

DEPARTMENT OF ZOOLOGY				CLASS: II B.Sc. Zoology				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours/week	CIA	Ext	Total
III	Core	20U3ZSM1	Applied Entomology	2	2	25	75	100

Nature of Course			
Knowledge and skill			Employability oriented
Skill oriented			Entrepreneurship oriented
			✓

Course Objectives

By the end of the course, students will be able:

1. To understand the economic and medical importance of insects.
2. To create awareness among the students about the applied aspects of Zoology.
3. To gain knowledge on various techniques employed in rearing of economically important insects.
4. To apply efficiently and execute the methodology for field practice.
5. To restate the role of insects in Forensic investigation.

Unit	Description	Hours	K-level	CLO
I	Sericulture Types of silk worm, Life history of mulberry silk worm <i>Bombyx mori</i> , Mountage, Diseases of silk worm: pebrine, muscardine and flacherie.	6	Up to K-2	1
II	Moriculture Cultivation of mulberry plant, Methods of harvesting and preservation. Role of Central Silk Board in Sericulture.	6	Up to K-3	2
III	Apiculture Different species of honey bees, Life history of bees, Newton's bee hive, Uses of honey.	6	Up to K-3	3
IV	Lac culture Lac insect classification, Life history of lac insects, Cultivation of lac, Harvesting and processing of lac, Composition and uses of lac.	6	Up to K-4	4
V	Forensic Entomology Insects of forensic importance, Corpse feeders, Maggots, Life cycle analysis, Role of insects in crime investigation.	6	Up to K-4	5

Books for Study

1. Tomer, BS. 2011. *Economic Zoology*, Emkay publications, Delhi.

2. Arumugam, N., Murugan, S., Johnson Rajeshwar, J. & Ramprabha, R. 2005. *Applied Zoology*, Saras publication, Nagercoil.
3. Johnson, M. & Kesary, M. 2008. *Sericulture IVth Edition*, N.M.C. College, Marthandam.
4. Ganga, G. & Sulochanachetty, J. 2000. *An Introduction to Sericulture*, Oxford & IBH Publishing Company Pvt. Ltd. New Delhi.

Books for References

1. Ravindranathan, KR. 2005. *A text book of economic zoology*, Dominant publishers and distributors, New Delhi.
2. Vasantharaj David, B. & Kumaraswamy, T. 1996. *Elements of Economic Entomology*, Popular book depot, Chennai.
3. Venkatanarasaiah, P. 2013. *Sericulture*, APH Publishing Corporation, New Delhi.

Web Resources

http://agritech.tnau.ac.in/farm_enterprises/fe_apiculture_home.html

http://agritech.tnau.ac.in/sericulture/seri_index.html

Rationale for Nature of the course

This course represents an attractive means of combining state-of-the-art transition on various techniques employed in rearing of economically important insects. It also highlights the use of insects in forensic investigations.

Activities having direct bearing on Skill development/Employability/Entrepreneurship

The acquired knowledge on applied entomology will help the students to develop their entrepreneurial skills that enable the students to become a successful entrepreneur. The knowledge on forensic entomology will help them to get through their employability in forensic department.

Pedagogy

Chalk and Talk, PPT, group discussion, seminar, interaction, quiz, tutorial and virtual labs.

Course designers:

Dr. S. Dinakaran

Dr. R. Eswaran

LESSON PLAN (Total hours: 30)

Unit	Description	Staff Name	Hrs	Mode
I	Types of silkworm		1	Lecture, Chalk and Talk, Interaction, PPT & Group Discussion
	Life history of mulberry silk worm <i>Bombyx mori</i>		1	
	Mountage		1	
	Diseases of silkworm (Pebrine, Muscardine & Flacherie)		3	
			6	
II	Cultivation of mulberry plant		2	Lecture, Chalk and Talk, Interaction, PPT & Group Discussion
	Methods of harvesting		1	
	Methods of preservation		1	
	Role of Central Silk Board in Sericulture		2	
			6	
III	Different species of honey bees		2	Lecture, Chalk and Talk, Interaction, PPT & Group Discussion
	Life history of bees		1	
	Newton's bee hive		2	
	Uses of honey		1	
			6	
IV	Lac insect classification		1	Lecture, Chalk and Talk, Interaction, PPT & Group Discussion
	Life history of lac insects		1	
	Cultivation of lac		1	
	Harvesting and processing of lac		1	
	Composition and uses of lac		2	
			6	
V	Insects of forensic importance		2	Lecture, Chalk and Talk, Interaction, PPT & Group Discussion
	Corpse feeders		1	
	Maggots		1	
	Life cycle analysis		1	
	Role of insects in crime investigation		1	
			6	

