SEMESTER - I

COURSE NAME: INTRODUCTION TO APICULTURE

Course Code: ZOO 427 **Credit: 02**

Course Learning Objectives:

- Introduction to the world of bees
- Development of understanding of beekeeping and rearing practices
- To learn about the excellent role of honey in pharmaceutical company, and cosmetic companies.

Course Learning Outcomes: After completion of the course student will be able to

- Develop and maintain an apiary
- Train the youths for rearing of bees
- Generate employment

UNIT I: INTRODUCTION TO APICULTURE

Apiculture- Definition, introduction, importance, and history of beekeeping. Introduction to honey bee; Origin, systematics, and distribution; different species of Honey Bees- *Apis dorsata*, *Apis indica*, *Apis florea* and *Apis mellifera*.

UNIT II: MORPHOLOGY AND ANATOMY OF HONEY BEE

General morphology, head, thorax, abdomen and anatomical features, life cycle, colony organization and division of labor, polymorphism, bee social behavior and bee communication. Bee dance- Round Dance, and Wag -Tail Dance.

UNIT III: FLORA AND BEE PRODUCTS

Ancient and modern beekeeping, Urban or backyard beekeeping. Bee keeping equipment.

Identification of flora for nectar and pollen. Honey- composition, quality control, by products of honey and their beneficial role. Importance and uses of honey. Composition and importance of bee wax, pollen, and royal jelly.

UNIT IV: HANDLING OF BEE COLONY AND MAINTENANCE OF APIARY RECORD

Selection of apiary site and bee species, examination of a bee colony, maintenance of apiary records, introduction to bee flora, qualities of a good bee flora, important honey flow sources in India.

Principles of Bee Management, management during- spring, winter, summer, monsoon, and autumn, swarming and control, honey extraction, migratory bee keeping, supplementary feeding, and queen management.

UNIT V: ENEMIES, DISEASES OF HONEY BEES AND THEIR CONTROL

An introduction, Bee enemies – wax moth, ants, wasps, microorganisms, pests. diagnosis and identification, mites attacking honey bees: varroa mites, mite biology and controlling varroa mites. bacterial disease, viral disease, and fungal disease.

Books Recommended:

1. Graham, J M (1992) The hive and the honey bee. Dadant and Sons, Hamilton, IIIinois.
2. Mishra R.C. (1995) Honey bees and their management in India. ICAR Publication, New Delhi.
3. Singh, S. (1971) Beekeeping in India, ICAR publication.
4. Gupta, J.K., Sharma, H K and Thakur, R K. 2009. Practical Manual on Beekeeping. Department of Entomology and Apiculture, Dr Y S Parmar University of Horticulture and Forestry, Nauni, Solan, p 83.
5. Gupta, J K. 2010.Spring management of honey bee colonies. In "OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, UNIT-I, pp 5-14, p 105.
6. Gupta, J K. 2010.Management in summer. In "OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, UNIT-II, pp 15-25, p 105.
7. Gupta, J K. 2010.Management in monsoon season. In "OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, UNIT-III, pp 26-33, p 105.
8. Gupta, J K. 2010.Management in autumn season. In "OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, UNIT-IV, pp 34-40, p 105.
9. Gupta, J K. 2010.Management in winter. In "OAPI-012 Management of honey bee colonies; Seasonal and specific management (Block 2), Indira Gandhi National open university, school of Agriculture, New Delhi, UNIT-V, pp 41-50, p 105.
10. Gatoria, G.S., Gupta, J. K., Thakur, R.K. and Singh, J. 2011. Mass queen bee rearing and multiplication of honey bee colonies. All India Co-ordinated project on honey bees and pollinators, ICAR, HAU, Hisar, p70.
11. Lorry, P. Entomology and Pest management. Macmillon Publishing.