



**University of Kerala**

Discipline	<b>ZOOLOGY</b>				
Course Code	<b>UK3DSEZOO202</b>				
Course Title	<b>Entomology I- General Entomology</b>				
Type of Course	<b>DSE</b>				
Semester	III				
Academic Level	200-299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	3 hours	-	2 hours	5
Pre-requisites	Pass in class XII				
Course Summary	<p>The course on General Entomology provides an understanding on the nature and scope of Entomology and diversity of insects that empower the students to identify the various insects around them and appreciate the diversity of the insect world. They get an understanding of morphological and anatomical features of insects. They understand basic physiological activities going on in insects. This course provides students with essential skills in handling and dissecting insects. Students understand the social life in insects and the different means of communication adopted by insects. Students become enthusiastic about the insects and their mode of living.</p>				

### Detailed syllabus

Module	Unit	Content	45 hrs
		<b>Insect Diversity</b>	<b>6</b>
<b>I</b>	1.1	Nature and scope of Entomology - Economic importance of insects.	2
	1.2	Classification of insects up to order (Brief description of important characters of each order with one example).	2
	1.3	Collection, preservation and culture techniques of insects.	2
		<b>Morphology of Insects</b>	<b>9</b>
<b>II</b>	2.1	Head – Mouthparts in insects (Cockroach, Honey bee). Structure of antenna, Compound eye and mosaic vision.	4
	2.2	Thorax – Wing, its modification and venation, Structure of thoracic leg, Types of legs adapted to diverse habitat.	4
	2.3	Abdomen – Segmentation, Genitalia in male and female.	1
		<b>Anatomy and Physiology of Insects</b>	<b>12</b>
<b>III</b>	3.1	Nutrition – Structure of gut and associated glands.	1
	3.2	Respiration – Spiracles, trachea, tracheoles and air sacs. Respiration in insects.	3
	3.3	Excretion – Malpighian tubules – structure and functioning, Accessory excretory organs (fat body, uricose glands, nephrocytes)	3
	3.4	Circulation – Dorsal vessel and accessory pumping sinuses. Composition of haemolymph.	2
	3.5	Nervous system - Structure and function	1
	3.6	Insect endocrine system – Brain neurosecretory cells, Corpora cardiaca, Corpora allata and Prothoracic gland.	2
		<b>Reproduction and Development in Insects</b>	<b>9</b>
<b>IV</b>	4.1	Male reproductive system and associated glands, Female reproductive system and associated glands.	3
	4.2	Metamorphosis – types and hormonal control.	3
	4.3	Moulting and Diapause	3
		<b>Insect behaviour</b>	<b>9</b>
<b>V</b>	5.1	Social organisation with reference to Honey bee and Termite.	4
	5.2	Communication in insects – Round dance and wagtail dance. Role of pheromones, kairomones and allomones.	5

## References

1. Mani M S (1982). A general textbook of Entomology. Oxford and IBM. New Delhi.
2. Chapman, R.F. The Insects- Structure and function, ELBS Arnold.
3. Modern Entomology, DB Tembhare.
4. Wigglesworth, VB. The principles of insect physiology & LBs, Methemen and Co.Ltd
5. General & Applied entomology, KK Nayar et al.
6. Ananthakrishnan TN (1998). Dimensions of insect plant interactions. Oxford and IBH Pub.Co. Pvt.N.Delhi.
7. Pant, NC. And Ghai (Ed) 1981. Insect physiology and anatomy. Indian Council of Agricultural Research, New Delhi.
8. Imms A D, Richard and Davies: A general textbook of Entomology. Chapman and Hall.
9. Snodgrass, R. E. Principles of insect morphology. Cornell Univ. Press, USA
10. Gullan, P. J. And Cranston, P. S. The insects, An outline of Entomology. Wiley Blackwell, UK.
11. Nation, J. L. Insect Physiology and Biochemistry. CRC Press, USA

