

Semester	Course Code	Core Paper XI Animal Biotechnology, Bioethics and IPR	Total Marks:100		Hours Per Week	Credits
VI	20UAQCT602		CIA: 25	ESE: 75	5	4

### Objectives:

- To study about various culture techniques for animal cells.
- To acquire knowledge about principles followed in animal cell culture.

### Course Outcome:

On successful completion of the course, the students will be able to:

- CO1 Describe the significance of growth media and primary culture
- CO2 Integrate with the methods used for the development of cell lines
- CO3 Apply the cells developed from tissue culture in various fields
- CO4 Know the ethics to be followed for transgenic studies
- CO5 Get a brief idea related to IPR

## UNIT I

**Introduction to Cell Culture:** Scope of animal tissue culture, Lab requirements for aseptic conditions, Culture Media and importance of media components for the growth of animal cells, antibiotic growth supplements, sterilization of glassware and media. Primary culture – Types, Behavior of cells and their properties. Secondary culture, Transformed cell lines, Continuous cell lines, commonly used animal cell lines - their origin and characteristics. Cell line preservation and Large scale culture of cell lines. Cell banks.

## UNIT II

**Animal Cell Culture Techniques:** Enzymatic and mechanical disaggregation of cells. Maintenance and growth kinetics of cells in culture - differentiation of cells, measurement of growth and viability of cells in culture, cytotoxicity assays and their applications, cell synchronization and senescence. Cryopreservation, Thawing. Scaling up of animal cell culture.

**Applications:** Animal cell culture for *in vitro* testing of drugs and environmental pollutants, application of cell culture technology in the production of human and animal viral vaccines, pharmaceutical proteins.

### UNIT III

**Stem cell therapy:** Embryonic and adult stem cells, Totipotent, Pluripotent and Multipotent Cells. Testing and generation of embryonic stem cells, Testing for adult stem cells and differentiation, Potential use of stem cells – Cell-based therapies.

**Concept of Transgene and Transgenics:** Transgene, Methods of gene transfer, Transgenic organisms, Transgenic Mice – expression of foreign genes and their application in research, Transgenic Cattle, Transgenic Fish. *In vitro* fertilization (IVF) in Humans and Embryo Transfer in Livestock, application of Embryo transfer technology

### UNIT IV

**Bioethics:** Patentability of microorganism, animal cloning and experimenting on animals, safety and ethical issues of transgenic animals. Human cloning and their ethical issues, testing drugs on human volunteers. Hazardous materials used in Biotechnology, their handling and disposal. Ethical implications of Biotechnological products and techniques. Public concerns and risks associated with genetic engineering, public education of producing transgenic organism. Social and legal implications of Biotechnology.

### UNIT V

**Basic Concepts of Intellectual Property:** Introduction to intellectual property rights, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights. Intellectual property laws, Trade Related Aspects of Intellectual Property Rights. Forms of IPR like patent, design, copyright and trademark. Patents: Introduction and types of patents. Patent Filing Procedures and Patent licensing. Indian patent act 1970.

### TEXT BOOK

R. Ian Freshney: Culture of Animal cell; 6th edition, Wiley-Blackwell Publishers, 2010.

### REFERENCES

1. B.Hafez and E.S.E Hafez, Reproduction in farm animals, 7th Edition, Wiley Blackwell, 2000.
2. Louis-Marie Houdebine, Transgenic Animals: Generation and Use 5th Edition, CRC Press, 1997.
3. M M Ranga, Animal Biotechnology, III Edition Studen edition, 2007

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