

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



Programme	B.Sc. (Hons) Agriculture (Major: Entomology)	Course Code	ENT-303	Credit Hours	3 (2-1)
Course Title	Principles of Insect Taxonomy (Theory)				
Course Introduction					
The course is designed to give insights regarding basic concepts of taxonomic hierarchy, identification, taxonomic characters, variations, taxonomic keys and preparation of taxonomic papers					
Learning Outcomes					
The students would be able to understand the basic concepts of taxonomic hierarchy, identification, taxonomic characters, variations, taxonomic keys and preparation of taxonomic papers.					
Course Content				Assignments/Readings	
Week 1	Unit-I 1.1 Introduction			Wiley, E. O. and Lieberman, B. 2011. Phylogenetics, Theory and Practice of Phylogenetic Systematics, Second Edition John Wiley & Sons, Inc., Publication	
	Unit-I 1.2 History of insect taxonomy				
Week 2	Unit-I 1.3 Functions and concepts of insect taxonomy			Daly, H.V. Doyen, J.T. Purcell, A.H. and Daly, B.B. 1998. Introduction to Insect Biology and Diversity. Oxford University Press.	
	Unit-I 1.4 Tasks of taxonomist				
Week 3	Unit-I 1.5 taxonomic categories			Kitching, I. Forey, P.L. and Humphries, C.J. 1998. Cladistics: Theory and Practice of Parsimony Analysis, Oxford University, Press, UK.	

Week 4	Unit-I 1.6 taxonomic procedures	Wiley, E. O. and Lieberman, B. 2011. Phylogenetics, Theory and Practice of Phylogenetic Systematics, Second Edition John Wiley & Sons, Inc., Publication
Week 5	Unit-I 1.7 collection and methods of sampling	Wiley, E. O. and Lieberman, B. 2011. Phylogenetics, Theory and Practice of Phylogenetic Systematics, Second Edition John Wiley & Sons, Inc., Publication
Week 6	Unit-I 1.8 collection and methods of identification	Kitching, I. Forey, P.L. and Humphries, C.J.1998. Cladistics: Theory and Practice of Parsimony Analysis, Oxford University, Press, UK.
Week 7	Unit-I 1.3 taxonomic characters 1.4 1.10 variations in population	Kitching, I. Forey, P.L. and Humphries, C.J.1998. Cladistics: Theory and Practice of Parsimony Analysis, Oxford University, Press, UK.
Week 8	Mid-Term Exam	
Week 9	Unit-II 2.1 taxonomic descriptions	Kitching, I. Forey, P.L. and Humphries, C.J.1998. Cladistics: Theory and Practice of Parsimony Analysis, Oxford University, Press, UK.
Week 10	Unit-II 2.2 taxonomic keys	Kitching, I. Forey, P.L. and Humphries, C.J.1998. Cladistics: Theory and Practice of Parsimony Analysis, Oxford University, Press, UK.
Week 11	Unit-II 2.3 concepts of species	Kitching, I. Forey, P.L. and Humphries, C.J.1998. Cladistics: Theory and Practice of Parsimony Analysis, Oxford University, Press, UK.
Week 12	Unit-II 2.4 kinds of species and phylogenies	Wiley, E. O. and Lieberman, B. 2011. Phylogenetics, Theory and Practice of Phylogenetic Systematics,

		Second Edition John Wiley & Sons, Inc., Publication
Week 13	Unit-II 2.5 preparation of taxonomic papers	Wiley, E. O. and Lieberman, B. 2011. Phylogenetics, Theory and Practice of Phylogenetic Systematics, Second Edition John Wiley & Sons, Inc., Publication
Week 14	Unit-II 2.6 code of zoological nomenclature	Wiley, E. O. and Lieberman, B. 2011. Phylogenetics, Theory and Practice of Phylogenetic Systematics, Second Edition John Wiley & Sons, Inc., Publication
Week 15	Unit-II 2.7 introduction to numerical and molecular taxonomy 2.8 phenetics, cladistics	Daly, H.V. Doyen, J.T. Purcell, A.H. and Daly, B.B. 1998. Introduction to Insect Biology and Diversity. Oxford University Press.
Week 16	Final-Term Exam	

