

21ENTO131 FUNDAMENTALS OF ENTOMOLOGY I

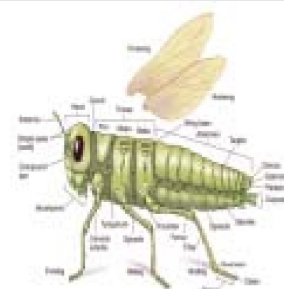
(INSECT MORPHOLOGY & TAXONOMY)

Hours Per Week :

L	T	P	C
2	-	2	3

Total Hours :

L	T	P
30	-	30



Source :

<https://www.carlsonstockart.com/photo/generalized-insect-structure-illustration/>

Course Description and Objectives:

This course makes students familiar with basic aspects of morphology and anatomy of different insects and provides skills to identify and classify insects up to family level.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Able to identify different species of insects and segregate in to different groups
2	Able to examine insects deeply within a biological level of analysis to design successful insect pest management strategies

SKILLS:

- ✓ Ability to identify different species of insects
- ✓ Complete understanding of the morphology and physiology of insects
- ✓ Apply suitable pest management strategies for different insects

ACTIVITIES:

- o *Collection and preservation of insects including immature stages*
- o *Dissection of mouth parts and digestive system in insects (Grasshopper)*
- o *Dissection of nervous systems in insects (Grasshopper)*
- o *Prepare permanent slides of antenna, wings and mouth parts of insects*

UNIT - 1

History of Entomology in India. Factors for insect's abundance. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes. Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and moulting

UNIT – 2

Body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, wing venation, modifications and wing coupling apparatus. Structure of male and female genital organs. Growth and development. Metamorphosis and diapauses in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretory (Endocrine) and reproductive systems in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes and chemoreceptors

UNIT – 3

Systematics: Taxonomy–importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta upto orders, basic groups of present day insects with special emphasis to orders and families of agricultural importance like Orthoptera

UNIT – 4

Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Miridae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papilionidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae

UNIT – 5

Lymantridae, Saturniidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Apionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthredinidae, Apidae, Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyzidae, Culicidae, Muscidae and Tephritidae; Acari: Tetranychidae, Tenuipalpidae and Eriophyidae

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS

1. Methods of collection and preservation of insects including immature stages
2. External features of Grasshopper / Blister beetle
3. Study of types of mouthparts – Biting and chewing, piercing, and sucking, rasping and sucking, chewing and lapping, sponging and siphoning
4. Study of different types of insect antennae and legs
5. Study of wing venation, types of wings and wing coupling mechanisms
6. Study of different types of insect larva and pupa
7. Dissection of digestive system in insects (Grasshopper)
8. Dissection of female and male reproductive systems in insects (Grasshopper)
9. Study of characters of Orders - Orthoptera, Dictyoptera and their families and Odonata
10. Study of characters of Orders - Isoptera and Thysanoptera and their families
11. Study of characters of Orders - Hemiptera and its sub order Heteroptera and their families
12. Study of characters of Sub Order - Homoptera and its families
13. Study of characters of Order - Neuroptera and Lepidoptera and their families
14. Study of characters of Order - Coleoptera and its families
15. Study of characters of Orders - Hymenoptera, Diptera, Acari and their families

REFERENCES:

1. Chapman, R. F 2013. *Insects: Structure and Function*. Ed by Simpson, S. J. and Douglas, C. Cambridge Univ. Press, UK
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3. Wigglesworth, V.B 2013. *Insect Physiology*. Springer (Originally published by Chapman and Hall, London, 1974)
4. Pant, N.C. and Ghai, S. 198. *Insect Physiology and Anatomy*. ICAR, New Delhi
5. Kapoor, V. C 2008. *Theory and Practice of Animal Taxonomy*. Oxford and IBH Publishing, New Delhi
6. Charles A Triplehom and Norman F. 2005. Borror and De Long's *Introduction to the Study of Insects*. Johnson Thomson Brooks / Cole Publishing. U.S.A
7. Snodgrass, R.E. 2001. *Principles of Insect Morphology*. CBS Publishers & Distributors, New Delhi.
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