General Entomology, ENTOM 343 [M]
3 Credit Hours
Fall 2015
T/R 10:35-11:50
Todd 320

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Prerequisites: BIOL 106, 107, or permission from the instructor

Course Webpage: http://www.nabitylab.org/teaching.html
All course handouts (e.g., syllabus, schedule), articles, and assignments are available on the website. In-class assignments will be posted after they occur.

Text REQUIRED: Gullan & Cranston, 2014. The Insects: An Outline of Entomology. 5th Edition. Wiley-Blackwell. ISBN: 978-1-4443-3036-6 (Available at The Bookie)

Text OPTIONAL: Borror & White. 1998. A Field Guide to Insects: America North of Mexico. Houghton Mifflin Harcourt. (Available at The Bookie)

Course Overview: General Entomology is a three credit, M-course introducing students to the biology of insects. Lectures will cover insect function and form by examining diversity, ecology, physiology, natural history, and behavior. Lectures will coincide with assignments and activities designed to think critically about insect biology from a diversity of perspectives. To fulfill the [M] designation, students will write a one-page News and Views style critique and choose an entomological topic for a longer research paper, which will be revised for credit prior to turning in a final copy.

For more information on the Writing in the major [M] course requirement, see
http://universitycollege.wsu.edu/units/writingprogram/units/writingdisciplines

Students are encouraged to refer to the academic calendar often to be aware of critical deadlines throughout the semester. The academic calendar can be found at:
http://catalog.wsu.edu/General/AcademicCalendar/

Course Objectives

1. Instill and expand a student's comprehensive understanding of insect biology
2. Expose students to the complexity of insect biology
3. Provide activities to stimulate critical scientific thought and problem solving for current issues in insect biology

Student Learning Outcomes, Knowledge, & Skill Development

Upon successful completion of this course students will be able to:

1. Use discipline specific definitions and terminology to explain insect biology
2. Identify the key groups of arthropods and insects
3. Communicate clearly, concisely, and effectively on a specialized topic within insect biology
4. Discuss the integration of various disciplines associated with insect biology;
5. Assess, value and discuss varying perspectives on issues related to insect biology
6. Assess, value and discuss current problems in insect biology and use sources and data to demonstrate this

This course fulfills six of the seven learning goals of the baccalaureate as outlined by university http://ugr.wsu.edu/faculty/7goals.html including: Critical & Creative Thinking, Quantitative Reasoning, Scientific Literacy, Information Literacy, Communication, and Depth Breadth and Integration of Learning

Expectations, Evaluation & Grading: Mutual respect and effort are essential components of success and are expected of everyone. Attendance is essential for learning**.** Unless otherwise noted, all assignments should be typed. Students must demonstrate an understanding of terminology, methodologies and issues associated with entomology to successfully complete the course requirements

Assignments & Grading (Also see COURSE SCHEDULE for due dates)

Exams (3 @ 100 points each)	300
Insect ID quizzes (3 @ 50 points each)	150
In-class Activities (6 @ 20 points each)	120
Writing	
News and Views Article	50
Annotated Sources	30
Research Topic Outline	50
Peer Revision Activity	50
Research paper Draft	150
Research paper Revision	100
Total Points	**1000**

Assignments:

1. EXAMS (30%). There will be three exams worth 100 points each.

2. INSECT IDENTIFICATION QUIZZES (15%). A key learning goal of Entom 343 is the identification of important North American arthropod and insect taxa. Three insect identification

quizzes will be used to assess students' ability to recognize key taxa. These quizzes will cover the major insect orders most commonly encountered in North America.

3. IN-CLASS ACTIVITIES (12%). Throughout the semester several short in-class exercises will be proctored to reinforce learning objectives. These exercises will only be available in class and cannot be made up.

4. RESEARCH PAPER & REVIEWER ACTIVITIES (43%). Information processing, synthesis, evaluation, and communication are all essential skills and the Research Paper and associated reviewer activities will support student learning in these areas. Your Research Paper will be a comprehensive review of a specific topic that uses the most up-to-date/current information from peer-reviewed literature. It will be a minimum of 10 pages, double-spaced, 12pt font, which is equivalent to 3000 words. The Research Paper must include in-text citations and a Literature Cited section. You must have at least 10 peer-reviewed publications. You will refine and revise your Research Paper based on in class peer-review and instructor/TA comments. Reviewer Activities will include editing and reviewing other students' Research Paper, reporting back to each other, and writing critiques that will be graded and shared with other students.

