

# **Syllabus**

**For**

**Certificate course in Plants Tissue Culture**

**Department of Botany**

**Dhanaji Nana Mahavidyalaya, Faizpur**

**2014-15**

## **Title of the course: certificate Course in Plant Tissue Culture**

### **Objectives:**

1. To know the importance of plant tissue culture in the improvement of useful crop plants and also the ways in which it has helped mankind.
2. Introduction of important techniques useful in plant tissue culture
3. Development of practical skills in students.
4. To make student competent in plant tissue culture sector.
5. Explain the nature of plant growth processes, in the tissue culture environment

**Duration of the course:** Six Months

### **Course structure**

- 1) Paper I: Plant tissue culture
- 2) Paper II: Practical

**Eligibility:** The admission shall be opened to any candidate who has passed 10+2 examination with at least 45% marks in aggregate in science.

### **Skeleton of Course**

Sl	Paper	Name of Subject	Teaching Hours	Maximum Marks			Passing		
				External	Internal	Total	External	Internal	Total
1	Paper I	Theory	45	80	20	100	32	08	40
2	Paper II	Practical	60	80	20	100	32	08	40

Co-Ordinator

Head

Department of Botany

External Subject Expert

Principal

## **Paper I: Plant Tissue Culture-I**

**(100 marks, 45 hours)**

### **UNIT 1: 11**

#### **lectures**

Prokaryotic and eukaryotic cells, animal and plant cells Principles of Plant Tissue and Determinism, PTC lab Culture, Terminology, Totipotency, Competency organization, Requirements of tissue culture facilities.

### **UNIT 2: 11**

#### **lectures**

Preparatory steps for Tissue culture, sterilization by heat, radiation, air sterilization, explants, and Basic procedure for Aseptic Tissue transfer, classification of basic chemical disinfectants, mechanism of action of disinfectants, concentration and time of exposure to disinfectants.

### **UNIT 3: 11**

#### **lectures**

Inoculation of culture, culture media, composition of media, phytohormones, media components, An appraisal of different media, selection of media, Hormones  
Auxins, Cytokinins, Gibberellins, Abscisic Acid, ethylene.

### **UNIT 4: 12**

#### **lectures**

Incubation systems : culture room, green house and shade house, hardening of tissue cultured plants, advantages and limitations of each system, Basic application of PTC, \Factors affecting Tissue Culture success : Media, explants, light, Temperature, Gas, polarity, Subculture, Genotype, and Season.

### **Recommended readings**

1. Cell Biology (India Ed.)-C. B. Powar (2003).
2. An Introduction to Plant Tissue Culture M. K. Razdan, Oxford and IBII publishing Co. pvt. Ltd., New Delhi.
3. Fundamentals of plant Biotechnology by Amla Batra Capital Publishing Company.
4. Introduction to Plant Tissue Culture, Bhojwani and Rozdan.
5. A textbook of Biotechnology by R. C. Dubey.
6. Plant Biotechnology by K. G. Ramawat.
7. Plant Tissue Culture: K. K. De (New central Book Agency).

8. Applied and fundamental aspects of plant cell, tissue and organ culture: J. Reinert and Y. P. S. Bajaj.

### **Paper II Practical**

**(100 marks, 60 hours)**

1. Lab organization and sterilization techniques-Dry, Hot and filtration.
2. Preparation of Plant Tissue Culture Media.
3. Callus Induction, characterization, subculture and maintenance
4. Organ culture : root
5. Organ culture : leaf
6. Organ culture : flower
7. Organ culture : meristem
8. Organ culture: shoot-tip
9. Organ culture : anther
10. Organogenesis : shoot system
11. Organogenesis : root system
12. Protoplast isolation and culture
13. Protoplast isolation, fusion and culture
14. Somatic embryogenesis from suitable explant
15. Industrial tour/visit

### **Recommended readings**

1. An introduction to plant tissue culture: Kalyan Kumar De (New Central Book Depot).
2. Plant cell and tissue culture-a laboratory manual : J. Reinert and M. M. Yeon.
3. Plant tissue culture-techniques and experiments: R. Smith.
4. Methods in plant molecular biology M. A. Schuler and R. E. Zielinski.
5. A laboratory manual of plant biotechnology: S. S. Purohit (AgroBotanica)
6. Methods in plant tissue culture: U. Kmar (Agrobios).