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**ENTO. 121**

**Fundamentals of Entomology**

**3(2+1)**

### **Theory:Part - I**

History of Entomology in India. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes. Morphology: Structure and functions of insect cuticle and molting. 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 organ. Major sensory organs like simple and compound eyes, chemoreceptor. Metamorphosis in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (endocrine) and reproductive system, in insects. Types of reproduction in insects.

### **Part-II**

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: Acrididae, Gryllidae; Dictyoptera: Mantidae, Blattidae; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papilionidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Bombycidae; Coleoptera: Coccinellidae, Gelerucidae, Cerambycidae, Curculionidae, Bruchidae, Melonhidae; Hymenoptera: Tenthredinidae, Apidae. Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.

### **Practical**

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Cockroach; Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper); Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera,

Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.

### Lecture Schedule: Theory

| S.N. | Topic   | No. of lectures |
|------|---|-----------------|
| 1.   | History of Entomology in India.   | 1               |
| 2.   | Major points related to dominance of Insecta in Animal kingdom.   | 1               |
| 3.   | Classification of phylum Arthropoda upto classes.   | 1               |
| 4.   | Structure and functions of insect cuticle and molting.  | 1               |
| 5.   | Morphology of grasshopper: Body segmentation- structure of head, thorax and abdomen.  | 2               |
| 6.   | Structure and modifications of insect antennae.   | 1               |
| 7.   | Structure and modifications of insect mouth parts.  | 3               |
| 8.   | Structure and modifications of insect leg.  | 1               |
| 9.   | Wing venation, modifications and wing coupling apparatus.   | 1               |
| 10.  | Structure of genital organs and sensory organs (simple and compound eyes, chemoreceptor).   | 2               |
| 11.  | Metamorphosis in insects, types of larvae and pupae.  | 1               |
| 12.  | Structure and functions of digestive system.  | 1               |
| 13.  | Structure and functions of circulatory and excretory system.  | 2               |
| 14.  | Structure and functions of respiratory system.  | 1               |
| 15.  | Structure and functions of nervous system.  | 1               |
| 16.  | Structure and functions of secretory (endocrine) system   | 1               |
| 17.  | Structure and functions of reproductive system and types of reproduction in insects.  | 2               |
| 18.  | <b>Taxonomy</b> - importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. | 2               |
| 19.  | Orthoptera: Acrididae, Gryllidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae. Thysanoptera: Thripidae.                             | 2               |
| 20.  | Hemiptera: Pentatomidae, Coreidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae.  | 1               |
| 21.  | Lepidoptera: Pieridae, Papilionidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Bombycidae.  | 1               |
| 22.  | Coleoptera: Coccinellidae, Galerucidae, Cerambycidae, Curculionidae, Bruchidae, Melonithidae.   | 1               |
| 23.  | Hymenoptera: Tenthredinidae, Apidae, Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae.   | 1               |
| 24.  | Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae; Neuroptera: Chrysopidae.  | 1               |

### Lecture Schedule: Practical

| S.N. | Topic   | No. of lectures |
|------|---|-----------------|
| 1.   | Methods of collection and preservation of insects including immature stages.            | 1               |
| 2.   | External features of Grasshopper/Cockroach.   | 1               |
| 3.   | Types of insect antennae, mouthparts and legs.  | 4               |
| 4.   | Wing venation, types of wings and wing coupling apparatus.                              | 1               |
| 5.   | Dissection of digestive system in insects (Grasshopper/ Cockroach)                      | 1               |
| 6.   | Dissection of male and female reproductive systems in insects (Grasshopper/ Cockroach). | 1               |
| 7.   | Study of characters of orders Orthoptera, Dictyoptera with their families.              | 1               |
| 8.   | Study of characters of orders Odonata, Isoptera, Thysanoptera with their families.      | 1               |
| 9.   | Study of characters of order Hemiptera with its families.                               | 1               |
| 10.  | Study of characters of order Lepidoptera with its families.                             | 1               |
| 11.  | Study of characters of order Coleoptera with its families.                              | 1               |
| 12.  | Study of characters of order Diptera with its families.                                 | 1               |
| 13.  | Study of characters of orders Hymenoptera and Neuroptera with their families.           | 1               |

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