

**Course Code : ENT 304**

**Course Title : Industrial Entomology**

**Credit Hours : 2 (1+1) Full Marks: 50 Theory: 25 Practical: 25**

## **OBJECTIVES**

Upon the completion of this course, the students will have clear concepts of beneficial insects such as honey bees, silkworms, lac insects and biological agents and crop pollinators.

## **I. SYLLABUS**

Beneficial insects of food, medicine and aesthetic values, commercialization of honey bees, silkworms, lac insects, biocontrol agents, crop pollinators and eco-environmental indicators

## **II. COURSE OUTLINE**

### **A. Lecture**

| <b>S.N.</b>  | <b>Topics</b>   | <b>No. of Lecture</b> |
|--------------|---|-----------------------|
| 1.           | Introduction  |                       |
| 1.1          | Introduction, significance, history and scope   | 1                     |
| 1.2          | Beneficial insects: their role in food, medicine, aesthetic values and as an environmental indicators | 1                     |
| 2.           | Apiculture, sericulture and lac culture   |                       |
| 2.1          | Apiculture: definition, history, scope and prospects  | 1                     |
| 2.2          | Major honey bee species: exotic and indigenous  | 1                     |
| 2.3          | Morphological specialties: mouth parts, legs and others   | 1                     |
| 2.4          | Honey bee castes, biology and behaviours  | 1                     |
| 2.5          | Bee keeping technology: artificial feeding and queen management                                       | 1                     |
| 2.6          | Honey bee problems: pests, diseases and pesticide poisoning   | 1                     |
| 2.7          | Sericulture: definition, history, scope and prospects   | 1                     |
| 2.8          | Silkworm rearing technology, harvesting and processing  | 1                     |
| 2.9          | Silkworm diseases and their management  | 1                     |
| 2.10         | Industrial aspects of lac insects   | 1                     |
| 3.           | Different aspects of industrial entomology  | 1                     |
| 3.1          | Prospects on biological control agents  | 1                     |
| 3.2          | Industrial aspects of crop pollinators  | 1                     |
| 3.3          | Prospects on scavengers and environmental indicators  | 1                     |
| <b>Total</b> |   | <b>15</b>             |

## B. Practical

| S.N.         | Topics  | No. of Practical |
|--------------|---|------------------|
| 1.           | Study of insect products  | 1                |
| 2.           | Study of life cycles of honey bees                                | 1                |
| 3.           | Bee hives and tools/equipments used in beekeeping                 | 1                |
| 4.           | Preparation of artificial feeds for different seasons             | 1                |
| 5.           | Queen preparation and technique of dequeening and requeening      | 1                |
| 6.           | Bee colony transfer and live hive transportation                  | 1                |
| 7.           | Identification of bee flora: Nectar, pollen and propolis sources  | 1                |
| 8.           | Honey harvesting, processing and storage                          | 1                |
| 9.           | Bee keeping records and inventory                                 | 1                |
| 10.          | Silkworm life stages and feeding                                  | 1                |
| 11.          | Humidity, temperature and diseases management in silkworm rearing | 1                |
| 12.          | Laboratory rearing techniques of bio-control agents: parasitoids  | 1                |
| 13.          | Collection and identification of major pollinators                | 1                |
| 14.          | Practical learning in scavengers                                  | 1                |
| 15.          | Practical learning in environmental indicators                    | 1                |
| <b>Total</b> |   | <b>15</b>        |

## REFERENCES

Dhaliwal, GS and Singh B. 2000. Pesticides and environment. Commonwealth Publishers, New Delhi, India

Gautam R. D. 2008. Biological Pest Suppression. Westville Publishing House, New Delhi, India

Naim, M. 1993. Beekeeping: pleasure and profit. Kalyani Publisher, New Delhi, India

Pratap, U. 1997. 1997. Bee flora of Hindu Kush Himalayas: Inventory and management. ICIMOD, Kathmandu, Nepal

Shukla, A. N. 2000. Beekeeping Trainers Resource Book (in Nepali), ICIMOD, Kathmandu, Nepal.