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

Programme	B.Sc. (Hons) Agriculture (Major: Entomology)	**Course Code**	**ENT-305**	**Credit Hours**	3 (2-1)
Course Title	**Insect Ecology (Theory)**				

Course Introduction

The course is designed to give insights regarding insect ecology; insect interactions with different ecological systems

Learning Outcomes

The students should be well versed with the basic concepts of insect ecology, succession, population, ecosystem and insect-ecosystem interactions.

	Course Content	**Assignments/Readings**
Week 1	**Unit-I** 1.1 Overview of insect ecology	Southwood, T.R.E. and Henderson, P.A. 2000. Ecological Methods. 3rd Ed. Blackwell Science..
	Unit-I 1.2 divisions of ecology	
Week 2	**Unit-I** 1.3 habitat and niche	Bourtzis, K. and Miller, T. 2003. Insects Symbiosis. CRC Press.
	Unit-I 1.4 ; intra and interspecific interactions	
Week 3	**Unit-I** 1.5 natural and agro-ecosystems	Bourtzis, K. and Miller, T. 2003. Insects Symbiosis. CRC Press.
Week 4	**Unit-I** 1.6 flow of energy in ecosystem	Bourtzis, K. and Miller, T. 2003. Insects Symbiosis. CRC Press.

Week 5	**Unit-I** 1.7 trophic relations	Southwood, T.R.E. and Henderson, P.A. 2000. Ecological Methods. 3rd Ed. Blackwell Science..
Week 6	**Unit-I** 1.8 food chain, food web concepts	Southwood, T.R.E. and Henderson, P.A. 2000. Ecological Methods. 3rd Ed. Blackwell Science..
Week 7	**Unit-I** 1.3 food mesh concepts 1.4 1.10 ecological succession	Southwood, T.R.E. and Henderson, P.A. 2000. Ecological Methods. 3rd Ed. Blackwell Science..
Week 8	**Mid-Term Exam**	
Week 9	**Unit-II** 2.1 population and its characteristics	Rockwood, L.L. 2006. Introduction to Population Ecology. Wiley, John & Sons.
Week 10	**Unit-II** 2.2 population natality and mortality	Rockwood, L.L. 2006. Introduction to Population Ecology. Wiley, John & Sons.
Week 11	**Unit-II** 2.3 population migration and dispersal	Rockwood, L.L. 2006. Introduction to Population Ecology. Wiley, John & Sons.
Week 12	**Unit-II** 2.4 density dependent factors	Rockwood, L.L. 2006. Introduction to Population Ecology. Wiley, John & Sons.
Week 13	**Unit-II** 2.5 density independent factors	Southwood, T.R.E. and Henderson, P.A. 2000. Ecological Methods. 3rd Ed. Blackwell Science..
Week 14	**Unit-II** 2.6 introduction to life tables	Southwood, T.R.E. and Henderson, P.A. 2000. Ecological Methods. 3rd Ed. Blackwell Science..
Week 15	**Unit-II** 2.7 Life table analysis 2.8 population diversity indices	Southwood, T.R.E. and Henderson, P.A. 2000. Ecological Methods. 3rd Ed. Blackwell Science..

Week 16	Final-Term Exam

Textbooks and Reading Material

1. Bourtzis, K. and Miller, T. 2003. Insects Symbiosis. CRC Press.
2. Huffaker, C.B. and Robert, L.R. 1984. Ecological Entomology. Wiley Intersciences.
3. Odum, E. P. and Gary W.B. 2005. Fundamentals of Ecology. Thomson Brooks/Cole 10 Davis Drive Belmont, CA 94002 USA
4. Price, P. W., Denno, R.F. Eubanks, M.D. Finke, D.L. and Kaplan, I. 2011. Insect Ecology: Behaviour, Populations and Communities, Cambridge University Press, Cambridge, UK, 801 pages.
5. Rockwood, L.L. 2006. Introduction to Population Ecology. Wiley, John & Sons.
6. Romser, W.S. and Stoffolano, J. G. 1998. The Science of Entomology. 4th Edition, WCB McGraw-Hill.
7. Schowalter, T.D. 2006 Insect Ecology: An Ecosystem approach. 2nd Ed. Press is an imprint of Elsevier.
8. Southwood, T.R.E. and Henderson, P.A. 2000. Ecological Methods. 3rd Ed. Blackwell Science.
9. Symondson, W.O.C. and Liddell, J.E. 1996. The Ecology of Agricultural Pests, Biochemical Approaches. Chapman and Hall, London, UK.
10. Vandermeer, J.H. and Goldberg, D.E. 2003. Population Ecology: First Principles, Princeton University Press.
11. Yazdani, S.S. and Agarwal, M.I. 1997. Elements of Insect Ecology. Narosa Publishing House, New Delhi..

