DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE 04)

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Social and Beneficial Insects ALS ZOO DSE 04	4	2	0	2	Class 12th Pass with Science	NIL

Learning Objectives:

The learning objectives of this course are as follows:

- to acquaint students of the social organization found in insects.
- to apprise them of beneficial aspects of insects.
- to impart knowledge about the techniques involved in culturing and rearing of bees, silkworms and lac insect.

Learning Outcomes:

By studying this course, students will be able to:

- identify different types of social and beneficial insects.
- differentiate the various castes and their role in the social life of insects.
- acquire skill for mass rearing of beneficial insects and their products.

Unit 1: Social Insects (7 Hours)

Characteristics and systematic position. Social organization: caste determination, communication, social parasitism and symbioses, social insect pathogens. Life cycle, social organisation and types of ants, bees, wasps and termites.

Unit 2: Apiculture **(7 Hours)**

Habit and habitat of honey bee (*Apis),* bee keeping techniques, bee pasturage, artificial bee hives. Economic importance of bee. Bee enemies, bee diseases and their control.

Unit 3: Sericulture **(6 Hours)**

Life cycle of silkworm *Bombyx mori.* Types of silkworm species and their salient features. Rearing techniques of mulberry, muga, eri and tassar silkworms. Enemies and diseases of silkworms and their management.

Unit 4: Lac Culture **(5 Hours)**

Habit, habitat and biology of *Laccifera lacca.* Host trees of lac insect, pruning, inoculation and lac harvesting. Enemies of lac insect and their control.

Unit 5: Ecological aspects of beneficial insects **(5 Hours)**

Ecological role of insects: pollination, weed control, improving soil fertility and as scavengers. Medicinal use of insects and insect products. Entomophagy.

PRACTICAL **(60 Hours)**

1. Study of life cycle of ants, bees, termites, silk worm and lac insect through museum specimens/photographs.
2. Study of different nests build by ants, bees and termites.
3. Construction and maintenance of artificial bee hives and study of equipments related to apiculture.
4. Rearing techniques of mulberry, muga, eri and tassar silkworms.
5. Study of different types of enemies and diseases of silkworms.
6. Study of lac culture technique: pruning, inoculation, cropping and harvesting.
7. Study of economically important insect products.

Essential/Recommended readings:

1. Watson, J. A. L., Okot-Kother, B. M. and Noiroh C. (1985) *Caste differentiation in social insects.* Pergamon Press.
2. Dunston AP. (2007) *The Insects: Beneficial and Harmful Aspects*.Kalyani Publishers., New Delhi.
3. Brian, M. V. (1983) *Social insects: ecology and behavioural biology*. Chapman and Hall, London, New York.
4. D. B. Tembhare (2017) *Modern Entomology.* Himalaya Publishing House.
5. Dokuhon, Z.S. (1998) *Illustrated Textbook on Sericulture.* Oxford & IBH publishing Co., Pvt. Ltd. Calcutta.
6. Shukla, G.S. and Upadhyay, V.B. (2014) *Applied and Economic Zoology*, Rastogi Publications.

Suggestive readings:

1. Maxwell F.G. and Jennings P.R. (Eds). (1980) *Breeding Plants Resistant to Insects*. John Wiley & Sons, New York.
2. *Encyclopedia of Social Insects* (2021) Springer International Publishing.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

Sd/-
REGISTRAR