

# GENERAL ENTOMOLOGY SYLLABUS

## Bio 367/ Bio 567– SEM I 2017-2018

**Instructor: Dr. Jamee Hubbard**  
 E-mail: [jhubbard@uwsp.edu](mailto:jhubbard@uwsp.edu)

Office: TNR 339  
 Office Phone: 715-346-2498

**Office Hours: Mon 1-2, Tues 1-2, Wed 11-1, or by appointment**

### Required Supplies:

**Textbook:** Gullan, P. J. and P. S. Cranston. 2014. *The Insects: An Outline of Entomology, 5<sup>th</sup> Edition*. Bookstore Rental.

**For Lab:** Small box (shoe box) to transport insects from home to school, suggested field guide (not required): *Peterson's Field Guides: Insects, Kaufman Field Guide to Insects of North America*

**Course learning outcomes:** By the end of this course, you will have

- Have a broad knowledge of insect biology, including anatomy, physiology, behavior, and ecological niches of some insects that you will commonly encounter
- Be able to identify several common insect orders and many families within those orders, either by site identification, by using key characteristics, or by using a dichotomous key
- Know how to assemble a professionally curated collection
- Have more experience presenting information on a biological topic through oral presentation on an entomological topic of your choice

**Tentative Exams, Assignments, and Points (Projected Points = 995), see information below chart for further details**

Assignment	Points	Grades
Lecture Exams – (3 @ +/-100 pts.)	300	A = 93-100% A- = 90- 92% B+ = 87-89% B = 83-86% B- = 80-82% C+ = 77-79% C = 73-76% C- = 70-72% D+ = 67-69% D = 60-66% F = <60%
Final Lab Exam	120 (+/-)	
Lab Quizzes (8 @ +/-20 pts.)	160	
Mid-term Collection Check	50	
Final Collection	300	
Insect Presentation	65	

- All lecture exams can have a combination of multiple choice, true/false, short answer, and essay; but be aware that the majority of the points on my exams come from short answer and essay. Lab exams typically are short answer but can also have any of the aforementioned combination.
- The final exam is a comprehensive lab practicum. If you have an A- or above at the end of the semester in both lecture exam points and lab quiz points, you may opt out of the final exam.
- ALL LAB QUIZZES ARE COMPREHENSIVE AND WILL LIKELY INCLUDE MATERIAL FROM PREVIOUS UNITS.
- Lab and lecture quizzes and Assignments can be added or deleted at any time at my discretion.
- During presentations, you will lose 10 points (that's 20%) towards your own presentation for EVERY fellow classmate's presentation you miss without discussing your absence with me first.
- Your collection will not raise your grade more than two full letter grades. For example, a student cannot do so poorly in the lecture and lab part of the class that they are earning an F, but then do so awesome on the collection that it raises their grade to an A. This tells me the student is not distributing their time in a way that corresponds to the learning objectives of the class.

**Class Conduct:** I expect good conduct and a high level of respect in the classroom, between you and your peers and between you and me. **Please turn off your cell phones, refrain from texting and casual talking during lectures, lab introductions and discussion, and exams and quizzes.** Cell phones are extremely distracting to me and your fellow students, and of course yourself. Furthermore, having this respectful experience and attitude in class prepares you for the expectations of your future employers. I expect you will attend all peer presentations and listen, rather than working on other school work. Please give your peers the respect you would expect to be given to you. Good conduct does make a difference in determining your final grade.

**Attendance:**

- **Attendance for lecture and lab is mandatory**, and past experience has shown there is a strong positive correlation between the amount of time a student spends in class and her/his final grade.
- Absences for exams, quizzes, and other assignments will be evaluated by me on an individual basis. I put a great deal of thought and time into preparing them, and I do not have the time to give multiple make-up exams and quizzes, so please make a serious effort not to miss exams and quizzes, and *I urge you to discuss it with me ahead of time if you know you will have to miss one.*
- Absences due to religious beliefs will be accommodated according to UWSP 22.03 in the university handbook, providing the student notifies the instructor within the first three weeks of the beginning of class regarding the specific dates she/he will be absent. And sorry, *hunting is not considered a religious belief.* ☺

**Students with Disabilities:** Students with disabilities are welcome and encouraged in this class. You should contact the Office of Disability Services during the first two weeks of the semester if you wish to request specific accommodations. Also, if you have a medical problem (for example, serious migraine headaches that require medical attention) that may cause you to miss class or exams often, then please contact the Office of Disability Services so your professors can be notified appropriately of accommodations that should be made for you. Disability and Assistive Technology Center: 715-346-3365, 609 Albertson Hall (ALB, the library).

