

ZOOLOGY COMPONENT – DSE

DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE 03)

Credit distribution, Eligibility and Pre-requisites of the Course

| Course title & Code | Credits | Credit distribution of the course | | | Eligibility criteria | Pre-requisite of the course |
|--|---------|-----------------------------------|----------|------------------------|--|-----------------------------|
| | | Lecture | Tutorial | Practical/ Practice | | |
| Integrated Pest Management ALS ZOO DSE 03 | 4 | 2 | 0 | 2 | Class 12 th Pass with Science | NIL |

Learning Objectives:

The learning objectives of this course are as follows:

- to familiarize the students with the ecology of pests and the damage caused by them.
- to acquaint the students of the concept of Integrated Pest Management (IPM) using different models.
- to apprise the students of various components of IPM viz. chemical, biological and genetic control.
- to impart knowledge about the various pest surveillance techniques and forecasting of pest outbreaks.

Learning Outcomes:

By studying this course, students will be able to:

- better understand the effects of insecticides on the environment and need for ecofriendly approach for management of insect pests.
- learn the management of agricultural ecosystem using effective pest control strategies and techniques.
- appreciate the role of IPM in sustainable agriculture.

Unit 1: Concept of Pest and its Ecology (5 Hours)

Pest population dynamics, Economic Injury Level (EIL), Economic Threshold Level (ETL), carrying capacity, secondary pest outbreak.

Unit 2: Overview of Integrated Pest Management (4 Hours)

Concept of IPM and its components, major IPM strategies.

Unit 3: Insect Pest Management (6 Hours)

Types of pest management: cultural, physical and mechanical; pest survey (types) and surveillance: factors affecting surveys; forecasting; pest and pesticide risk analysis; political, social and legal implications of IPM; case studies of successful IPM programmes.

Unit 4: Chemical Control (5 Hours)

Classification of insecticides, insecticide adjuvants and formulations, mechanism of insecticide action with reference to chlorinated hydrocarbons, organophosphates, carbamates, plant products, synthetic pyrethroids, fumigants, IGR compounds and pheromones.

Unit 5: Biological Control (6 Hours)

Principle; biocontrol agents: parasitoids, predators and pathogens (NPV, bacteria, fungi and nematodes).

Unit 6: Genetic Control and Legislation (4 Hours)

Sterile Insect Release Method (SIRM): radio and chemo sterilization, hybrid sterility; other strategies of genetic control; quarantine laws.

PRACTICAL (60 Hours)

1. Study of damage caused by the common insect pests of stored grains and crops (any 6).
2. Study of life history of important insect pests and non-insect pests.
3. Study of common natural enemies of crop pests (parasitoids, predators, microbes).

4. Study of IPM model for control of *Leptocorisa acuta* and *Scirpophaga nivella*.
5. Learn algorithm (flow chart) of IPM strategies for the sustainable agriculture.
6. Study of tools and techniques of IPM: mechanical, physical, cultural control.
7. Study of the equipments used for spraying and dusting of insecticides.
8. Determination of LD50/LC50 of insecticides based on assessment of SIT efficacy through data.
9. Submission of project report on visit to IARI, IPFT, Hindustan Insecticides Ltd., FCI complex.

Essential/recommended readings:

1. Atwal A.S. and Dhaliwal G.S. (2018) *Agricultural Pests of South Asia and their Management*, 7th Edition Kalyani Publ., New Delhi.
2. Dhaliwal G.S. and Singh R. (2004) *Host Plant Resistance to Insects – Concepts and Applications*. Panima Publ., New Delhi.
3. Hill, Dennis S (2012) *Agricultural insect pests of the tropics and their control*, 2nd Edition; Permission of Cambridge University, printed at Shree Maitrey Printech Pvt.
4. Horowitz, A. Rami and Ishaaya, Isaac. (2009) *Insect Pest Management - Field and Protected Crops* by Mary Lou Flint and Robert van den Bosch, (1981).
5. Flint MC & Bosch RV. (2012). *Introduction to Integrated Pest Management*. Springer, New York.

Suggestive readings:

1. Pedigo, L.P. (1996) *Entomology and pest management*, prentice hall, New Delhi
2. Raymond A. Cloyd, Philip L. Nixon and Nancy R. Pataky. 2004. *IPM for Gardeners: A Guide to Integrated Pest Management*, Timber Press.

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