Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Department of Zoology

Course Type: SEC-I
Course Title: Bee Keeping
Course Code: 101ZOO1601
Credits: 02 **Marks: 50** **Hours: 30**

Learning Objectives

LO 1. To inculcate importance of Bee keeping and honey processes

LO 2. To give students knowledge about various techniques of Bee keeping

LO 3. To teach techniques of construction of Bee Hives and its maintenance.

LO 4. To teach students about Honey production and health related problems

LO 5. Students will learn important steps in bee keeping and bee hive handling

LO 6. Students will learn the use of different equipment's in bee keeping.

Course outcomes

After completion of course the student will be able to:

CO 1. Differentiate in different types of honey bee.

CO 2. Understand to use the artificial hive for beekeeping

CO 3. Comprehend the technique of honey purification and processing.

CO 4. Comprehend to construct the artificial honey hive and maintain it.

CO 6. Understand to start own beekeeping equipment agency for farmers.

Unit No.	Title of Unit & Contents	Hrs.
I	**Introduction to Apiculture**	**8**
	i) Introduction to Apiculture/Bee keeping - scope, importance ii) Definition and role of bee keeping in India as a source of employment... iii) Traditional bee keeping, Modern beekeeping. iv) Role of Central Honey Bee Research and Training Institute, Pune **Practical:** i) Handling of parts of artificial hive / Bee box, ii) Different tools used in Bee keeping. iii) Identification of Queen cells, Drone cells and Brood cells.	
	Unit Outcomes: UO 1. Student will learn introductory aspects of Apiculture/Bee keeping. UO 2. Student will learn practical aspects of Handling of parts of artificial hive. Understand to operate apiculture tools.	

Unit No.	Title of Unit & Contents	Hrs.
II	**Morphology, Anatomy and Life Cycle of Honey Bee**	**7**
	i) Honey Bee morphology, Anatomy and Life cycle ii) Morphology of Honey bees – Difference in indigenous and exotic honey bees, Life cycle and Parthenogenesis in honey bees. iii) Honey bee identification and systematic position. iv) Colony life and social organization in honey bees– Queen, drone, worker. Honey bee as a pollinator. **Practical:** 1) Methods of Extraction of Bees wax, Royal Jelly and Bee venom.	
	Unit Outcomes: UO 1. Student will learn morphology, Anatomy of honey bee. UO 2. Student will learn Colony life and social organization in honey bees. UO3. Student will learn Methods of Extraction of Bees wax.	
III	**Disease and management**	**7**
	i) Honeybee Enemies and Diseases ii) Bee enemies– Wax Moth, Ants, Wasps, iii) Bacterial disease - American Foulbrood. iv) Viral disease - Deformed Wing Virus / Kashmir Bee Virus v) Fungal disease - Chalk brood, Protozoan disease - Osmosis, **Practical:** Extraction of Honey using Honey extractor, moisture reduction, packing and storing of Honey Study of natural enemies and predators of Honey Bees - management involved.	
	Unit Outcomes: UO 1. Student will learn various diseases. UO 2. Student will learn practical approaches of Extraction of Honey	
IV	**Applications of Apiculture**	**8**
	i) Honey processing and its properties and application in various fields ii) Honey - its medicinal properties -- other valuable by products of honey bees. iii) Modern method of honey processing, packing and marketing. iv) Value added honey products, Nutrients and composition of honey, Acid content and flavor effects v) Types of value added honey products **Practical:** Honey testing kit - Physical and chemical methods of analysis. Compulsory visit to a Bee keeping centre	
	Unit Outcomes: UO 1. Student will learn various Applications of Apiculture. UO 2. Student will learn practical approaches of Honey testing kit	

Learning Resources:

1. Economic Zoology –Vinita Jaiswal and Kamal Jaiswal –PHI Learning private limited, Delhi-110092[2014]
2. Text book of Applied Zoology by DR. Pradeep V Jabbed-Discovery publishing house.
3. Beekeeping in India-M. Kishan Tej, R. Aruna, Geetanjali Mishra, and M.R. Srinivasan
   https://www.researchgate.net/publication/313692521
4. Modern beekeeping and honey processing technology-EIRI Publications
5. First lesion in Beekeeping-Kethis Delaplane
6. Beekeeping Manual -Brian Rowe
7. Honey Bees and Beekeeping -University of Georgia
8. The bee keeper's problem Solver -Tew, James E. (Author) English (Publication Language)
9. Honey Bee Biology and Beekeeping-Hardcover Book, Dewey M. Caron (Author)
10. Madhumakshika Palan-Sunil Pokre , https://www.kviconline.gov.in/