**Students' Rights and Responsibilities & Academic Misconduct:** You can find out about your rights and responsibilities as a UWSP community member at <http://www.uwsp.edu/stuaffairs/Documents/RightsRespons/SRR-2010/rightsChap14.pdf>. Any form of cheating, plagiarism, or any misrepresentation of your work will result in a grade of zero (0) points for that test, quiz, or other assignment. In addition, if a person is knowingly assisting someone in cheating, that person will also get a grade of zero (0) points for that test, quiz, or other assignment. You can find out more about academic misconduct on pages 4-9 of the above Community Bill of Rights and Responsibilities electronic link.

**I do not give extra credit assignments on an individual basis. *I would rather that any extra time you may have to do extra credit assignments be put toward your best effort on the scheduled assignments, exams, and quizzes.*** If you are not doing as well as you would like, do not hesitate to come talk to me. Stop by during office hours, call me, or email me, and I will work with you in any way I can to help you get a better grade *on future course work.*

**Devices NOT allowed to be used in class:** Cell phones (have it off your body so you are not distracted by texts or calls), laptops (unless you have permission through me or Disability Services).

**Devices ALLOWED to be used in class:** Audio recording devices (not cell phones), *simple* calculators that do not store text are allowed for exams, word-to-word language translator or paperback translator if English is not your first language (*however, if the device gives definitions, it will not be allowed for exams; clear with me first, please*).

**Presentation Topics (first come first serve basis) – choose one or we can discuss another topic of interest to you**

- Concern, history, and current state of Zika Virus as it relates to mosquitoes and vector-borne diseases
- Colony Collapse Disorder (CCD) in honey bees
- Rare and endangered Wisconsin insects
- History and current state of Emerald ash borer
- Current state of malaria and malaria management/prevention
- Insects as vectors of plant disease in Wisconsin
- Insects used by the military (as weapons, as “friendly forces,” and so on; see: bomb-sniffing wasps)
- Genetically and physically modified insects for insect control
- Regulating pesticides
- Unique/alternative pesticides (like fungi, nematodes, viruses, genetically modified plants)
- Insect commodities
- Insects as food (make sure you bring enough for everybody!)
- Physics of insect flight
- Insect-*inspired* machinery or products (not made from insects) (ex., slippery surfaces, Velcro)
- Insects and hotels/dormitories (like bedbugs)
- Forensic entomology
- Insects as bioindicators
- Insects as biocontrols for invasive plants (big local topic right now)
- Insects in religion and/or mythology
- Ants and fungal relationships
- Insects as medicines
- Insect venom
- Prehistoric insects
- Insects in art and/or poetry
- Insects in children’s literature
- Insects in film
- Insects in music
- Insects in advertising (think Orkin commercials)

## Student Presentation Assignment

### Student Learning Outcomes:

- Students will broaden their understanding of insect biology and, in turn, further their appreciation for the impact insects have on specific human endeavors. Students will also gain more experience presenting on their scientific knowledge to a peer group.

### Task Assignment:

- Students will choose a topic from the list of current entomology topics or insect-human interactions and prepare a **15-25-minute PowerPoint presentation that is based on relevant literature findings**. This presentation is **worth 70 points**. Use of props, the board, group activities, or other presentation tools (e.g., food made from insects) is *encouraged* in order to enhance interest in the presentation and subject identification. **At least one peer-reviewed journal article is to be included among your references, but at least five relevant references should be used for your presentation.** We can discuss alternatives, if you are having difficulty finding peer-reviewed journal article. This article is worth 5 points.
- You must schedule a time to meet with me at least one week prior to your presentation to discuss your ideas and images for your presentation. This meeting is worth 10 points. You should have at least some of your PowerPoint or other presentation materials prepared for the meeting. You must also present your journal article or alternative (discussed with instructor) to me at this point.

