

DEPARTMENT OF BIOLOGY
College of Arts and Sciences
University of the Philippines Manila

BIO 174. Entomology

A. Course Catalogue Description

1. Course Code: BIO 174

2. Course Title: **Entomology**

Course Description: : A study of the biology of insects, focusing on their taxonomy, morpho-physiology, life cycles, ecosystem roles and relevance to human society.

3. Prerequisite: BIO 116

5. Semester Offered: First Semester, Second semester

6. Course Credit: 3.0

7. Number of Hours: 2 hours lecture, 3 hours laboratory per week

8. Meeting Type: Lecture, laboratory and field exercises

9. Course Goals: To instill knowledge of insect biology among students and prepare them in the practice of handling and maintaining specimens for collection and research purposes.

B. Rationale

Insects comprise the largest class of organisms in the animal kingdom, and as such have many roles in various ecosystems, often serving as drivers of several natural processes. They are relevant to human culture because of their importance as food sources, disease vectors, keystone species or environmental facilitators, biological indicators, and even as scientific test subjects. An understanding of insect biology and its diversity is important as

31 to acquire substantial knowledge in formulating concepts or guidelines for how human beings can utilize, manipulate or maintain these organisms in
32 different fields of discipline such as agriculture, medicine, environmental management and research.

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C. Course Outline

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1. Course Outcomes (CO)

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By the end of the course, the student should be able to:

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CO 1. Describe the evolutionary history of the insect class

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CO 2. Relate insect morphology and physiology to their adaptations in diverse environments

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CO 3. Apply analytical thinking in conceptualizing means of utilizing and manipulating insects as model animals in different fields of research.

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CO 4. Develop practical skills in the collection, handling and maintenance of preserved or live specimens for study purposes.

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2. B.S. Biology Generic Program Learning Objectives:

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1. Develop a mindset for lifelong learning in pursuit of excellence with a global perspective

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2. Demonstrate adaptability, professionalism, and ethical behavior in the workplace

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3. Foster social and environmental responsibility to build a healthy community

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B.S. Biology Specific Program Learning Objectives:

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1. Demonstrate knowledge and comprehension in the core areas of biology (from molecules to ecosystems)

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2. Apply critical, analytical, and integrative thinking to biological problem

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3. Employ the scientific method to design and ethically conduct biological research that contributes to addressing national and global issues on

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environment and health

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4. Effectively communicate biological ideas in both written and oral form, and through the use of various media

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Mapping of BIO Course Outcomes vis-à-vis Program Outcomes:

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BIO 174 Course Outcomes After completing Bio 174 (Entomology) the student shall be able to:	Generic Objectives			Specific Objectives			
	P01	P02	P03	P04	P05	P06	P07
1. Describe the evolutionary history of the insect class	X			X			
2. Relate insect morphology and physiology to their adaptations in diverse environ in diverse environments	X	X		X	X		
3. Apply analytical thinking in conceptualizing means of Utilizing and manipulating insects as model animals in different fields of research	X	X	X	X	X	X	X
4. Develop practical skills in the collection, handling and maintenance of preserved or live specimens for study purposes.	X	X	X	X	X	X	X

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3. Course Content

Lecture Topics	Laboratory Exercises
I. Arthropod evolution and insect diversity A. Origin and diversity of Arthropods B. Taxonomy of the insects 1. Naming and Classifying insects 2. General Body Plan 3. Key to the orders of insects	1. Identifying different dipteran larval stages and rate of metamorphosis at different temperatures/other conditions 2. Identifying different Blattarian larval stages and effectiveness of chemical and mechanical deterrents
First Long Exam	
II. Insect Anatomy and physiology A. The Integument	3. Identifying hemipteran species and documentation of feeding pairs (organism to plant)