## Web Resources

1. Indian Entomologist <https://www.indianentomologist.org>
2. Indian Journal of Entomology <https://www.indianentomology.org>
3. Entomological Society of India [https:// entosocindia.org](https://entosocindia.org)
4. ICAR-Indian agricultural research institute <https://www.iari.res.in>>introduction
5. <https://guides.library.cornell.edu/entomology>
6. <https://guides.uflib.ufl.edu/entomology>
7. <https://feedly.com>>top>entomology
8. <https://science.feedspot.com>>entomology

## Practicum (30hrs)

Sl. No	Contents
1	Mounting and display of mouthparts – Cockroach/ Honey bee/ Butter fly/ Mosquito (any 2)
2	Mounting, Sketching and labelling of antenna in Cockroach/ Honey bee/ Butter fly/ Mosquito (any 2)
3	Dissection and display of alimentary canal and associated glands - Cockroach/ Dysdercus (any 1)
4	Dissection and display of nervous system - Cockroach/ Dysdercus (any 1)
5.	Dissection and display of female reproductive system in Cockroach.
6	Morphological study of various castes of Honey bee/ Termite.
7	Setting up of the Berlese funnel and description of its principle.
8.	Field study on harmful insects and report submission on any 4 common pests.

## References

1. Mani M S(1982). A general textbook of Entomology. Oxford and IBM. New Delhi.
2. General & Applied entomology, KK Nayar et al.
3. Imms A D, Richard and Davies: A general textbook of Entomology. Chapman and Hall.

## **Web Resources**

1. <https://guides.library.cornell.edu/entomology>
2. <https://guides.uflib.ufl.edu/entomology>

## Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Understand about nature and scope of Entomology, diversity of insect world and recollect various insects met with the day today life.	U, R	PSO-1,3
CO-2	Understand the structural peculiarities of insect head, thorax and abdomen.	U, R	PSO-1,3,6
CO3	Create an insight into the various organ systems in insects and basic physiological activities going on in insects.	U, An	PSO- 4,6
CO4	Understand the structure of the reproductive system in insects and remember about the process of metamorphosis and moulting.	U, R	PSO-1,2
CO5	Remember and analyse the social organisation in insects and appreciate the communication methods in insects.	R, An	PSO-2, 4

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: Entomology I- General Entomology  
Credits: 3:0:1 (Lecture: Tutorial: Practical)**

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/Tutorial (T)	Practical (P)
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1.	Understand about nature and scope of Entomology, diversity of insect world and recollect various insects met with the day today life.	PO- 1,2 PSO-1,3	U,R	F,	L	P
2.	Understand the structural peculiarities of insect head, thorax and abdomen.	PO - 1 PSO-1,3,6	R,U	F,P	L	P
3.	Create an insight into the various organ systems in insects and basic physiological activities going on in insects.	PO -1,6 PSO-4,6	U, An	F, P	L	P
4.	Understand the structure of reproductive system in insects and remember about the process of metamorphosis and moulting.	PO -1,2 PSO-1,2	U,R	F,C	L	
5.	Remember and analyse the social organisation in insects and appreciate the communication methods in insects.	PO-1,2,4 PSO-2,4	R,An	F,C	L	

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs**

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1	1	-	2	-	-	-		1	2-	-	-	-	-		
CO 2	1	-	2	-	-	3		2			-	-			
CO 3			-	1	-	2		1			-	-	2		
CO 4	1	2			-	-		1	3						
CO	-	1	-	2				2	2		3				
5															

**Correlation Levels:**

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

**Assessment Rubrics:****Assignment/ Seminar topics**

1. Social organisation in Honey bee/ Termite/ Ants.
2. Communication in insects.
3. Mouth parts in insects.
4. Types of metamorphosis.
5. Role of microbiota in insect digestion.
6. Economic importance of insects.
7. Identification of common pests.

**Continuous Comprehensive Assessment**

1. Quiz
2. Assignment
3. Internal exam
4. Field report

**End Semester assessment**

1. Multiple choice questions
2. Very short answer questions
3. Short answer questions
4. Essay questions
5. Practical examination

**Mapping of COs to Assessment**

	Internal Exam	Assignment/Quiz	Project Evaluation	End Semester Examinations
CO 1		✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓		✓