### General Presentation Structure

- **Introduction:** Introduce the central topic in an engaging way. Hook the audience right away!
- **Body:** Develop the central topic in a sequence of ideas with supporting detail in each paragraph. Present your evidence in a compelling manner which sustains the audiences' interest throughout the presentation. The body should begin with background information and then continue to historical and current research or activities within the subject.
- **Conclusion:** Restate the thesis of the presentation, emphasizing the importance of the topic.
- **References:** References need to be cited in small print at the bottom of slides that contain newly discussed information. Photo credit must also be given for each photo with a caption in small print below the photo (such as – Photo: URL, or Photo: someone's name). See me if you have questions about how to cite or give photo credit.

### Considerations when you begin organizing your presentation

- **Introduction**
  - How does your topic impact human society or the environment?
  - How does this affect us and why should we care?
- **Body**
  - What types of “products” or “problems” are related to your topic?
  - How has science used your topic?
  - What evidence do you have to support your claims?
  - The reader should gain some important insights on your subject.
- **Conclusion**
  - What are your overall impressions of this topic?
  - What do you want to be the “take home” message of your subject?

See example presentation rubric to help you prepare

## THE INSECT COLLECTION

What you should and shouldn't have in your collection:

- You must turn in a list of specimens along with your collection. The list should be in taxonomic order and contain the lowest taxonomic information from your label. This will serve as my check sheet while grading.
- **Every organisms in your collection must have a collection label (where, when, who) and a taxonomic label (identification). Every insect in your collection must have at least Order level designation in order for it to be counted at all and every non-insect arthropod must have at least Class level designation, but your label should have all taxonomic classifications that you know.**
- The collection must be in taxonomic order, according to the order in which Orders and Families are presented in *Borror and DeLong's Introduction to the Study of Insects, 7<sup>th</sup> Edition* (found in cabinet in lab). Vials can be placed within the regular collection or turned in as a separate collection (either within the same case or in a separate box), but *if this is done, a replica taxonomic label must be placed within the regular collection as a placeholder for where the vial would have gone in the taxonomic group.*
- Your collection must contain a combination of Orders, Suborders, Families, and "species," which I will characterize as specimens within the same family that look significantly different from each other. See me if you are unsure whether two or more specimens are significantly different (grasshoppers, for example). You are not expected to be able to identify to the species level, and in fact it would be difficult for most if you do not have access to an actual species key for that family. The collection is worth 300 points in total and will be tallied according to the point distribution listed under the "Scoring" section.
- The total collection *must* contain at least 10 different orders.
- You may turn in **Families** and **Orders** that are not cover in class as long as they are properly identified. Furthermore, you should try to identify to the Family level covered in *Borror and DeLong's Introduction to the Study of Insects*, even if I do not cover the family level in class. This will provide additional opportunities to get points in your collection and will give you additional practice keying insects. Additional Suborders and Superfamilies or other classifications *not covered in class* will *not* be counted in the final scoring.
- No more than 25 points of your collection can be specimens collected before May 2016.
- No more than 30 points of your collection can be immatures or non-insect arthropods, and they must be correctly identified to Order, Suborder, or Family for immature insects and Class (and Order if you know it) for non-insect arthropods. **See *Borror and DeLong's Introduction to the Study of Insects* for these classifications.**
- No more than 1/3 of the total specimens in your collection can be collected by a classmate (due to trading).
- You *must* collect at least **5 different** examples of insect feeding or damage. (Examples include, but are not limited to: wood alteration/destruction, leaf chewing, leaf mining, leaf stippling, leaf galls, clothes moth damage, stored food damage). For example, you should not have two different types of galls. A typical collection might include, for example: 1 gall, 1 skeletonized leaf, 1 piece of wood with wood-boring, 1 leaf with stippling, and 1 leaf with mining. The evidence must be obviously insect-induced, **oo it must be clearly labeled as to what specific type of feeding or damage it is, and a collection label must be included with the specimen. I also want you to speculate as to what possible orders of insect (or specific insect, if you have that information) did the feeding or damage. It must have a collection label associated with it.** Try to turn at least 3 in with your midterm collection.
- In addition to the above criteria, your collections **must have insect representatives from 20 of the 27 ecological categories listed on the following 2 pages.** Specimens you select from your collection to fulfill those categories should be marked with a separate "ecology" label (I will provide) on the pin or on/with the vial. *You can only use one ecology label for one "species."* If your label goes on a pinned specimen, mount it flush with the bottom of the insect box at a 90 degree angle to the other labels; if it goes with alcohol specimen, pin it to the box below the vial or tape it to the vial; **please do not put it inside the vial with the rest of the labels, as the color from the paper will bleed into the alcohol.**

