

**JYOTI NIVAS COLLEGE AUTONOMOUS  
SYLLABUS FOR 2018 BATCH AND THEREAFTER**

**Programme: B.Sc.**

**Semester: VI**

**BIOTECHNOLOGY PAPER VIII**

**ANIMAL AND PHARMACEUTICAL BIOTECHNOLOGY**

**Course Code: 18VIBT8**

**No. of Hours: 45**

**COURSE OBJECTIVES:**

- It is intended to give an overview on the current developments in different areas of Animal and Pharmaceutical biotechnology such as animal tissue culture, transgenic animals and production of health care products.
- It also enhances knowledge on the advanced and recent developments in these fields particularly in areas like drug designing and its delivery.
- It also exposes the students to various procedures involved in Intellectual Property Rights and patenting along with the bioethical issues concerning the same.

**LEARNING OUTCOMES:** On completion of the course, students will develop skills regarding

- Knowledge on animal cell culture and on the production and importance of transgenic animals
- Can provide examples of current applications of biotechnology and advances in the different areas like medical, microbial, environmental, bioremediation, animal, and forensic science
- Production of healthcare products such as monoclonal antibodies, blood clotting factors, hormones etc.
- Know about bioethical and biosafety measures involved in biotechnological methods.

**UNIT I ANIMAL CELL CULTURE**

**10 HRS**

Definition, types, Basic requirements – instruments (CO<sub>2</sub> incubator, LAF, filters, Inverted Microscopes), Culture **media** – Balanced salt solution (BSS). Natural and Chemically defined media. **Animal Tissue culture** – Sterilization and culture of explants [primary and secondary culture], isolation [chemical method and enzymatic method] and culture of isolated cells, maintenance of established cell lines. Cryopreservation and Thawing.

**UNIT II TRANSGENICS AND CLONES**

**12 HRS**

Brief note on stem cells. Development and applications of transgenic mice. Applications of transgenic cattle, sheep, goat, pig, poultry and fish. A brief account of animal cloning (Dolly). Ethical issues related to genetically modified organisms (GMOs), ethical implications and monitoring of transgenic animals.

### **UNIT III MOLECULAR MARKERS**

**04 HRS**

DNA fingerprinting and its applications, Molecular markers – Restriction fragment length polymorphism (RFLP), Random amplified polymorphic DNA (RAPD), Quantitative Trait Locus (QTL) and Minisatellites.

### **UNIT IV PHARMACEUTICAL BIOTECHNOLOGY**

**08 HRS**

Production and applications of monoclonal antibodies. Production of Insulin, cytokines (Interferons), blood clotting factors, growth factor (somatotropin) and Bioactive peptides.

### **UNIT V DRUG THERAPEUTICS**

**08 HRS**

Concept of drug, pharmacodynamics and pharmacokinetics, Drug designing (computer aided and rational designing). Drug delivery through hybrid proteins, liposomes, vesomes and other novel methods, advantages and disadvantages of various methods. Applications of biologicals in medicine, chemical versus biological disease treatment and its pros and cons.

### **UNIT VI INTELLECTUAL PROPERTY RIGHTS (IPR) AND PATENTING 03 HRS**

Biotechnology regulatory authorities [National and International], concepts of IPR and Patenting - Patent processing (any one Indian/ US patent on Biologicals).

### **REFERENCES:**

1. Culture of animal cells: A manual of Basic Techniques, R. Ian Freshney, P Alan R. Liss, Inc, New york, (1983).
2. Animal cell culture methods, Jenne P Mather, David Barnes., Academic press, (2006).
3. Animal Tissue Culture: Principles and Practices, SudhaHangal, University Press (2007).
4. Animal Biotechnology, A. K. Srivastava., R. K. Singh., M. P. Yadav., Oxford and IBH Publishing Co. Pvt. Ltd., (2006).
5. Animal Biotechnology, Sashidara R., MJP Publishers, Chennai, (2006).
6. Pharmaceutical Biotechnology, S. S. Kori., M. A. Halkai, P. Ellaiah., Delhi VallabhPrakashan., (2006).
7. Pharmaceutical Biotechnology, K. SambamurthyAshutoshkar, New Age International Publishers, (2006).
8. Genetic Engineering and Animal Biotechnology by B. D. Singh, Kalyani Publications (2006).

## SEMESTER VI -PRACTICAL VIII – PROJECT WORK

### General Instructions:

- In this paper students are supposed to a project work individually with a guidance of a supervisor.
- The students are allowed to select the topic of their interest.
- The department will decide the topic and the supervisor based on information furnished by the students.
- In case of any perplexity, the decision of the department is final in allotting the topic and the supervisor.
- In consultation of the supervisor, the student should submit a synopsis of the work to the Head of the Department.
- The Department will decide the possibilities of the work by seeking assistance from other Departments of the college.
- The student cannot change her topic after the final approval of the Department. For any practical difficulty of carrying out a work, a topic can be change in consultation with the supervisor within seven days of its formal approval.
- The final work report should be certified by the supervisor /s as well as by the Head of the Department.
- The internal examiner (supervisor) and the external examiner will evaluate the project report during the examination.
- During evaluation 20 marks will be allotted for the project report and 10 marks will be for Viva – Voce which has to be finalized by both external and internal examiners.
- Project report without certification is strictly not allowed for the examination.
- Along with In-house project, external projects are also permitted. In such cases, the outside supervisor along with the internal faculty should act as co-supervisors.

### EVALUATION OF PROJECT WORK

The project report shall be evaluated by both Internal and External examiners. Seminar and Viva-voce shall be conducted jointly by the external examiner and the project evaluation committee of the department comprising the Head of the Department as chairperson and other faculty members of the Department.

Marks Distribution will be as given below:

<b>Max. Marks</b>	<b>– 30 Marks</b>
<b>Presentation of the project report</b>	<b>– 20 Marks</b>
<b>Viva voce</b>	<b>– 10 Marks.</b>