Textbooks and Reading Material

1. Daly, H.V. Doyen, J.T. Purcell, A.H. and Daly, B.B. 1998. Introduction to Insect Biology and Diversity. Oxford University Press.
2. Kitching, I. Forey, P.L. and Humphries, C.J. 1998. Cladistics: Theory and Practice of Parsimony Analysis, Oxford University, Press, UK.
3. Manzoor, F. 2006. Morphometric Studies on Termite Genus *Odontotermes*. Published by, Higher Education Commission, Islamabad.
4. Mayer, E. and Ashlock, P.D. 1991. Principles of Systematic Zoology, 2nd. Ed. McGraw-Hill Inc. New York.
5. Schuh, R. T. and Andrew V. Z. B. 2009. Biological Systematics Principles and Applications. Cornell University Press, Sage House, 512 East State Street, Ithaca, New York, USA.
6. Triplehorn, C.A. and Johnson, N.F. 2005. Borror and DeLong's Introduction to the study of Insects. Brooks Cole. 7th Ed.
7. Wheeler, Q.D. 2008. The New Taxonomy. CRC Press London, New York.

8. Whitfield, J. B. and Purcell, A.H. . 2012. Daly and Doyen's Introduction to Insect Biology and Diversity. Third Edition. Oxford University Press.
9. Winston J., 1999. Describing Species: Practical Taxonomic Procedure for Biologists Columbia University Press USA, pp 512.

Teaching Learning Strategies

Lectures, discussions, presentations, quiz and assignments

Assignments: Types and Number with Calendar

1. Insect phylogenetic systems (Mid-term)
2. Preparation of taxonomic keys (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.
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.

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



Programme	B.Sc. (Hons) Agriculture (Major: Entomology)	Course Code	ENT-303	Credit Hours	3 (2-1)
Course Title	Principles of insect taxonomy (Practical)				
Course Introduction					
The course is designed to give insights regarding basic concepts of taxonomic hierarchy, identification, taxonomic characters, variations, taxonomic keys and preparation of taxonomic papers					
Learning Outcomes					
The students would be able to understand the basic concepts of taxonomic hierarchy, identification, taxonomic characters, variations, taxonomic keys and preparation of taxonomic papers.					
Course Content				Assignments/Readings	
Week 1	Unit-I 1.1 Methods of collection				
Week 2	Unit-I 1.2 Methods of preservation				
Week 3	Unit-I 1.3 Pinning and mounting techniques				
Week 4	Unit-I 1.4 Preparation of taxonomic keys				
Week 5	Unit-I 1.5 Pictorial and dichotomous keys				
Week 6	Unit-I 1.6 Identification of ametabolous insect orders				

Week 7	Unit-I 1.7 Identification of hemimetabolous insect orders	
Week 8	Mid-Term Exam	
Week 9	Unit-II 2.1 Identification of holometabolous insect orders	
Week 10		
Week 11		
Week 12		
Week 13	Unit-II 2.2 Cataloguing and writing descriptions of identified insects	
Week 14	Unit-II 2.3 preparation of phenograms	
Week 15	Unit-II 2.4 Preparation of cladogram 2.5 Preparation of phylogenetic trees	
Week 16	Final-Term Exam	
Textbooks and Reading Material		
<p>10. Daly, H.V. Doyen, J.T. Purcell, A.H. and Daly, B.B. 1998. Introduction to Insect Biology and Diversity. Oxford University Press.</p> <p>11. Kitching, I. Forey, P.L. and Humphries, C.J.1998. Cladistics: Theory and Practice of Parsimony Analysis, Oxford University, Press, UK.</p> <p>12. Manzoor, F. 2006. Morphometric Studies on Termite Genus Odontotermes. Published by, Higher Education Commission, Islamabad.</p>		

13. Mayer, E. and Ashlock, P.D. 1991. Principles of Systematic Zoology, 2nd.Ed. McGraw-Hill Inc. New York.
14. Schuh, R. T. and Andrew V. Z. B. 2009. Biological Systematics Principles and Applications. Cornell University Press, Sage House, 512 East State Street, Ithaca, New York, USA.
15. Triplehorn, C.A. and Jhonson, N.F. 2005. Borror and Delong's Introduction to the study of Insects. Brooks Cole. 7th Ed.
16. Wheeler, Q.D. 2008. The New Taxonomy. CRC Press London, New York.
17. Whitfield, J. B. and Purcell, A.H. . 2012. Daly and Doyen's Introduction to Insect Biology and Diversity. Third Edition. Oxford University Press.
18. Winston J., 1999. Describing Species: Practical Taxonomic Procedure for Biologists Columbia University Press USA, pp 512.

Teaching Learning Strategies

Lectures, discussions, presentations, quiz and assignments

Assignments: Types and Number with Calendar

3. Insect phylogenetic systems (Mid-term)
4. Preparation of taxonomic keys (Final-term)

Assessment

Sr. No.	Elements	Weightage	Details
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.

6.	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.
----	------------------	-----	--