<p>B. Muscular system and Locomotion C. Nervous and Sensory systems D. Gas Exchange and Circulation E. Food intake, Utilization and Excretion F. Hormonal regulation</p>	<p>4. Identify species and comparison of urban and forest species of thysanurans 5. Identify species and colony behaviour of isoptera</p>
<p>Second long exam</p>	<p>6. Identify species and different life stages of lice.</p>
<p>III. Reproduction and development 1. Reproductive systems 1. Male and female structures 2. Mating behavior 2. Insect ontogeny and post-embryonic development</p>	<p>7. Identify species and different life stages (collected specimens) of lepidoptera 8. Identify species and colony behavior (within and between) hymenoptera</p>
<p>IV. Ecology and social impacts 1. Effects of Abiotic factors 1. Temperature and light 2. Moisture 3. Weather 2. Biotic influences 1. Trophic relationships 2. Insect-plant relations 3. Intra- and interspecific interactions B. Beneficial insects C. Pest control</p>	<p>9. Identify species and different life cycle of coleoptera.</p>
<p>Third long exam</p>	

4. Course Coverage

Week	Intended Learning Outcomes	Topic	Essential questions	Suggested Teaching and Learning Activities	Assessment Tasks
1 to 4	<p>1. To describe the basic features of the arthropod body plan and its evolution.</p> <p>2. To apply taxonomic concepts in identifying insects and organising their phylogenies.</p>	<p>I. Arthropod evolution and insect diversity</p> <p>A. Origin and diversity of Arthropods</p> <p>B. Taxonomy of the insects</p> <p>1. Naming and Classifying insects</p> <p>2. General Body Plan</p> <p>3. Key to the orders of insects</p>	<p>What are the similarities and modifications of the insect body plan from the generalized arthropod form?</p> <p>What are some the basic features by which diverse insects are categorized in taxonomy?</p>	<p>Lecture</p> <p>Assignments</p> <p>Specimen observations</p> <p>Film showing</p>	<p>Long Exam</p> <p>Quizzes</p> <p>Worksheets /Assignments</p>
5 to 8	<p>2. To relate the different structures/organ systems of insects with their function and behavior in diverse environments.</p>	<p>II. Insect Anatomy and physiology</p> <p>A. The Integument</p> <p>B. Muscular system and Locomotion</p> <p>C. Nervous and Sensory systems</p> <p>D. Gas Exchange and Circulation</p> <p>E. Food intake, Utilization and Excretion</p> <p>F. Hormonal regulation</p>	<p>How have the different structural and functional features of the insects contributed to their success on a local and global scale?</p>	<p>Lecture</p> <p>Assignments</p> <p>Specimen observations and collection</p>	<p>Long Exam</p> <p>Quizzes</p> <p>Worksheets /Assignments</p>
9 to 12	<p>3 To describe the diverse processes involved in the development and life cycles of different insect groups</p> <p>4. To nalyze how developmental strategies play a part in the survival of the insects..</p>	<p>III. Reproduction and development</p> <p>A. Reproductive systems</p> <p>1. Male and female structures</p> <p>2.Mating behavior</p> <p>B. Insect ontogeny and post-embryonic development</p>	<p>How do the reproductive features of insects relate to their life cycles?</p> <p>What are the basic differences in the developmental processes among insects with direct and indirect development?</p> <p>How are the postdevelopmental traits of insects influences by variables in their earlier stages?</p>	<p>Lecture</p> <p>Assignments</p> <p>Specimen observations</p> <p>Film showing</p>	<p>Long Exam</p> <p>Quizzes</p> <p>Worksheets /Assignments</p>
				Lecture	Long Exam

13 to 16	<p>4. To present models of how insect populations influence and are influenced by abiotic and biotic factors in the environment.</p> <p>5. To apply concepts of insect biology in deqs</p>	<p>IV. Ecology and social impacts</p> <p>A. Effects of Abiotic factors</p> <ol style="list-style-type: none"> 1. Temperature and light 2. Moisture 3. Weather <p>B. Biotic influences</p> <ol style="list-style-type: none"> 1. Trophic relationships 2. Insect-plant relations 3. Intra- and interspecific interactions <p>C. Beneficial insects</p> <p>D. Pest control</p>	<p>What are the most common ecological roles performed by members of the insect class?</p> <p>How do abiotic and biotic factors impact the abundance and distribution of the insects?</p> <p>What are some of the benefits and disadvantages brought about by insects that have impacted human culture?</p> <p>What are guidelines necessary in the practical control and maintenance of insect populations?</p>	<p>Assignments</p> <p>Specimen collection and observations</p> <p>Video</p>	<p>Quizzes</p> <p>Worksheets /Assignments</p>
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5. Course Requirements

Lecture

Long examinations (65%). There will be three(3) lecture exams to assess student learning, one for every two units of the course.