RESEARCH PAPER TOPICS:
The following are just a few suggestions for research paper topics. ALL TOPICS will need approval from the instructor and ideas not on this list WILL BE allowed. In each case, specific taxa should be identified to avoid being overly general with a topic. Choosing one or a few taxa (depending on the focus of the paper) will make writing easier.

- Historical significance of an insect (e.g. – typhus & lice in the Napoleonic Wars, Yellow Fever and the building of the Panama Canal, etc.).
- Chemical ecology of a specific insect or arthropod.
- Genetics or genomics of insects as model systems for human health
- Integrated Pest Management or Biological Control of a specific arthropod of your choice in a specific crop/economic situation.
- Predator-prey interactions in managed or natural systems
- Insect management in schools, office, or other publicly inhabited dwellings.
- Speciation in a specific insect taxon.
- Insect symbioses and how they alter host-parasite relationships
- Evolution of specific insect traits.
- Insect sounds and their significance, focusing on a specific insect.
- Insects as disease vectors (choose a specific arthropod vector and disease).
- Insects as food in the 21st Century and beyond.
- Sexual selection or conflict in a specific arthropod group.
- GMO crops and their arthropod targets.
- Medical importance of a specific taxon of insects/arthropods.

5. EXTRA CREDIT. If you miss an in-class activity, or perform less than you prefer on an exam or assignment, or just love insects, then any of the following activities will be accepted for their assigned points:

- Collect and curate (pin and label) 10 insects from at least 5 different orders. 20 points.

See instructor for curation supplies. Must be turned in Prior to Thanksgiving Break (Due by Nov 19, 2015)

- Write a 400-600 word essay on the novelty of an insect trait or life history in the style of Buzzwords: a column produced quarterly by the Entomological Society of America in their American Entomologist journal. Minimum 3 citations required. 30 points. See instructor to confirm topic prior to writing. Must be turned in Prior to Thanksgiving Break (Due by Nov 19, 2015)

Grading Scale:

Grade	Percentage Range
A	90-100
B	80-89
C	70-79
D	60-69
F	<60

Late Penalties: All assignments are **due** at the beginning of class on the due date, without exception. Assignments that are turned in late will be penalized using the following point loss scale:

- Assignments handed in any time other than at the beginning of the class on the due date will receive a 10% penalty.
- For each day (based on a 24 hr scale) past the due date, late assignments will be penalized an additional 10% per day.

WSU Reasonable Accommodation Statement: Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist at 509-335-3417, or online at http://accesscenter.wsu.edu, or via email Access.Center@wsu.edu

WSU Academic Integrity Statement: I encourage you to work with classmates on assignments. However, each student must turn in original work. No copying will be accepted. Students who violate WSU's Standards of Conduct for Students will receive an F as a final grade in this course, will not have the option to withdraw from the course and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions.

WSU Safety: Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors. It is highly recommended that you review the Campus Safety Plan (http://safetyplan.wsu.edu/) and visit the Office of Emergency Management web site (http://oem.wsu.edu/) for a comprehensive listing of university policies, procedures, statistics, and information related to campus safety, emergency management, and the health and welfare of the campus community.

Learning management systems and campus resources: ctlt.wsu.edu, WSU Writing Center, http://www.writingprogram.wsu.edu/units/writingcenter/

News and Views Assignment:
50 points

GOALs: 1) To locate primary literature, 2) read primary literature, 3) and summarize primary literature in popular, layperson-friendly manner.

Please view the following articles online at
http://www.nabitylab.org/teaching.html

1. Insect Fossils
2. Pesticides and Birds
3. Insect Resistance
4. Insect Eyes

Using the above articles as a reference for the style of a News and Views article you are to do the following:

1. Go to one or more of the following journals:
    a. Ecology letters
        i. http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1461-0248
    b. Trends in Plant Sciences, Trends in Ecology and Evolution
        i. http://www.sciencedirect.com/science/journal/01695347
    c. Current Opinion in Insect Science
        i. http://www.sciencedirect.com/science/journal/22145745
    d. Proceedings of the National Academy of Sciences
        i. http://www.pnas.org/content/current

2. Search for an article of your interest
3. Read the article
4. Summarize the article in a News and Views format
    a. Define the problem
    b. Describe the study
    c. Why is this significant
    d. Include the citation

An article should be about 1pg single-spaced, 12pt font or 400-600 words.

