

GENERIC ELECTIVES (GE-10): Insect Vector and Disease
Zoo-GE-10

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	Department offering the course
		Lecture	Tutorial	Practical/ Practice			
Insect Vector and Disease Zoo-GE-10	04	02	Nil	02	Passed Class XII with Biology/ Biotechnology	NIL	Zoology

Learning Objectives

The learning objectives of this course are as follows:

- to familiarize the students with a variety of diseases caused by insects.
- to learn the complex interactions between the transmission by Insect-borne pathogens affecting human health.
- to acquire knowledge of how the insects can only be controlled and prevented by studying their biology, modalities of pathogen transmission
- to enable students to evaluate the associated risk factors and devising new efficient techniques to control these insects.
- to help understand the environmental pressures caused by stagnant water.
- to motivate students to pursue a career in Health Management.

Learning Outcomes

By studying this course, students will be able to

- identify different insects and classify them based on their morphology and behaviour.
- describe the host-pathogen relationships and the role of the host reservoir on transmission of parasite.
- explain various modes of transmission of parasite by insect vectors.
- recognize various possible modern tools and methodologies for laboratory diagnosis, surveillance and treatment of diseases.
- develop a critical understanding of insect transmitted diseases such as Zoonotic, Vertical and Horizontal transmission, host specificity etc.
- spread awareness on public health programs about insect borne diseases and their control.

- To use advanced management strategies in disease control with respect to parasite evolution

SYLLABUS OF GE-10

UNIT- 1: Introduction to Insects

8 hrs

General Features of Insects, Classification of insects up to Orders- General features of orders, Morphological features: Head, legs and types of antennae. Types of Insects mouth parts w.r.t. feeding habits: siphoning type (butterfly), sponging type (housefly), biting and chewing type (cockroach), piercing and sucking type (mosquito), chewing and lapping type (honey bee).

UNIT- 2: Concept of Vectors

5 hrs

Brief introduction to carriers and vectors (mechanical and biological vector); Insect reservoirs; Host-vector relationship; Vectorial capacity; Host Specificity; Modes of disease transmission - vertical and horizontal transmission. Insects as vectors: General adaptations in insects to act as vectors.

UNIT- 3: Dipterans as disease Vectors-I

7 hrs

Dipterans as important insect vectors–Mosquitoes. Study of mosquito borne diseases– Malaria, Dengue, Chikungunya, Filariasis, Viral encephalitis. Control and prevention/cure of diseases caused by mosquitoes. Study of sand fly-borne diseases- Visceral Leishmaniasis, Cutaneous Leishmaniasis; Control of Sand fly; Study of house fly as important mechanical vector, Control of house fly.

UNIT- 4: Siphonapterans as disease vectors

5 hrs

Fleas as insect vectors; Study of flea borne diseases – Plague, typhus fever; Control and prevention/cure of diseases caused by fleas.

UNIT- 5: Siphunculata as disease vectors

5 hrs

Human louse (head, body and pubic louse) as disease vectors; study of louse borne diseases – Typhus fever, relapsing fever, vagabond's disease, phthiriasis; Control of human louse and prevention/cure of diseases caused by them.

Practical

(60 hrs)

(Laboratory periods: 15 classes of 4 hours each)

1. Study of different kinds of mouth parts and legs of insects through slides/specimens
2. Study of insect vectors through permanent slides or photographs: Mosquitoes (*Aedes*, *Culex*, *Anopheles*), lice [head, body (*Pediculus*), pubic (*Pthirus*)], Flea (*Xenopsylla cheopis*), sand fly (*Phlebotomus*), house fly (*Musca domestica*)

3. Study of different diseases transmitted by above insect vectors using photographs.
4. Project report on any one disease transmitted by insect vector.
5. Optional field trip/Lab. visit to institutes such as NIMR, NCDC.

Essential/recommended readings

1. Mullen and Darden (2009) Medical and Veterinary Entomology, 3rd Edition, Academic Press.
2. Service, M.W. (1980) A Guide to Medical Entomology, Macmillan Press.

Suggestive readings

1. Burgess, N.R.H and Cowan, G.O. (1993) A colour atlas of medical entomology. Springer Science and Business Media, B. V. House.

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