Group Assignments (20%). The class will be divided into groups. Each group will be given assignments related to topic content currently discussed in class.

Report (15%). Students will work in pairs to present an oral/written report on a preassigned topic.

Laboratory

Laboratory examinations (60%) At least two examinations pertaining to biological systematics will be held as an assessment tool.

Exercise worksheets (20%). Completion of laboratory worksheets as an assessment tool in the performance of pre-assigned exercises.

Quizzes (10%). Holding quizzes will prepare students as to the nature and scope of test questions that could be potentially given during laboratory exams.

Group project (10%). Students in class will participate in a project demonstrating practical relevance of the course.

D. References:

(Faculty may draw their reading requirements from this list or may add their own)

1. Barnes, E. and R. Ruppert. 1991. Invertebrate Zoology. Saunders College, U.S.A.
2. Gillot, C. 2005. Entomology. Third Edition Springer, Ltd. USA..

E. Course Policies:

1. Long Examinations
 - a. All exams are departmental. Exams are scheduled at the beginning of the semester and will only be rescheduled in cases of extreme weather and holiday declarations.
 - b. No make-up exams will be given. Students who miss any exam (lecture or laboratory) for a valid reason will automatically take the Final Exam at the end of the semester, provided that the student presents a valid excuse slip (medical certificate from UP Health Service only) not later than two weeks from the student's return from absence. The grade of the Final Exam will take the place of the missed exam. If the student's absence is not excused, the student receives a zero for the missed exam.

2. Final Examinations
 - a. A comprehensive final examination will be given at the end of the semester and will cover lessons from both the lecture and laboratory parts. It will comprise 20% of the final grade for the course.
 - b. A student who incurs a grade of **54% or below** in either lecture or laboratory component will automatically get a grade of **5.0** in the course.
 - c. A student may be exempted from taking the final examination under the following conditions:
 - No missed examination
 - Pre-final grade is **2.5 (70%) or better**
 - d. Computation of final grades will be as follows: 80% (pre-final grade) + 20% (final exam score)
 - If the combined pre-final grade and final exam score is 60 or better, then the student passes the course.
 - If the combined pre-final grade and final exam score is 54 or below, then the student fails the course.
 - If the combined pre-final grade and final exam score falls between 55-59, the student gets a grade of 4.0 and will be allowed to take a removal exams if she/he has no excessive absences in both lecture and laboratory.

3. Class Rules
 - a. Mobile phones and other electronic gadgets must be turned off or put into silent mode during class hours. Making calls and sending text messages are strictly prohibited. However, important calls or text messages may be sent or accepted outside the classroom.
 - b. Eating and drinking are not allowed during class hours.
 - c. A monitor is assigned for each laboratory period. They are responsible for signing out all material and equipment for the laboratory exercise.
 - d. All unkept and unlabeled samples and set-up will be discarded.
 - e. All flora and faunal samples (both laboratory and field setting) must be handled with utmost respect and care. Faunal samples must be released back in the wild.
 - f. All equipment and instruments must be cleaned and returned to the stockroom at the end of each laboratory/field class/exercise. Laboratory rooms must be cleaned as well after class.
 - g. Students who fail to comply with any of these rules will receive demerits in their pre-final grade.
 - h. CHEATING in any form, whether premeditated or not, automatically merits a grade of 5.00 for the course.

University Grading Scale:

93 – 100	1.00
90 – 92 -	1.25
87 – 89 -	1.50
84 – 86 -	1.75
80 – 83 -	2.00
75 – 79 -	2.25
70 – 74 -	2.50
65 – 69 -	2.75
60 – 64 -	3.00
55 – 59 -	4.00
54 and below -	5.00

F. List of faculty members who will handle the course

Miriam P. de Vera, Ph.D.
Samuel M. Go, M.Sc.
Melody Anne B. Ocampo, M.Sc.
Glenn L. Sia Su, Ph.D.
Myra S. Mistica, M.Sc.