# Department of Entomology
# Faculty of Agricultural Sciences
## University of the Punjab, Lahore
## Course Outline

| Programme | B.Sc. (Hons) Agriculture (Major: Entomology) | Course Code | ENT-301 | Credit Hours | 3(2-1) |
|---|---|---|---|---|---|
| **Course Title** | **Insect Morphology (Theory)** | | | | |

**Course Introduction**

The course is designed to give insights regarding insect morphology to undergraduate students

**Learning Outcomes**

On the completion of the course, the students will:

1. Understand the comparative morphology of insect organ systems.
2. Understand how the morphology of an organ is related to its function.

| | Course Content | Assignments/Readings |
|---|---|---|
| **Week 1** | **Unit-I**<br>1.1 Introduction | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |
| | **Unit-I**<br>1.2 Integument and its derivatives | |
| **Week 2** | **Unit-I**<br>1.3 Body regions | Dunston P.A. 2004. The Insect Structure, Function and Bio-Diversity |
| | **Unit-I**<br>1.4 Segmentation | |
| **Week 3** | **Unit-I**<br>1.5 Sclerites, sulci and appendages of head | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |
| **Week 4** | **Unit-I**<br>1.6 Sclerites, sulci and appendages of thorax | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |
| **Week 5** | **Unit-I**<br>1.7 Sclerites, sulci and appendages of abdomen | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |

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| **Week 6** | **Unit-I**<br>1.8 Modification of head | Dunston P.A. 2004. The Insect Structure, Function and Bio-Diversity |
| **Week 7** | **Unit-I**<br>1.9..Modification of thorax<br>1.10 Modification of abdomen | Dunston P.A. 2004. The Insect Structure, Function and Bio-Diversity |
| **Week 8** | **Mid-Term Exam** | |
| **Week 9** | **Unit-II**<br>2.1 Endoskeleton and internal organ systems | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |
| **Week 10** | **Unit-II**<br>2.2 Digestive system | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |
| **Week 11** | **Unit-II**<br>2.3 Circulatory system | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |
| **Week 12** | **Unit-II**<br>2.4 Respiratory system | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |
| **Week 13** | **Unit-II**<br>2.5 Nervous system | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |
| **Week 14** | **Unit-II**<br>2.6 Reproductive system | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |
| **Week 15** | **Unit-II**<br>2.7 Exocrine organs<br>2.8 Endocrine organs | Chapman, R. F. 2020. The insects: Structure and Function (5th Ed.). Cambridge University Press. |
| **Week 16** | **Final Term Exam** | |

**Textbooks and Reading Material**

**1.** Beutel, R. G.,Friedrich, F., Yang, Xing-Ke and Ge, Si-Qin. 2014. Insect Morphology and Phylogeny. Walter De Gruyter Inc publisher.

**2.** Chapman, R. F. 2012. The insects: Structure and Function (5th Ed.). Cambridge University Press.

**3.** Dunston P.A. 2004. The Insect Structure, Function and Bio-Diversity. Kalyani Publishers, Ludhiana.

**4.** DuPorte, E. M. 1959. Manual in Insect morphology. Reinhold Press. University of Minnesota, USA.

**5.** Gilbert, L.I., Iatrou, K. and Gill, S. S. 2005. Comprehensive Molecular Insect Science. 2nd edition, Elsevier/Pergamon.

**6.** Kerkut, G.A. and Gilbert, L.I. 1985. Comprehensive Insect Physiology, Biochemistry and Pharmacology. Vols. 1-12, Pergamon Press, Oxford, New York, Toronto, Sydney, Paris, Frankfurt.

**7.** Richard, O.W. and Davies, R.G. 1984. Imm's General Textbook of Entomology, Vol. I, revised. 10th Ed. (Structure, Physiology & Development). Chapman and Hall, London, N.Y.

**8.** Snodgrass, R. 1935. Principles of Insect Morphology. Cornell Univ. Press., U.S.A.


## Teaching Learning Strategies

Lectures, discussions, presentations, quiz and assignments

## Assignments: Types and Number with Calendar

1. Draw and label different body systems of insects (Mid-term)
2. Insect collection and dissection (Final-term)

## Assessment

| Sr. No. | Elements | Weightage | Details |
|---|---|---|---|
| 1. | Midterm Assessment | 35% | Written Assessment at the mid-point of the semester. |
| 2. | Formative Assessment | 25% | Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc. |

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|---|---|---|---|
| 3. | Final Assessment | 40% | Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc. |

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|---|---|---|---|---|---|
| **Course Title** | **Insect Morphology (Practical)** | | | | |

**Course Introduction**

The course is designed to give insights regarding insect morphology to undergraduate students

**Learning Outcomes**

On the completion of the course, the students will:

3. Understand the comparative morphology of insect organ systems.
4. Understand how the morphology of an organ is related to its function.

| | Course Content | Assignments/Readings |
|---|---|---|
| **Week 1** | **Unit-I**<br>1.1 External morphology of a generalized insect/insect integument | |
| **Week 2** | **Unit-I**<br>1.2 Insect dissection | |
| **Week 3** | **Unit-I**<br>1.3 comparative study of body regions/slides preparations | |
| **Week 4** | **Unit-I**<br>1.4 comparative morphology of sclerites, sulci and appendages of head | |
| **Week 5** | **Unit-I**<br>1.5 comparative morphology of sclerites, sulci and appendages of thorax | |
| **Week 6** | **Unit-I**<br>1.6 comparative morphology of sclerites, sulci and appendages of abdomen | |

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|---|---|---|
| **Week 7** | **Unit-I**<br>1.3 Modification of thorax<br>1.4 1.8 Modification of abdomen | |
| **Week 8** | **Mid-Term Exam** | |
| **Week 9** | **Unit-II**<br>2.1 Endoskeleton and internal organ systems | |
| **Week 10** | **Unit-II**<br>2.2 Dissection to study digestive system | |
| **Week 11** | **Unit-II**<br>2.3 Dissection to study circulatory system | |
| **Week 12** | **Unit-II**<br>2.4 Dissection to study respiratory system | |
| **Week 13** | **Unit-II**<br>2.5 Dissection to study nervous system | |
| **Week 14** | **Unit-II**<br>2.6 Dissection to study reproductive system | |
| **Week 15** | **Unit-II**<br>2.7 Study of exocrine organs<br>2.8 Study of endocrine organs | |
| **Week 16** | Final-Term Exam | |

**Textbooks and Reading Material**


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**10.** Chapman, R. F. 2012. The insects: Structure and Function (5th Ed.). Cambridge University Press.

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**Teaching Learning Strategies**

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**Assignments: Types and Number with Calendar**

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**Assessment**

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| 4. | Midterm Assessment | 35% | Written Assessment at the mid-point of the semester. |
| 5. | Formative Assessment | 25% | Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc. |
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