours

Qualification Required: - XII Science

Organizing Department: Biotechnology Department
Faculty: Biotechnology Department Faculty/ Teachers

Syllabus

Course code: CCPTC22(T)

Nomenclature: Plant Tissue Culture (Theory)

Maximum marks: 80

Time: 3 Hours

Course outcome:

- Student will come to know about various Instruments and techniques used for PTC.
- Students can propagate *In Vitro* cultured plants in aseptic conditions.
- Students can get job-oriented skill developments in commercial plant tissue culture laboratory.
- Students can propagate disease resistant plants.

Note: Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/ short answer type question covering the entire syllabus. In addition to that eight more question will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question no. 1. All questions will carry equal marks.

Unit 1

- Plant tissue culture: Introduction, History, Scope, Advantages, Applications and Limitations.
- Laboratory: lay out, organization, instruments, and other requirements.
- sterilization techniques: Washing and drying, sterilization of glass ware and explants.

Unit II

- Media: Formulation & their various types- MS, white's Media, B5, Nitsch's Media. Nutritional requirements for plant tissue culture, role of different plant Growth regulators.
- Aseptic inoculation techniques, Explant types, Micropropagation- stages, advantages, applications.

Unit III

- Types of Organ culture; root culture, meristem culture, anther and pollen culture, ovule and ovary culture, callus culture.
- Embryo culture- mature and immature embryo culture. Embryo rescue.

Unit IV

- Acclimatization Techniques: Need, Process, Packaging and export.
- Application of Plant Tissue Culture, Transgenic plants: Introduction, Insect, Bacterial, Fungal and Viral resistant plants

Recommended Books:

1. Chawla H.S. Introduction to Plant Biotechnology. 3rd Edition. Science Publishers, 2000.
2. Bhojwani S.S. and Razdan M.K. Plant Tissue Culture: Theory and Practice, 5th Edition. Elsevier.
3. Singh B.D. Biotechnology, Expanding Horizon. Kalyani Publishers, 2021.
4. Nagar S and Adhav M. Practical Biotechnology and Plant Tissue Culture. S. Chand Publishers.

Course code: CCPTC22(P)
Nomenclature: Plant Tissue Culture (Practical)

Total: 40
Experiment: 20
Practical Work Book: 10
Viva Voce: 10
Time: 3 hours

List of Practicals

- Instrumentation of Plant Tissue Culture.
- Washing & Sterilization Techniques of glassware.
- Preparation of stock solutions and nutrient media.
- Surface sterilization of Explants.
- Embryo / Ovules and anther Cultures.
- Establishment of callus cultures.
- Establishment of organ cultures for the induction of multiple shoots
- Primary hardening of tissue culture plants for their acclimatization

Assessment by Exam: At the end of course, examination will be conducted in offline mode (Pen and Paper Mode).

Scheme of Examination: There will be a written theory examination of 60 marks and practical examination will carry 40 marks.

Award of Certificate: After successful completion of the course certificate indicating grade will be awarded to the students.

Grading of Certificate:

- 90% & above: 'A+' grade
- 70% & above but less than 90%: "A" grade
- 60% & above but less than 70%: "B" grade
- 50% & above but less than 60%: "C" grade
- 35% & above but less than 50%: "D" grade

The course content and syllabus of the Certificate Course in Plant Tissue Culture - CCPTC22 is developed and designed by following teachers: -

- Dr. Vivek Srivastava
- Dr. Raj Rani
- Dr. Asha
- Dr. Puneet Beniwal

Dr. Vivek Srivastava
HOD

Principal