*Rules for Organizing Your Collection: specimen order*

- Insects and other arthropods should be organized in taxonomic order, **according to the book *Borror and DeLong's Introduction to the Study of Insects*** by Johnson and Triplehorn (provided for in-class use). This goes for any taxonomic level, such as Order, Suborder, Family, and Subfamily.
- If, for a given Order, you have specimens that were identified to Family and some that were not, then place the ones not identified to Family *after* the ones that were identified to family.
- Orders are to be **organized in rows, running left to right, not top to bottom, nor clusters.**

*Rules for Organizing Your Collection: in the display case*

- Insect labels need to be hand-written with alcohol-proof pen *or* printed with a *laser printer* onto heavyweight paper (provided by instructor). I would be glad to print your labels for you if you do not have access to a laser printer. A printer will be provided to you during class times in my research laboratory. **You must NOT use an inkjet printer.**
- Organize your location and identification labels according to the picture in the *Guide to Curating Insects* handout, adjusting them to the correct position relative to the insect.
- Use the provided pinning block to correctly space your specimen and location and identification labels.
- Use insect pins to pin insects (not sewing pins or any other types of pins). Insect pins are supplied by the instructor.
- Insects will be organized into the glass-top insect boxes for final presentation to instructor, but **these boxes stay in the lab.**
- Place a heading label flush to the bottom of the insect box to indicate a new order, and place all insects within that order below or to the right of the label.
- **Position of insects inside the box:** The front of the box has a label-holder; the side that goes into the cabinet first is the back side of the box. *With the exception of point-mounted and minuten pin-mounted insects, all pinned insects should be positioned with their heads toward the back of the box (away from you, if you are standing in front of the box).* The left side of **all** labels should also be facing the back of the box, and that includes the labels for the minuten pin-mounted and point-mounted specimens. Point mounted and minute pin mounted insects are positioned differently, relative to the label (be careful to place point-mounted insects in the correct position on the label – see the *Guide to Curating Insects* handout).
- For alcohol specimens, **all collection and taxonomy labels go in the vial**, preferably back-to-back so that it is easy to read both labels. If more than two labels, allow your location and identification labels to face outward (back-to-back) and the others in-between those two labels. **Eco labels do not go in the vials because they are on colored paper and the color will bleed into the alcohol.**
- Stabilize vials with size 3 insect pins (pin beneath the cap on either side and then one above at bottom of vial) or some other method or place within a separate box inside the display box or in a completely different box, altogether. If you place your vials somewhere else, please place a taxonomic label in the space where the liquid preserved insect would be if it had been included in the regular collection.
- **For alcohol-preserved specimens, all different morphotypes must be placed in separate vials.**

**Ecological categories**

Category	Code for label	Example
Leaf feeding (chewing)	LEAF CHEWING	Grasshopper
Plant sucking	PLANT SUCKING	Aphid
Feeds on vertebrates	VERT. PARASITE	Mosquito
Predator of other insects	INSECT PREDATOR	Dragonfly, lady bird beetles
Parasite on other insects	INSECT PARASITE	Ichneumonid wasp
Aquatic as adults	AQUATIC ADULT	Water boatman
Litter inhabitant	LITTER	Ground beetle
Rotten wood inhabitant	WOOD	Termite, bess beetle