Grading:
News and Views Rubric

• Article citation	10
• Page length	10
• Content	30
o Brief summary	(12)
o Significance	(12)
o Grammar/spelling	(6)
Total	**50**

Annotated Sources Assignment
30 points

GOAL: Identify, locate, and summarize primary literature pertinent to your research topic.

Prior to writing your research-based review or synthesis of an insect-related topic you will need to locate sources from the primary literature. These sources will provide evidence for your in-depth assessment and will need to be explained in context with one another in your paper. To help you along with that process this assignment asks that you identify 10 sources from the primary scientific literature[1]. Once you have found 10 sources you will need to prepare a bibliography or literature cited where each source contains the relevant information[2]. You will also need to add a summary statement or two on the importance of each article.

EXAMPLE
Frago, E, Dicke M, Godfray HCJ. 2012. Insect symbionts as hidden players in insect-plant interactions. Trends in Ecology & Evolution 27:705-711
This review examines the current literature on how microbes that live inside insects may regulate how insects alter plants, often to the benefit of the insect host.

[1] What is the primary literature? Examples include research articles in peer-reviewed journals, dissertations and theses, technical reports, and conference proceedings. If you have any doubt your source may not be a primary source, please contact the instructor or TA.

[2] The information required for a citation should include all authors, date, title, journal/source, volume/issue, and page numbers. See the example for reference.

Grading:
Annotated Sources Rubric

• Citation	10
• Consistent formatting (are all citations formatted the same?)	10
• Summary statement	10
Total	**30**

Research Topic Outline
50 points

GOAL: Construct a logical, hypothesis- or problem-based overview of a specific research topic.

You will be writing a lengthy (>10 page; > 3000 words) paper this semester. To help you formalize your ideas prior to writing in the last minute, you will need to prepare an outline of your topic. This outline will be based on 10 sources from the primary literature and contain the following:

- An identifiable hypothesis, problem, or question that specifically relates to your entomological topic.
- A preliminary, logical step-by-step list of how you will introduce, justify, and discuss/review the topic.
- An estimate of the length of each section.

NOTE: Because this is an outline, and you will learn from your peers and the instructors more about your topic and interests as you progress through this class, it is acceptable for your THESIS, the focus of the paper, and your sources to change. It is recommended, however, that you do not change much otherwise you will make more work for yourself.

Grading:
Research topic Outline Rubric

• Sources in Literature Cited Format (minimum 10)	20
• Hypothesis/problem/question	5
• Introduction/Justification with bulleted details	10
• Discussion/Review/Future with bulleted details	10
• Estimated length for each section	5
Total	**50**

EXAMPLE:
Name:
Title: Grape phylloxera as a model system for insect-induced phenotypes

Length Estimate (in Paragraphs)	
	1) Introduction:
	a) What is grape phylloxera?
1	i) Aphid like pest of grapes native to North America
1	b) Why is grape phylloxera important?
	i) Nearly eliminated global grape production
	ii) Still threatens grape production but is managed
	c) How has grape phylloxera become a model system?
1	i) 150 years of study but new evidence shows it induces novel phenotypes
1	ii) Genomic technologies reveal new traits in reciprocal plant-insect interactions
.25	d) THESIS: The aphid-like grape phylloxera, *Daktulosphaira vitifoliae*, once rose to infamy because of its pestiferousness; however new evidence is rapidly transitioning this insect into a model system for understanding how insects manipulate plants.
	2) Discussion
	a) Grape-phylloxera interactions and phenotypes
	i) How does the insect colonize its host?
1	(1) Insect life cycle
1	(2) Induced phenotypes and their significance
	ii) How does the plant respond to the insect?
1	(1) What are compatible vs incompatible plant responses?
1	(2) How are genes regulated in grapes?
1	(3) What functional traits change?
	b) What do model systems do?
1	i) Past: drosophila was the only tractable system
	(1) Human health applications
	ii) Present: sequencing technologies make more systems tractable
1	(1) How do these techniques work?
1	(2) How are these techniques applied to Human health, agriculture, evolution
1	(3) How are these techniques applied to grape-phylloxera interactions?
	3) Future perspectives and synthesis
	a) Do gene-for-gene interactions exist within phylloxerans?
1	i) What are gene-for-gene interactions?
1	ii) Evidence of gene-for-gene interactions with grape phylloxera
1	b) Grape phylloxera as a model for plant manipulation
1	c) Grape phylloxera as an insect model for evolution of endosymbionts

Total ~ 17.25 paragraphs

Peer Revision Assignment
50 points

GOAL: Critically assess student writing of an entomological research topic.

