

## APICULTURE

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/ week	Total Hours/ Semester	Hrs/ week	Total Hours/ Semester		
IV		Elective-IV	3	45	3	45	Nil	3

### COURSE OBJECTIVES

- To Understand the social life of honey bees and their behavior
- To apply knowledge on care and management of apiary
- To identify major bee keeping challenges and opportunities

### COURSE OUTCOMES:

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	To remember the types of species and the steps involved in modern bee keeping techniques and its practical difficulties	K1
CO2	To Understand the medicinal values of honey and commercial products of apiary reveals the importance of apiculture	K2
CO3	To comprehend methodologies involved in bee keeping .	K3
CO4	To apply modern tools in bee keeping techniques and its by products .	K3
CO5	To motivate the students for their self employment opportunities	K3&K4

Knowledge Level : K1-Remember ; K2 –Understand ; K3 – Apply ; K4 – Analyze

### MAPPING WITH PROGRAMME OUTCOME

COS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	M	S	S	M	S
CO3	S	S	M	M	M
CO4	M	S	M	S	S
CO5	S	M	S	M	M

S- Strong; M – Medium ; L- Low

DISTRIBUTION OF MARKS: THEORY 100%

## **UNIT-I BASICS OF BEE KEEPING**

**9 Hours**

History of bee keeping: Definition, Bee keeping in world wide, In India. Traditional bee keeping, Modern beekeeping, Urban or backyard beekeeping. Introduction to honey bee; Origin, systematics and distribution; Types of honey bees, Species of honey bees. Bee identification. Types of beehives - structure - location, care and management.

## **UNIT- II**

**9 Hours**

### **SOCIAL ORGANISATION AND COMMUNICATION OF HONEY BEES**

Colony life and social organization – Queen, drone, worker. Annual biological cycle of the bee colony. Communication in honey bees: Bee learning and communication – Learning - Color learning in honeybees, Color discrimination, Color learning rates and preferences, Color memory, Timing in color learning, Neurobiology of color vision; Communication - Odor plume, Trophallaxis,

## **UNIT-III BEE PASTURAGE AND POLLINATION**

**9 Hours**

Definition, types of bee pasturage – single year productive, multi year productive, permanent productive. Installing a bee pasture. Pollination by bees – pollinator. Pollinator conservation methods: Pollinators definition, Types of pollinators, Pollinators at Risks, Threats to Pollinators, Actions to Help Pollinators, Conservation methods.

## **UNIT- IV BEE ENEMIES AND DISEASES**

**9 Hours**

Bee enemies – Wax Moth, Ants, Wasps, Mites, Microorganisms, Pests. Diagnosis and Identification. Bacterial, viral, fungal & protozoan diseases: Bacterial disease - American Foulbrood, European Foulbrood, Viral disease - Deformed Wing Virus, Sacbrood Virus, Black Queen Cell Virus, Kashmir Bee Virus, Acute Bee Paralysis Virus; Fungal disease - Chalkbrood, Stonebrood; Protozoan disease - Nosemosis, Nosema cerana

## **UNIT-V VALUES AND FINANCIAL ASSISTANCE FOR BEE KEEPING**

**9 Hours**

Bee products – An introduction, honey, pollen, royal jelly, bees wax, propolis & venom, Significance of bee products. Value added honey products. Properties of honey products, Nutrients and composition of honey, Acid content and flavor effects. Types of value added honey products. Preparing for bee keeping project-Steps involved in starting a beekeeping project, Funding sources for beekeeping projects. Funds mobilization from state and national banks. Grant Resource and utilization.

**TEXT BOOKS**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Singh, Sardar	Beekeeping in India.	ICAR, New Delhi.	1962
2.	Cherian R, & K.R. Ramanathan	Bee keeping in India.	ICAR, New Delhi.	1992
3.	Mishra, R.C.	Honey bees and their Management	ICAR, New Delhi.	1985
5.	David W.	Bee Keeping- A Novices' Guide	Ashford Colour Press Ltd., United Kingdom	2010
6.	Devanesan, S. and Jacob, A	Thai sacbrood virus disease of Asian honeybee <i>Apis cerana indica</i> Fab., in Kerala, India. Proc. 37 <sup>th</sup>	International Apiculture Congress, Durban, South Africa.	2001

**REFERENCE BOOKS**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Roger, A. Morse	The ABC and XYZ of Bee culture, 40 <sup>th</sup> edition,	A.I. Root & Co., Medina, Ohio	1990
2.	Cramp, D.	The Practical Manual of Beekeeping.	Spring-hill House, Oxford, United Kingdom.	2008
3.	Capinera, J.L.	Encyclopedia of Entomology. Second Edition, Vol. 4.	Springer Science and Business Media B.V.	2008
4.	Bhat, P.R., and Kolatkar, M.	Performance and Problems of the Beekeeping Industry in Karnataka.	Indian Institute of Science, Bangalore.	2011
5.	Engle, M.S.	The honeybees of India (Hymenoptera: Apidae),	Journal of Bombay Natural History Society 99 (1): 3-7.	2002
6.	Danaraddi, C.S., Viraktamath, S., Basavanagoud, K., and Bhat, R.S..	Nesting habits and nest structure of stingless bee, <i>Trigona iridipennis</i> Smith at Dharwad, Karnataka.	Karnataka J. Agric. Sci. 22(2): 310-313.	2009

## **WEB SOURES**

[www.sciencedaily.com](http://www.sciencedaily.com)

[www.sciencemag.com](http://www.sciencemag.com)

[www.treehugger.com](http://www.treehugger.com)

[www.nature.com](http://www.nature.com)

## **TEACHING METHODOLOGY**

- Class room teaching
- Assignments, Seminars and Models
- Group Discussions
- Home test
- PPT Presentations
- Board and chalk
- Demonstration from the Video slides, Animated videos and interactive software.

## **SYLLABUS DESIGNERS**

- Dr D.Sasikala, Assistant Professor & HOD
- Dr.V.Kiruthiga, Assistant Professor
- Dr V.Rekha, Assistant Professor
- DrA.Vinodhini, Assistant Professor
- Dr.G.Vidhya, Assistant Professor
- Dr. S. Vijayakumari, Assistant Professor