

Syllabus for General Entomology AG/BI 345 - Fall 2015

October 4, 2015

1 Place and Time

Labs and lectures will take place in ALS 124, which is the teaching lab in the Agriculture and Life Sciences Building.

- Lectures: Tuesdays and Thursdays, 11:00-12:20
- Labs: Mondays 12:30-3:20

2 Instructor and Contact Information

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- Office hours: by appointment

3 Course Description (from the UoG Catalog)

This course is an overview of insect biology with emphasis on fundamental problems encountered by insects, and the structural and functional adaptations used to overcome these problems. The laboratory focuses on insect identification. An insect collection is required. The course meets for three hours of lecture weekly. Prerequisites: BI157-157L or AG109 or AG281.

4 Required Text Book

Borror, D. J. and R. E. White 1970. A Field Guide to Insects. Houghton Mifflin ISBN 0-395-91170-2.

5 Curricular Mapping

5.1 Institutional Learning Objectives (from the UoG Catalog)

Some of the expected fundamental knowledge, skills, and values that the University of Guam student will have demonstrated upon completion of any degree are:

1. Mastery of critical thinking and problem solving
2. Mastery of quantitative analysis
3. Effective oral and written communication
4. Understanding and appreciation of culturally diverse people, ideas, and values in a democratic context
5. Responsible use of knowledge, natural resources, and technology
6. An appreciation of the arts and sciences
7. An interest in personal development and lifelong learning

5.2 Program Learning Objectives (from the UoG Catalog)

5.2.1 Learning Objectives for Agriculture Students

Disciplinary Knowledge: Graduates apply their agricultural knowledge and skills in the production of agricultural products using best management practices and addressing locally important issues such as island pocket economies, conservation, invasive species and endangered species problems. They use their knowledge and understanding of scientific concepts to diagnose and solve problems in agricultural fields.

1. Quantitative Skills: Graduates apply numerical methods in research design, financial analysis, pesticide and fertilizer application, irrigation and field setup and use computers for analysis of data and preparation of reports of results.
2. Research/laboratory skills: Graduates are competent in basic laboratory procedures and safety in the laboratory and the field. Students will develop applied thinking skills to help them formulate testable hypotheses and create effective experimental designs.

3. **Communication Skills:** Graduates can gather and assess evidence and use it to create effective lab and scientific reports, and oral presentations. They will develop the ability to identify, summarize and effectively communicate current issues to given audiences.
4. **Technological Literacy:** Graduates are competent at applying technological skills to their chosen work. They are also competent in the use of analog and digital equipment used in modern agricultural systems. Graduates effectively judge the usefulness and appropriateness of existing and new technologies in their professional endeavors.
5. **Professionalism:** Graduates work effectively together in teams in laboratory, community and field settings while following ethical principles in analysis and communication. Graduates apply their gained knowledge in addressing natural resource and social issues.

5.2.2 Learning Objectives for Biology Students

Disciplinary knowledge and skills: Graduates use their knowledge and understanding of essential concepts to solve problems in ecology, genetics, molecular biology, systematics, and evolution. They can apply their biology knowledge and skills to locally important issues such as island biogeography, conservation, and endangered species problems. They apply relevant concepts from chemistry and physics to biology problems.

1. **Quantitative skills:** Graduates apply numerical methods in research design, and use computers for analysis manipulating and modeling biological data.
2. **Research/laboratory skills:** Graduates are competent in basic biology procedures and safety in the laboratory and the field; they formulate testable hypotheses and create effective experimental designs using their knowledge, understanding, and practical experience of scientific instruments.
3. **Communication skills:** Graduates use scientific literature and diagrams as a source of information, properly cite sources and avoid plagiarism, and create text and graphics to communicate results effectively through print and oral presentations. They collect and assess evidence and use it to create effective arguments in writing scientific reports and proposals.
4. **Digital Literacy:** Graduates use and process information in multiple formats via computer. Graduates are competent in the following computer skills as related to their science work: desktop competencies, word processing, presentation, and data retrieval and manipulation. Graduates effectively judge the usefulness and accuracy of external sources of information.
5. **Professionalism:** Graduates work effectively together in teams in a laboratory and field settings and follow ethical principles underlying scientific research and pub-

lication. Graduates understand and apply the values and limitations of scientific research in addressing public policy issues.

5.3 Student Learning Outcomes for AG/BI 345

Upon completion of AG/BI 345, General Entomology:

1. Students will be able to accurately identify any insect on Guam to the taxonomic level of Order and in most cases to Family.
2. Students will be familiar with the behavior and biology of common insects on Guam.
3. Students will know how to collect insects and preserve them as museum quality specimens with proper labeling.
4. Students will have an understanding of the importance of insects in ecosystem function.
5. Students will be aware of negative impacts of invasive species on Guam's ecosystems and economy and will be certified as First Detectors by the National Plant Diagnostics Network.
6. Students will know how to find detailed information on insects in online resources and in the scientific literature.

