ZOS 405: ENTOMOLOGY

Teaching hours **10hrs /Unit**

COURSE OUTCOME:

1. Students are trained in the basics of insect classifications and preservation of collected samples in the laboratory condition for future studies.
2. The behavioural paradigm, insect physiology and biological applications of various insects are studied in detail.
3. Plant-insect interactions are discussed to understand the biological significance of insects in controlling pests and pollination.
4. Nutritional requirements of different insects are discussed and this will help the students to establish own insect culture at home or fields.
5. The training helps the students to apply for different competitive exams and get selected.
6. Taxonomical training in identification and classification of insects helps students get job opportunities as entomologists or in related fields.

UNIT I

Historical review of insect classifications. Basic of insect classification. Phylogeny of the Arthropoda and the Hexapoda. Hexapoda Orders: Protura, Diplura, Collembola, Archeognatha, Zygentoma, Odonata, Ephemeroptera Orders: Orthoptera; Dictyoptera; (Mantodea, Blattodea, Isoptera), Phasmida; Dermaptera, Psocoptera. Mallophaga; Siphunculata; Hemiptera (Homoptera.Heteroptera); Thysanoptera. Orders: Coleoptera; Strepsiptera; Neuroptera; Hymenoptera. Orders: Trichoptera; Lepidoptera; Siphonaptera; Diptera

UNIT II

Scope of insect ecology. Ecosystem approach to insect ecology' ecosystem, levels, their structure and functions (herbivore, entomophagy, haemophagy). Population Ecology: Population dynamics: size, fluctuation, models' Biogeography, Community ecology: species interaction, community structure 'Successional' changes, diversity versus stability.

UNIT III

Fundamentals of Insect ethology and its application: Pattern of behaviour' periodicity and clocks. Functional aspects of behaviour: displacement' orientation' communication, reproduction, host selection, defence. Polymorphic phases (swarms, outbreaks, and migration). Locusts in making, and adaptive behaviour. Population ethology; behavioural genetics and evolution. Chromo-ecological and protective behaviour.

UNIT IV

Insect behaviour as control measure in plant protection. Biological control: definition; history. Biological control agents: parasites and parasitoids, predators, and competitors. Mass production and distribution. Advantages and disadvantage of biological control. Integrated Pest Management (IPM): Definition; importance; tools; basic principles and evolutionary trends. Ecological basis of IPM. Legislative methods.

UNIT V

Insect growth, life cycle, stages of development, metamorphosis (histolysis, histogenesis), types of metamorphosis, moulting, harmones controlling moulting. Nutritional requirements of insects. Digestion of special food stuffs (wool, collagen, keratin, pollen, silk. wax). Fat body. Heart and circulation; physical and chemical properties of haemolymph. Haemocytes. Physiological response of insect to heat.

REFERENCES

1. Arnett, R. (2000) American Insects: A Handbook of the Insects of America North of Mexico, 2nd edition, CRC Press.
2. Chapman, R. F. (1998) The Insects: Structure and Function, 4th edition [paperback] Cambridge University Press.
3. Daly,H. V., Doyen J. T. and Purcell A. H. (1998) Introduction to Insect Biology and Diversity, 2ndedition, Oxford University Press. .
4. Gullan, P. J. and Cranston P.(2010) The Insects: An Outline of Entomology, 4th edition, Wiley-Blackwell Press.
5. Pedigo, L.(2009) Entomology and Pest Management, 6th edition, Prentice-Hall,Upper Saddle River, New Jersy.
6. Resh, V. H. (2009) Encyclopedia of Insects, 2nd edition, Elsevier Science.
7. Triplehon, C.A and Johnson N.F (2005) Borror and Delong's Introduction to the study of Insects, 7th edition, Thomson Brooks/Col, U K.