Course Focusing on Human Values and Professional Ethics

| Sem. | Course Code | ELECTIVE – II ANIMAL CELL CULTURE TECHNIQUES | Total Marks: 100 | | Hours Per Week | Credits |
|---|---|---|---|---|---|---|
| II | 17 PBFET206 | | CIA: 25 | ESE: 75 | 5 | 4 |

**OBJECTIVES:**

- To understand the components of culture media and various tissue culture techniques
- To learn the various techniques of genetic engineering in animals
- To enable the students to have a sound knowledge on the large scale production of recombinant proteins

**UNIT-I**

**Animal Cell Culture:** Basic principles of Animal cell culture. Facilities for animal cell culture- Infrastructure, equipment, Culture Vessels. Importance of aseptic techniques in cell culture. Advantages and Limitations of Animal cell culture.
Cell sources and cell types required for Animal cell culture.

**UNIT-II**

**Culture media:** Physico-Chemical properties of culture media. Complete culture media- EMEM and RPMI, Balanced Salt Solution, Composition of Earle's BSS and Hank's BSS. **Natural media:-** Serum and Tissue extracts. Serum free media- Advantages and Disadvantages. Sterilization of media.

**UNIT-III**

**Biology of cultured cells:** Cell adhesion, Cell Proliferation, Cell differentiation, Metabolism of cultured cells, Initiation of cell culture, Evolution of Cell line and Hybridization of Cell line. Stem cells and its application in Organ synthesis.
Characterization of cultured cells. Measurement of growth parameters of cultured cells. Cell synchronization. Apoptosis and its measurement.

**UNIT-IV**

Primary cell culture – Mechanical and Enzymatic method. Cell line- Finite and Continuous cell line. Subculture - Passage number, Split ratio, seeding efficiency and criteria for subculture. Monolayer culture.
**Types of cell culture:** Organ culture, tissue culture, Three dimensional culture. Tissue engineering and Tissue modeling with applications.
**Embryo Culture:** An overview of collection and preservation of embryos- IVF and Embryo transfer.

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UNIT-V

**Transgenic animals:** Methods- Microinjection method and Embryonic Stem cell method. Transgenic clone Dolly – case study.

**Application of Animal cell culture:** Production of Vaccines, Interferon and therapeutic proteins.

**Biosafety:** Definition, Frame work of Biosafety, Regulation for Transgenic animals in India.

**Bioethics:** Definition, Animal ethics and ethical issues, ethical clearance, Norms for conducting studies on animals and human subjects.

## TEXT BOOKS

1. M.M.Ranga, "Animal Biotechnology" Second edition. AgroBios, 1993.
2. A.Wilson Aruni, P.Ramadass, "Animal Tissue Culture", MJP Publishers, 1995.
3. U.Satyanarayana, "Biotechnology" Books and Allied (P) Ltd, 2000.

## REFERENCE BOOKS

1. R.Ian Freshney "Culture of Animal cells-A Manual of Basic technique" Fourth Edition. A John Wiley & Sons.Inc Publications, 2000.
2. Butler Worth Einenen Heineman,"Invitro Cultivation of Animal cells" BIOTOL series, 1993.

| QUESTION PAPER PATTERN | | |
|---|---|---|
| **SECTION - A** | **SECTION - B** | **SECTION - C** |
| **10 x 1 = 10 Marks**<br>(Multiple Choice, Four options)<br>Two questions from each unit | **5 x 7 = 35 Marks**<br>(Either or choice)<br>Two questions from each unit | **3 x 10 = 30 Marks**<br>(Answer any three Questions)<br>One Question from each unit |

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