Teaching Learning Strategies

Lectures, discussions, presentations, quiz and assignments

Assignments: Types and Number with Calendar

1. Construct life-table of any hemimetabolus insect (Mid-term)

2. Construct life-table of any holometabolus insect (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.

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Programme	B.Sc. (Hons) Agriculture (Major: Entomology)	Course Code	ENT-305	Credit Hours	3 (2-1)
Course Title	**Insect Ecology (Practical)**				

Course Introduction

The course is designed to give insights regarding insect ecology; insect interactions with different ecological systems

Learning Outcomes

The students should be well versed with the basic concepts of insect ecology, succession, population, ecosystem and insect-ecosystem interactions.

	Course Content	Assignments/Readings
Week 1	**Unit-I** 1.1 Maintenance and measurement of temperature with different intruments	
Week 2	**Unit-I** 1.2 Maintenance and measurement of light with different intruments	
Week 3	**Unit-I** 1.3 Maintenance and measurement of humidity with different intruments	
Week 4	**Unit-I** 1.4 Maintenance and measurement of wind with different intruments	
Week 5	**Unit-I** 1.5 Study of insect incubators	
Week 6	**Unit-I** 1.6 Study of growth chambers	

Week 7	**Unit-I** 1.7 Rearing of insect pests to study the effect of abiotic factors	
Week 8	**Mid-Term Exam**	
Week 9		
Week 10	**Unit-II** 2.1 population natality and mortality	
Week 11	**Unit-II** 2.2 population sampling techniques	
Week 12	**Unit-II** 2.3 Active sampling	
Week 13	**Unit-II** 2.4 Passive sampling	
Week 14	**Unit-II** 2.5 Estimation and construction of life tables	
Week 15	**Unit-II** 2.6 Life table analysis 2.7 Use of life table data in pest management	
Week 16	**Final-Term Exam**	

Textbooks and Reading Material

12. Bourtzis, K. and Miller, T. 2003. Insects Symbiosis. CRC Press.

13. Huffaker, C.B. and Robert, L.R. 1984. Ecological Entomology. Wiley Intersciences.

14. Odum, E. P. and Gary W.B. 2005. Fundamentals of Ecology. Thomson Brooks/Cole 10 Davis Drive Belmont, CA 94002 USA

15. Price, P. W., Denno, R.F. Eubanks, M.D. Finke, D.L. and Kaplan, I. 2011. Insect Ecology: Behaviour, Populations and Communities, Cambridge University Press, Cambridge, UK, 801 pages.

16. Rockwood, L.L. 2006. Introduction to Population Ecology. Wiley, John & Sons.

17. Romser, W.S. and Stoffolano, J. G. 1998. The Science of Entomology. 4th Edition, WCB McGraw-Hill.

18. Schowalter, T.D. 2006 Insect Ecology: An Ecosystem approach. 2nd Ed. Press is an imprint of Elsevier.

19. Southwood, T.R.E. and Henderson, P.A. 2000. Ecological Methods. 3rd Ed. Blackwell Science.

20. Symondson, W.O.C. and Liddell, J.E. 1996. The Ecology of Agricultural Pests, Biochemical Approaches. Chapman and Hall, London, UK.

21. Vandermeer, J.H. and Goldberg, D.E. 2003. Population Ecology: First Principles, Princeton University Press.

22. Yazdani, S.S. and Agarwal, M.I. 1997. Elements of Insect Ecology. Narosa Publishing House, New Delhi.

Teaching Learning Strategies

Lectures, discussions, presentations, quiz and assignments

Assignments: Types and Number with Calendar

3. Construct life-table of any hemimetabolus insect (Mid-term)
4. Construct life-table of any holometabolus insect (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.