

Syllabus for B.Sc. (Hons) Agriculture Year – I (Sem. II)

Subject Code: 16AS0210

Subject Short Name: Ag. Ento. 2.1

Subject Name: Fundamentals of Entomology

Objective:

1. To know the history of entomology, classification of insects and their relationship with other arthropods
2. To study the various morphological characters of class insect and their importance for classification of insects
3. To get an idea about the different physiological systems of insects and their roles in growth and development and communications of insects
4. To study the characteristics of commonly observed insect orders and their economically important families

Credits Earned: 3 Credits (2+1)

Course Outcomes: After completion of this course, Students will be able to

- Gain the basic concept of entomology, insect collection and preservation.
- Gain knowledge on external morphology of insects, appendages and functions.
- Understand relationship of class insecta with other classes of arthropoda along with harmful and useful insects.
- Develop the understanding of anatomy and physiology of class insecta.

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Progressive Assessment (PA)	Viva (V)	Term work (TW)	
2	0	2	3	40	20	20	10	10	100

Theory Content:

Unit	Topics	Contact Hours
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 up to classes. Relationship of class Insecta with other classes of Arthropoda. Harmful and useful insects.	4
2	Morphology: Structure and functions of insect cuticle, moulting and body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, wing venation, modifications and wing coupling apparatus. Metamorphosis and diapause in insects. Types of larvae and pupae.	6
3	Structure of male and female genital organs. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive systems in insects. Types of reproduction in insects. Major sensory organs	4
4	Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta up to Orders. Major characteristics of orders. Basic groups of present-day insects with special emphasis to orders and families of Agricultural importance like Orthoptera: Acrididae, Tettigonidae, 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; Lepidoptera: Pieridae, Papilionidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthredinidae, Apidae. Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae, Muscidae, Tephritidae.	10
	Total	24

Practical Content:

Unit	Topics	Contact Hours
1	Methods of collection and preservation of insects including immature stages	2
2	External features of Insects (Grasshopper/Blister beetle/Cockroach etc.)	2
3	Insect antennae and their modifications	2
4	Insect mouthparts, Legs, Wings and their modifications	2
5	Metamorphosis and diapause in insects	2
6	Insect larvae and pupae	2
7	Dissection of digestive system of insects (Grasshopper/Cockroach)	2
8	Dissection of male and female reproductive system of insects (Grasshopper/Cockroach)	2
9	Study the characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera and their families of agricultural importance	2
10	Study the characters of orders Lepidoptera, Coleoptera, Neuroptera, Hymenoptera, Diptera and their families of agricultural importance	2
11	Insecticides and their formulations. Pesticide appliances and their maintenance.	2
12	Sampling techniques for estimation of insect population and damage	2
	Total	24

Reference Books:

- A Text Book of Entomology, Ross H H, John Wiley and Sons, 2013
- A textbook of Agricultural Entomology, Alford D V, Blackwell Science Ltd, 1999
- The insects: an outline of entomology, The insects: an outline of entomology, Gullan PJ, Cranston PS, John Wiley & Sons, 2014.
- Fundamentals of Ecology - Eugene. P. Odum and Gray W. Barrett
- Imm's General Text book of Entomology— O.W. Rechards and R.G. Davies
- Introduction to the study of Insects –D. J. Borror and DeLong's

Suggested Theory distribution:

The suggested theory distribution as per Bloom’s taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
25%	25%	20%	10%	10%	10%

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board may also use any of tools such as demonstration, role play, quiz, brain storming, MOOCs etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.