DISCIPLINE SPECIFIC ELECTIVE COURSE: **ALS ZOO DSE 14**

Application of Biotechnology for Pest Management

Credits distribution, Eligibility and Pre-requisites of the Course

Course title & Code	**Credits**	**Credit distribution of the course**			**Eligibility criteria**	**Pre-requisite of the course (if any)**
		Lecture	**Tutorial**	**Practicals / Practice**		
Application of Biotechnology for Pests-Management **ALS ZOO DSE 14**	**2**	**1**	**Nil**	**1**	**Appeared in Sem-VII**	NA

Learning Objectives:

Learning objectives of this course are as follows:

- To provide knowledge about alternative measures to traditional pest management practices against insects.
- To learn about various tools and techniques of biotechnology used for controlling insect pests.

Learning Outcomes:

By studying this course, students will be able to:

- distinguish between various types of pests and the damage they cause to their host plants.
- acquire the skill to use important tools and techniques of biotechnology for management of pests.

Theory **30h**

Unit 1: Introduction to eukaryotic cell culture **4 h**

Introduction to eukaryotic cell culture; Historical background, Biology of animal cell and cell-cell interactions, good laboratory practices, Sterilization methods and techniques. Isolation of the tissue, Initiation of culture: Types of primary culture. Subculture and cell lines;

Unit 2: Media and Buffers **6 h**

Types of culture media, Physicochemical characteristics of medium-Osmolality, Temperature, Viscosity and Surface Tension. Importance of Serum and Serum-free media, Antibiotics and other supplements.

Unit 3: Advanced Cell culture techniques **15 h**

Principles of cryopreservation of cell lines. Methodology of production of chimeric DNA, I*n vitro* transfection of animal cells-chemical method, lipid mediated gene transfer (lipofection), Electroporation. Microbial contaminants (Bacteria, Yeast, Fungi, Mycoplasma and Virus) in cell line. Applications of Animal Cell Culture: Toxicology studies, Vaccine production, Gene therapy, Stem cell therapy, Production of recombinant proteins, Derived benefits from DNA barcode-based molecular taxonomy, Use of biotechnology for insect pest management

Unit 4: Challenges and Technologies for Pest management **5 h**

International project on barcode of life, Host–plant resistance: mechanism of resistance-antibiosis, antixenosis, tolerance, factors mediating resistance. Transgenic mosquito**,** Genetic control through sterile insect techniques.

Practicals **60 h**

(Laboratory periods: 15 classes of 4 hours each)

1. Packing and sterilization of glassware and plasticware for cell culture.
2. Preparation and sterilization of culture medium, buffers and solutions.
3. To study about cytotoxicity and cell viability.
4. Demonstration of Transfection in cell lines using Photographs/Videos.
5. Demonstration of working of the following instruments:

i) Laminar Flow Hood ii) Autoclave iii) Humidified CO_2 Incubator iv) pH Meter.

6. Project report on visit to animal cell culture labs

Essential/recommended readings

1. Freshney, R. IAN. (2021). Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications (8th Ed.).
2. Masters, John. R. W. (2000). Animal Cell Culture: A Practicals Approach (3rd Ed.).
3. Butler, M. (2003). Animal Cell Culture and Technology. (2nd Ed.).

Suggested readings

1. Davis, John. M. (2011). Animal Cell Culture: Essential Methods.
2. Bhatt, Sheelendra. M. (2011). Animal Cell Culture: Concept and Application.

NOTE: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.