Household pest	HOUSEHOLD	House fly, cockroach
Nocturnally active	NOCTURNAL	Moth
Social insect	SOCIAL	Paper wasp, ant, honeybee
Sound producer	ACOUSTIC	Cricket
Pollinator	POLLINATOR	Honey bee
Aposematic coloration	WARNING COLOR	Yellow jacket
Camouflage coloration	CRYPTIC COLOR	Katydid
Casemaking insect	CASE MAKER	Caddisfly larva
Stem borer	BORER	Corn borer
Soil burrower	SOIL	Solitary beetle, digger wasps
Seed feeder	SEED	Flour beetle
Leaf roller	LEAF ROLLER	Maple leafroller
Aquatic nymph	AQUATIC NYMPH	Mayfly nymph
Batesian mimic	MIMIC	Hover fly
Chemical defenses	CHEM. DEFENSE	Stink bug
Gall inhabitant	GALL	Oak gall wasp
Agricultural pest	AGRIC. PEST	Potato beetle, soybean aphid
Leaf miner	LEAF MINER	Locust leaf miner
Dung or carrion feeder	DUNGCARRION	Dung beetle, carrion beetle
Fungus-feeder	SAPROPHYTE	Fungus beetle

**Scoring:**

The collection is worth 300 points. The points for each category are as follows:

Collection Category	Points
Each correctly identified Order	5
Each correctly identified Family	2
Each correctly identified Superfamily <i>covered in class</i>	2
Each correctly identified Suborder <i>covered in class</i>	1
Each correctly identified non-insect arthropod Class*	5
Each correctly identified non-insect arthropod Order*	5
Each "species" (insect or non-insect) <sup>‡</sup> , if you have correct Order level	0.5
Five different feeding/damage examples	25
Properly labeled, organized, and mounted collection	50
Each Order missing from the minimum of 10 required	-10
Each ecological category missing from the minimum of 20 required	-5
Each missing feeding/damage example missing from the 5 required	-5
Incorrect I.D. of specimens if duplicates within a correctly I.D.'d taxon	-0.25

\*See criteria above for regulations on non-insect arthropods

<sup>‡</sup>**Organism does not need to be identified to species**; this only means that it shall be significantly morphologically different than other organisms in the collection. If you are not sure if it is a different species, please ask!

As an example, if a student turns in 108 "species" within 45 families, 3 suborders, and 14 orders, and if all 20 ecological categories and 5 feeding categories have been fulfilled, the specimens are correctly identified, and the collection is in good condition and properly organized, the total points will be 287.5, and that student will earn a 96% on the collection. **Please note that if you make the correct taxonomic identifications, you will get the specified points, but if you misidentify a specimen, you simply will not get the points for that taxonomic level (i.e., Family and/or Super- or Subfamily); in other words, you do not get points taken off for misidentification. Therefore, as long as you have the correct Order, if you misidentify a few things but have a sufficient number of specimens, you have the potential to get at least 100% on the collection.**

**The collection you submit for your grade becomes the property of UWSP. In most cases, most of it will be returned to you; however, the instructor reserves the right to retain specimens for the UWSP insect collection.**

**Example of Insect Collection Rubric, How Points are Calculated for Insect Collection**

	<u>TOTAL NO.</u>	<u>x/-</u>	<u>Points</u>	<u>Total Points</u>
Order	_____	×	5	_____
Suborder ( <i>those allowed</i> )	_____	×	1	_____
Superfamily ( <i>those allowed</i> )	_____	×	2	_____
Family	_____	×	2	_____
“Species”* (*you <u>do not</u> have to know the species name)	_____	×	0.5	_____
Non-insect Class	_____	×	5	_____
Non-insect Order	_____	×	5	_____
Non-insect Family	_____	×	2	_____
Non-insect “Species”	_____	×	0.5	_____
Feeding Damage minus any missing or incorrect	<u>25</u>	-	( )5	_____
Missing Orders	_____	×	-10	<u>—</u>
Missing Ecological Labels	_____	×	-5	<u>—</u>
Incorrect I.D. of specimens if they are duplicates within a correctly I.D.’d taxon	_____	×	-0.25	<u>—</u>
Additional Ecological Labels	_____	×	5	_____
Additional Feeding Examples	_____	×	2.5	_____
Collection Organization	<u>50.0</u>	-	_____	_____
<b>TOTAL POINTS (out of 300):</b>				_____