| GANPAT UNIVERSITY | | | | | | | | | |
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| **Faculty of Agriculture, Allied Sciences & Technology** | | | | | | | | | |
| Programme | B.Sc. (Hons) | | | | | Branch/Spec. | | Agriculture | |
| Semester | II | | | | | Version | 1.1.1.1 | | |
| Effective from Academic Year | | | 2025-26 | | | Effective for the batch Admitted in | | | July 2025 |
| Subject code | 2IIA07FEN | | Subject Name | | | **Fundamentals of Entomology** | | | |
| Teaching scheme | | | | | | Examination scheme (Marks) | | | |
| (Per week) | Lecture (DT) | | Practical(Lab.) | | Total | | CE | SEE | Total |
| | L | T<br>U | P | TW | | | | | |
| Credit | 2 | 0 | 1 | - | 3 | Theory | 40 | 40 | 80 |
| Hours | 2 | 0 | 2 | - | 4 | Practical | 20 | 00 | 20 |

**Objectives of the course:** To acquaint the students with the basic concepts of Entomology and their application in agriculture.

Course Outcome:

CO-1. To know the history of entomology, classification of insects and their relationship with other arthropods.

CO-2. To study the various morphological characters of class insect and their importance for classification of insects.

CO-3. To get an idea about the different physiological systems of insects and their roles in growth and development and communications of insects.

CO-4. To study the characteristics of commonly observed insect orders and their economically important families.

CO-5. To learn to identify the various insects and their physical characteristics with practical approach.

**Theory Syllabus**

| Unit | Content | Hrs |
|---|---|---|
| 1 | History of Entomology in India. Major points related to dominance of Insects in Animal kingdom. Classification of phylum Arthropoda up to classes. Relationship of class Insects with other classes of Arthropoda. | 5 |
| 2 | 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.<br>Metamorphosis and diapause 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. Major sensory organs. | 6 |

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| 3 | Insect Ecology:<br>Introduction, Environment and its components. Effect of abiotic factors and biotic factors.<br>Categories of pests. Systematics: Taxonomy – importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. | 5 |
| 4 | Classification of class Insecta up to Orders, basic groups of present day insects with special emphasis to orders and families of Agricultural importance like Orthoptera: Acrididae, Tettigoniidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; | 7 |
| **5** | Lepidoptera: Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae. Trichogrammatidae, lchneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae. | 7 |

**Practical Content**

1. Methods of collection and preservation of insects including immature stages,
2. External features of Grasshopper/Blister Beetel
3. Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus
4. Dissection of digestive system in insects (Grasshopper);
5. Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.
6. Insecticides and their formulations/ Pesticide appliances and their maintenance.
7. Sampling techniques for estimation of insect population and damage.

**Reference book**

1. Fundamentals of Ecology - Eugene. P. Odum and Gray W. Barrett
2. Imm's General Text book of Entomology— O.W. Rechards and R.G. Davies
3. Introduction to the study of Insects –D. J. Borror and DeLong's