

DISCIPLINE SPECIFIC ELECTIVES (DSE-2): Agrochemicals & Pest Management

Zoo-DSE-2

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		
Agrochemicals & Pest Management Zoo-DSE-2	04	03	00	01	Passed 12 th Class	NIL

Learning Objectives

The learning objectives of this course are as follows:

- This course offers an insight about the role of insects as powerful competitors of man as they cause enormous injury to crops and animals and also act as vectors of many diseases.
- To impart knowledge about various types of pests, their distinguishing features, life cycle, symptoms of infestation and/or damage to crops and human health.
- This course will help the students to understand the concept of insect pests and their population dynamics in relation to changing environmental conditions.
- The students will learn about the various methods used in pest management with *pros* and *cons* of each, and how they could be integrated for effective, economical and eco-friendly pest management programs (IPM).
- To enthuse the students to become entomologists.

Learning Outcomes

By studying this course, students will be able to:

- create awareness about adverse effects of insecticides on the environment and the need for an environment-friendly approach to the management of insect pests.
- gain knowledge about the concepts and tools of pest management.
- Understand the planning of agricultural ecosystem, tolerance of pest damage, and timing of different pest control tactics to effectively manage the pest population.
- learn about the use of different pest control techniques in a harmonious manner.
- understand the role of IPM in sustainable agriculture as the future of modern plant protection and pest control strategy.

SYLLABUS OF DSE-2

UNIT- I: Diversity of insects

6 hrs

Salient features of insects and reasons for their diversity; Outlines of insect classification up to orders. Significance of insects in the ecosystem.

UNIT-2: Insect morphology and development

9 hrs

Overview of insect morphology: Distinction between prognathous, hypognathous and opisthognathous head, types of antennae, mouth parts and legs. Insect development and types of metamorphosis.

UNIT-3: Insect crop pests and their management

12 hrs

Introduction to different types of pests and their status, Factors responsible for emergence of pest, Pest population dynamics.

Bionomics and Control of Crop pests: *Leptocorisa acuta*, *Sesamia inferens*, *Helicoverpa armigera*, *Pyrilla perpusilla*, *Earias vitella*, *Raphidopalpa faveicollis*, *Papilio demoleus*.

Bionomics and strategies for the management of stored grain pests: *Sitophilus oryzae*, *Callosobruchus chinensis*, *Trogoderma granarium* and *Corcyra cephalonica*.

UNIT-4: Medically Important and Household Pests

6 hrs

Bionomics and management of cockroach, rat flea, mosquitoes, house fly, sand fly, human louse and termites.

UNIT-5: Insect Pest Management

12 hrs

Overview of pest management tactics: physical, mechanical, cultural, biological, microbial, botanical and genetic control (SIT/SIRM).

Chemical control: Chlorinated hydrocarbons (BHC, Aldrin) organophosphates (Malathion Parathion), carbamates (Carbaryl, Propoxur) and synthetic pyrethroids (Allethrin and Cypermethrin).

Integrated pest management (IPM): Definition, principle, components of IPM and advantages.

Practical

30 hrs

(Laboratory periods: 15 classes of 2 hours each)

1. Study of the morphology of insects with the help of museum specimens/ slides/ photographs: types of antennae, mouthparts, and legs of insects.
2. Study of two economically important insects representing different orders: Dictyoptera, Hemiptera, Orthoptera, Isoptera, Anoplura (Siphunculata), Diptera, Coleoptera, Hymenoptera and Lepidoptera.
3. Elementary knowledge of collection, preservation and rearing techniques of

insects: Submission of life cycle stages of any two insect pests.

4. Determination of LD₅₀/ LC₅₀ of insecticides based on the data provided.
5. Study of Instruments used for chemical control through specimens/videos/photographs.
6. Submission of report based on field trips to entomological institutes, museums, laboratories.

Essential/recommended readings

1. Borror, D.J., Triplehorn, C.A., and Johnson, N.F. (2005) Introduction to the Study of Insects. M Saunders College Publication, USA.
2. Chapman, R.F. (1998) The Insects: Structure and Function. Cambridge University Press, UK.
3. Imms, A. D. (1923) A General Text Book of Entomology. Chapman & Hall, UK.
4. Snodgrass, R. E. (1935) Principles of Insect Morphology. Cornell Univ. Press, USA.
5. Dennis, S. Hill. (2005) Agricultural Insect Pests of the Tropics and Their Management. Cambridge University Press.
6. David, B. V. and Ananthakrishnan, T.N. (2004) General and Applied Entomology. Tata-McGraw Hill, New Delhi.

Suggested readings

1. Duntson, P.A. (2004) The Insects: Structure, Function and Biodiversity. Kalyani Publishers, New Delhi.
2. Atwal, A.S. (1993) Agricultural Pests of India and South East Asia. Kalyani Publishers, New Delhi.
3. Wigglesworth, V.B. (1984) Insect Physiology. VIII Edition, Chapman & Hall, New York.