



First Semester, 2019-2020

COURSE HANDOUT (PART-II)

01/08/2019

In addition to part I (general handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No : **BIO F352**
Course Title : **Cell and Tissue Culture Technology**
Instructor-In charge : **Kumar Pranav Narayan, Dhansri Krishnamurthy**

1. Course Description: Plant and animal cell cultures from various organism; development and maintenance of cell lines.

2. Scope and objective of the course: This course will provide an introduction to theory and application of tissue culture technologies. The details of animal and plant tissue culture will be covered including design of media and large scale production of the animal and plant cells. The course also covers the various techniques of preserving the animal cell lines.

3. Text Books:

1. Narayanaswamy, S. Plant Cell and Tissue Culture, Tata McGraw Hill Publishing Company Limited, 1994 (Ninth Reprint 2008).
2. Freshney, R.I. Culture of Animal Cells: A Manual of Basic Technique, Willey-Liss Press (5th Ed), 2005.

4. Reference books:

1. Bhojwani, S.S. and Razdan, M.K. Plant Tissue Culture: Theory and Practices, a Revised Edition, Elsevier, Reprint 2004.
2. Freshney, R.I. Animal cell culture: A practical approach, Oxford University Press, 2nd Ed. 1992.

5. Course plan:

Lect. No.	Learning objective	Topics to be covered	Chapter in the Text Book
Part A	Animal Cell and Tissue Culture		
1-2	Introduction	Types of culture, advantages and limitations of tissue culture.	Ch.1 (TB-2)
3-5	Laboratory design and equipments	Designing of animal tissue culture laboratory, common and specialized equipments, consumable items.	Ch. 4,5 (TB-2) Ch. 3,4 (RB-2)
6	Aseptic environment	Aseptic techniques, sterilization.	Ch. 6 & 11 (TB-2)
7-8	Culture media	Defined media and supplements, serum-free medium.	Ch. 9 & 10 (TB-2)
9-10	Primary culture	Types of primary cell cultures, isolation	Ch. 12 (TB-2)

		of tissue, primary culture.	
11-12	Subculture and cloning	Subculture, cloning, isolation of clones.	Ch. 13, 14 (TB-2)
13-14	Cell separation	Various methods of cell separation.	Ch. 15 (TB-2)
15	Transformation	Transformation, immortalization.	Ch. 18 (TB-2)
16-17	Contamination	Source of contamination, monitoring and eradication of contamination.	Ch. 19 (TB-2)
17-18	Cryopreservation	Rationale, principles and acquisition of cell lines for cryopreservation.	Ch. 20 (TB-2)
19-20	Cytotoxicity	Viability and Cytotoxicity assays.	Ch. 22 (TB-2)
Part B	Plant Cell and Tissue Culture		
21-22	Introduction, objective and scope of tissue culture	Historical introduction to plant tissue culture	Chap 1, TB 1 Chap 1, RB 1
23-24	Plant tissue culture laboratory	Lab organization (Lay out, requirements and general techniques)	Chap 2, TB 1 Chap 2, RB 1
25-26	How to grow plants <i>in vitro</i>	Culture media constituents, media selection and preparation	Chap 3, TB 1 Chap 3, RB 1
27-28	<i>In vitro</i> techniques of clonal propagation	Micro propagation stages, factors affecting micropropagation, applications and limitations	Chap 7, TB 1 Chap 16, RB 1
29-31	Production of haploids	Haploid production through anther culture and microspore culture, applications and limitations	Chap 10, TB 1 Chap 7, RB 1
32-33	Producing disease free plants	Meristem culture and virus free plants	Chap 6, TB 1 Chap 15, RB 1
34-36	Creating variations <i>in vitro</i>	Somaclonal variations	Chap 9, RB 1
37-38	Somatic hybridization	Protoplast isolation and culture, somatic hybrids production	Chap 11, TB 1 Chap 12 & 13 RB 1
39-40	Storing plant genetic resources	Cryopreservation	Chap 15, TB 1 Chap 18, RB 1

6. Evaluation scheme:

Component	Duration	Weightage %	Date and time	Venue	Nature of the Component
Mid Sem	90 mins	30 (90)	01/10/2019, 11:00 to 12:30PM		CB
Lab test		15 (45)	Multiple	Lab	OB
Assignment		10 (30)		Class room	OB
Surprise test		10 (30)		Class room	CB
Comprehensive	3 hrs	35 (120)	06/12/2019 AN		CB

7. Chamber consultation hour: To be announced in the class.

8. Notices: All notices will be displayed on the CMS and Biological Sciences notice board.

9. Make-up Policy: Make-up decisions will be made on a case-by-case basis and only genuine cases as determined by the team and validated by Wardens and/or medical office will be considered. No make-up for surprise Quizzes.

10. Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**Instructor – in-charge
BIO F352**