6 Schedule

6.1 Lecture Schedule

1. Introduction to Entomology - August 20
2. Insect Biodiversity and Taxonomy - August 25
3. Insect Biodiversity in Micronesia - August 27
4. Invasion of the Land - September 3
5. External Insect Morphology - September 8
6. Internal insect Morphology - September 10
7. Metamorphosis - September 15
8. Insect Orders with Complete Metamorphosis - September 27
9. Guest Lecture (Roland Quitugua): Coconut Rhinoceros Beetle - September 22

10. Guest Lecture(Jesse Bamba): Insect Pests of Agriculture on Guam - September 24
11. Insect Orders with Incomplete Metamorphosis I - September 29
12. Insect Orders with Incomplete Metamorphosis II; Review for Exam 1 - October 1
13. Exam 1 - October 6
14. Insect Ecology – Population Dynamics - October 8
15. Insect Ecology – Predator-prey relationships and biological control - October 13
16. Insect Ecology – Semiochemicals - October 15
17. Insect Ecology – Social Insects - October 20
18. Insect Ecology – Pollination - October 22
19. Insect Ecology – Mimicry - October 27
20. Insect Invasions on Guam I - October 29
21. Insect Invasions on Guam II - November 5
22. First Detector Training; Review for Exam 2 - November 10
23. Exam 2 - November 12
24. Economic Entomology and Pest Control - November 17
25. Urban Entomology - November 19
26. Medical Entomology - November 24
27. Forensic Entomology - November 26
28. Insects as a Human Food Source - December 1
29. Silk - December 3
30. Review for Exam 3 - December 10

6.2 Lab Schedule

1. August 24 - Intro to insect collecting – tools of the trade
2. August 31 - Special techniques – spreading moths and butterflies; pointing small insects
3. September 07 - Independent work on collection
4. September 14 - Independent work on collection
5. September 21 - Independent work on collection
6. September 28 - Independent work on collection
7. October 05 - Insect Photography
8. October 12 - Proposals for Research Projects
9. October 19 - Field Trip to Yigo Ag. Expt. Stn.
10. October 26 - Independent work on collection and/or research project
11. November 02 - Independent work on collection and/or research project
12. November 09 - Independent work on collection and/or research project
13. November 16 - Independent work on collection and/or research project
14. November 23 - Research Project Presentations
15. November 30 - Independent work on collection
16. December 07 - Turn in Collections for Grading

7 Grading

Activity	Date/Deadline	Maximum Points
Exam 1	October 6	15
Exam 2	November 12	15
Exam 3	TBD	15
Research Project - written report	November 23	10
Research Project - oral presentation	November 23	5
First Detector Training	December 7	5
Insect Collection	December 7	35
Total		100

8 Course Guidelines

8.1 Course Web Site

- All handouts and other course resources will be available on the Ag/BI 345 web site at <http://guaminsects.net/AGBI345SITE>.

8.2 Examinations

- Examinations are cumulative, meaning that you may be asked questions on any topics covered between the start of the course and the date of the exam.
- All exams are 'open book' and you are free to use digital devices and online resources.
- Part of each exam will be spent identifying insect specimens.

8.3 Research Project

- Research projects will be done by teams of 1, 2 or 3 people.
- Each team will make an oral presentation to propose their project during the October 12 lab period.
- Each team will submit a written research report and make an oral presentation during the November 23 lab period.

8.4 First Detector Training

During this course you will learn about impacts of invasive species on Guam and other islands. You will be trained and certified as 'First Detector' via a lecture and completion of online training modules provided by the National Plant Diagnostics Network at <https://firstdetector.org/static/index.html>.

8.5 Insect Collection

- You will be required to collect, preserve at least 35 insect species, with species from at least ten orders.
- We will not collect immature insects and soft bodied specimens which must be preserved in alcohol.
- We will use an iNaturalist project at <http://www.inaturalist.org/projects/ag-bi-345-f15> to record data for each specimen in the collection. I will provide software to print a catalog and pin labels.

- Collect adults only; spread Lepidoptera wings and mount minute insects on paper points
- You will receive a maximum of 35 points for your collection. You will get one point for each specimen which:
 - is properly preserved (moths and butterflies spread; insects too small to pin on paper points)
 - has an observation record in iNaturalist
 - points will not be given for specimens which do not comply to the above items
 - points will not be given for duplicate specimens with the same species