

P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSET01**

Offered to B.Sc. (BZC)

Domain Subject: BOTANY

Semester – V

Max. Marks: 75

Theory Hrs.
/Week: 3

Course 6C: PLANT TISSUE CULTURE

Type of the Course: Skill Enhancement Course (Elective: Theory),

Credits: 04

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Comprehend the basic knowledge and applications of plant tissue culture.

CO2: Identify various facilities required to set up a plant tissue culture laboratory.

CO3: Acquire a critical knowledge on sterilization techniques related to plant tissue culture.

CO4: Demonstrate skills of callus culture through hands on experience.

CO5: Understand the biotransformation technique for production of secondary metabolites.

CO-PO MATRIX							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					M		
CO2						M	
CO3						H	
CO4						H	
CO5						H	

II. Syllabus: (Total Theory Hours: 45 including Unit

tests etc.)UNIT-I Basic concepts of plant tissue

culture (9h)

1. Plant tissue culture: Definition, history, scope and significance.
2. Totipotency, differentiation, dedifferentiation, and redifferentiation; types of cultures.
3. Infrastructure and equipment required to establish a tissue culture laboratory.

UNIT-II Sterilization techniques and culture media

(9h)

1. Aseptic conditions – Fumigation, wet and dry sterilization, UV sterilization, ultrafiltration.
2. Nutrient media: Types of media
3. Composition and preparation of Murashige and Skoog culture medium.

UNIT-III Callus culture technique (9h)

1. Explant: Definition, different explants for tissue culture, surface sterilization, inoculation

methods.

2. Callus culture: Definition, various steps in callus culture.
3. Soma clonal variations and their isolation.

UNIT-IV Micropropagation (9h)

1. Direct and indirect morphogenesis, organogenesis, role of PGRs; somatic embryogenesis and synthetic seeds.
2. Protoplast Culture.
3. Cybrids.

UNIT-V Applications of plant tissue culture (9h)

1. Germplasm conservation: cryopreservation methods, slow growth, applications and limitations; cryoprotectants.
2. r DNA Technology.
3. Transgenic plants- gene transfer methods, BT cotton, Golden Rice.

III References/ Text Book/ e-books/websites

1. Razdan, M.K. (2005) Introduction to Plant Tissue Culture, Oxford & IBH Publishers, Delhi
2. Bhojwani, S.S. (1990) Plant Tissue Culture: Theory and Practical (a revised edition). Elsevier Science Publishers, New York, USA.

Reference Materials on the Web/web links:

<https://www.youtube.com/watch?v=dFrX-t5J0PA>
<https://www.youtube.com/watch?v=A6qEgc6Jt3Q>

IV Co-Curricular Activities

(a) Mandatory:(Training of students by teacher in field related skills:(lab:10 + field: 05)

1. **For Teacher:** Training of students by teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of sterilization procedures, preparation of media, establishment of callus culture, growth measurements; morphogenesis and organogenesis; acclimatization and hardening of plantlets.
2. **For Student:** Students shall (individually) visit any one of plant tissue culture laboratories in universities/research organizations/private facilities, write their observations on tools, techniques, methods and products of plant tissue culture; and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages to the teacher in the given format.

3. Max marks for Fieldwork/Project work Report: 05
4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like identifying tools in plant tissue culture and their handling, operational techniques with safety and security, IPR)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on tools and techniques in plant tissue culture.
5. Collection of material/figures/photos related to products of plant tissue culture, writing and organizing them in a systematic way in a file.
6. Visits to plant tissue culture/biotechnology laboratories in universities, research organizations, private firms, etc.
7. Invited lectures and presentations on related topics by field/industrial experts

Suggested Question Paper Pattern

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: SECBOTT01

Offered to B.Sc. (BZC)

Title of the Course: PLANT TISSUE CULTURE

SECTION – A (Total: 25 Marks)

Short Answer Questions (25 Marks: 5 x5)

Answer any Five questions. Each answer carries 5 marks. At least 1 question should be given from each Unit

1. What is totipotency? Explain. **CO1L4.**

2. Describe the method of dry sterilization. **CO2L1.**
3. Enumerate the somaclonal variations. **CO3,L1.**
4. Discuss about the cybrids. **CO4,L2.**
5. Prepare a note on role of auxins. **CO5,L3.**
6. State a note on Bt Cotton. **CO5,L1.**
7. What is morphogenesis? Describe. **CO4,L1.**
8. Describe the synthetic seeds in detail. **CO4,L1.**

SECTION B (Total: 5 x 10 = 50 Marks)

Answer all questions. Each answer carries 10 marks. Two questions should be given from each unit with internal choice.

9(a) State the concepts differentiation, dedifferentiation, and Redifferentiation. **CO1,L1**

OR

9(b) Enumerate an account of Infrastructure and equipment required to establish a tissue culture laboratory. **CO1,L1**

10(a) Explain various methods of sterilization. **CO2,L4**

OR

10(b) Discriminate an account of the composition and preparation of MS media. **CO2,L4**

11(a) Paraphrase various ways of surface sterilization of explants. **CO3,L2**

OR

11(b) Summarize an account of callus culture. **CO3,L2**

12(a) Illustrate about somatic embryogenesis. **CO4,L3**

OR

12(b) Demonstrate the process of Organogenesis in plant tissue culture. **CO4,L3**

13(a) Explain the steps involved in r DNA Technology. **CO5,L2.**

OR

13(b) Memorize the Agrobacterium mediated gene transfer method. **CO5,L4**