This assignment asks you to critique a peer's writing as it relates to the rubric below. First you will need to write a draft of your Introduction. You will then trade this for a peer's writing in class, read it and assess it prior to the next class, and then discuss your critique briefly in the next class period.

You should grade this assignment for the following:

Grading:
Peer Revision Rubric

• Is the minimum written?	10
• Introduction	35
o Is there a hypothesis/thesis?	(10)
o Is it justified/is the significance set up?	(10)
o Is the overall topic explained?	(10)
o Are the citations current or relevant?	(5)
• Is the grammar/spelling correct?	5
Total	**50**

You will be graded for your assessment based on how well you follow the rubric above, and how critically you assess the written material. You should point out areas that are unclear as written, grammatical and spelling mistakes, or if the material seems off topic from the main thesis. Your assessment will be graded following:

Grading:
Assessment of Peer Revision

• Did you grade the paper for each component of the above rubric?	10
• Did you suggest ways to improve the Introduction?	20
o Or explain why it is appropriate as written	
• Did you check the citations for relevance?	10
• Did you check the grammar/spelling?	10
Total	**50**

Peer Revision Assessment
Author of Article:_____

Reviewer:_____

Is the minimum written? **/10**

Introduction **/35**

Is there a hypothesis/thesis/problem? /(10)
What is it?

Is the hypothesis/problem justified? Is the significance set up? /(10)
Why or why not?

Is the overall topic explained or is information missing? /(10)
Why or why not?

Are the citations current or relevant? /(5)
Why or why not?

Is the grammar/spelling correct? **/5**

******Author Assessment of Peer Review******
You will privately evaluate how helpful this peer review was when you turn in your first draft. The review will be assessed on a scale of 1-10 with 1 being 'not helpful' and 10 being 'helpful'.

Research Paper Draft Assignment (RPDA)
150 points

GOAL: To construct a primary literature (i.e., evidence) based discussion of a current entomological problem or hypothesis.

This assignment (RPDA) asks you to write an evidence-based discussion of a current entomologically themed topic of your choosing. The paper should be ~3000 words or >10 pages (if double spaced, 12pt Times font). The paper will be graded per the following rubric:

Grading:
Research paper Draft Rubric

- Sources explained in text 20
  - Introduction (10)
  - Discussion (10)
- Hypothesis/problem/question 10
  - Is it clearly stated (5)
  - Is it setup by primary literature (5)
- Introduction/Justification 40
  - Do the sources support the topic (5)
  - Is the significance clearly established (5)
    - Why is this an important idea? (10)
  - Is the literature current?
    - Or if not of historical importance? (20)
- Discussion/Review 50
  - Evidence (20)
  - Synthesis of evidence (15)
  - Future perspective or implications (15)
- Grammar/Punctuation 10
- Were student suggestions incorporated? 10
  - Was the Peer Review constructive? 10
    - Rate your review from 1-10 as 'not helpful' (1) or 'helpful' (10)

Total **150**

Research Paper Revision Assignment
100 points

GOAL: To incorporate peer and instructor/TA edits and suggestions in a manner to revise your justification and synthesis of an entomological topic, ultimately crafting a more concise, in-depth, and evidence-based discussion of your topic.

Revisions SHOULD NOT only be corrections of mistakes. The Revision Assignment is your chance to correct previously identified grammatical and spelling mistakes, AND enhance the incorporation of your sources into your discussion, AND improve the clarity of your argument. Revisions SHOULD include these changes to receive full credit. You will be graded following:

Research Paper Revision Rubric

• Were the student suggestions incorporated? If not, include a justification after the Literature Cited	10
• Were the TA/Instructor revisions incorporated?	60
o Introduction content	(25)
o Discussion content	(25)
o Grammar/punctuation	(10)
• Does the paper follow the original **RPDA**?	30
o Introduction as per the **RPDA**	(15)
o Discussion as per the **RPDA**	(15)
Total	**100**