Course Learning Outcomes:

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

CLOs	CLO Statements	Knowledge level
CLO-1	Describe the life cycle silkworm, honey bee and lac insects	K2
CLO-2	Outline the rearing techniques of economically important insects.	K3
CLO-3	Examine the rearing and cultivation methods for mulberry	K3
CLO-4	Analyse the uses of products derived from the culture of insects	K4
CLO-5	Investigate the role of insects in Forensic investigation	K4

Mapping with Programme Specific Outcomes of Chemistry

	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	PSO-6	PSO-7	PSO-8
CLO-1	2	2	1		2	2		1
CLO-2	2		3	1	2	3	2	1
CLO-3	2	1	1	3	1	3	1	
CLO-4	2		2	1		1	1	
CLO-5	2	1	2	2	3	3	2	2

3- Advance application; 2- Intermediate level; 1- Basic level

Mapping with Programme Outcomes

	PO-1	PO-2	PO-3	PO-4	PO-5
CLO-1	1	1	1	1	2
CLO-2	2	2	1	1	3
CLO-3	2	2	1	1	3
CLO-4	2	3	1	1	3
CLO-5	2	3	1	2	2

3- Advance application; 2- Intermediate level; 1- Basic level

BLUE PRINT FOR INTERNAL ASSESSMENT - I
Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C (Either/or Choice)	Section D (Open Choice)	Total
			MCQs		Short Answers				
			No. of Questions	K- Level	No. of Questions	K- Level			
1	CLO 1	Up to K2	2	K1& K2	1	K1	2 (K2&K2)	1(K2)	
2	CLO 2	Up to K3	2	K1& K2	2	K2	2 (K3&K3)	2(K2/K3)	
No. of Questions to be asked			4		3		4	3	14
No. of Questions to be answered			4		3		2	2	10
Marks for each question			1		2		5	10	
Total Marks for each section			4		6		10	20	40

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

BLUE PRINT FOR INTERNAL ASSESSMENT - II
Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C (Either/or Choice)	Section D (Open Choice)	Total
			MCQs		Short Answers				
			No. of Questions	K- Level	No. of Questions	K- Level			
1	CLO 3	Up to K3	2	K1& K2	1	K1	2 (K2&K2)	2(K2/K3)	
2	CLO 4	Up to K4	2	K1& K2	2	K2	2 (K3&K3)	1(K4)	
No. of Questions to be asked			4		3		4	3	14
No. of Questions to be answered			4		3		2	2	10
Marks for each question			1		2		5	10	
Total Marks for each section			4		6		10	20	40

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

BLUE PRINT FOR EXTERNAL

Articulation Mapping - K Levels with Course Learning Outcomes (CLOs)

Sl. No	CLOs	K- Level	Section A		Section B		Section C (Either/or Choice)	Section D (Open Choice)
			MCQs		Short Answers			
			No. of Questions	K- Level	No. of Questions	K- Level		
1	CLO 1	Up to K2	2	K1& K2	1	K1	2 (K1&K1)	1(K2)
2	CLO 2	Up to K3	2	K1& K2	1	K1	2 (K2&K2)	1(K3)
3	CLO 3	Up to K3	2	K1& K2	1	K2	2 (K3&K3)	1(K3)
4	CLO 4	Up to K4	2	K1& K2	1	K2	2 (K4&K4)	1(K4)
5	CLO 5	Up to K4	2	K1& K2	1	K2	2 (K3&K3)	1(K3)
No. of Questions to be asked			10		5		10	5
No. of Questions to be answered			10		5		5	3
Marks for each question			1		2		5	10
Total Marks for each section			10		10		25	30

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

Distribution of Section-wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (No Choice)	Section C (Either/or)	Section D (Open Choice)	Total Marks	% of Marks without choice	Consolidated
K1	5	2	10	--	17	14.16	42%
K2	5	8	10	10	33	27.5	
K3	-	-	20	30	50	41.67	42%
K4	-	-	10	10	20	16.67	16%
Total Marks	10	10	50	50	120	100.00	100%