

BSPM 302: Applied and General Entomology

Fall 2017
Clark A-104
MWF 9:00 – 9:50, 2 credits

Note: this class runs for 10 weeks, beginning August 21st and ending November 3rd (no class on October 30th or November 1st; 1 hour cumulative final on November 3rd).

Instructor: Paul Ode, C-137 Plant Sciences
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TA: Alison Hogeboom
Office hour location: W004 (basement) Plant Sciences
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This course description outlines what you can expect from this class and from us as instructor and TA. It also outlines what we expect from you as a student.

In this course you will learn the basics of entomology, spanning insect evolution and diversity, structure and function, and interactions with humans and the environment as well as management strategies for 'problem' species. The overall theme of this course is insect biodiversity – why are there so many insects and why are they so diverse. The course is roughly divided into these four themes: insect diversity and evolution, insect structure and function, insect interactions with other organisms, and insect interactions with humans.

Note that there are three different lab courses available (optional, but strongly recommended):

- BSPM 303A (General Entomology) – 2 credits, taught by Dr. Boris Kondratieff. This laboratory emphasizes insect biology and diversity in natural systems. You will learn to identify insects to the family level. There are two sections: Tu & Th 1:00–2:40 PM, and W & F 3:00–4:40 PM. (both sections in Plant Sciences E008)
- BSPM 303B (Horticultural Entomology) – 1 credit, taught by Dr. Whitney Cranshaw and Matt Camper. This laboratory emphasizes the biology of common pest and beneficial insects in horticultural systems. You will learn to identify insects to the order level. There are three sections: Tu 8:00–9:40 AM (Plant Sciences E008), Tu 10:00–11:40 AM (Plant Sciences E008), and Tu 1:00–2:40 PM (Plant Sciences E005).

While enrollment in a lab is optional, students usually find that the lab material reinforces the lecture material and vice versa. Both of these courses are independent of this course in terms of content and grading. Lab courses run the entire semester. Prior or concurrent enrollment in

BSPM 302 is required to take either lab course. Unlike BSPM 302, the laboratory sections run the entire semester!

Cell phones, iPads, etc.: Please turn them off during lecture. Answering calls, texting your friends, playing games, or checking the web are distracting to the rest of the class and to me.

Questions during class: Questions and comments are always welcome and, indeed, strongly encouraged. If something I've said or written isn't clear to you, or you need more explanation, or you want to add a comment, chances are great that you are not the only one. The more interactive this class is, the more everyone will get out of it.

Office hours:

Paul: I will in my office MWF: 1:00-2:00 PM, C-137 Plant Sciences Building. Furthermore, I always welcome drop-in visits to my office as well as appointments made by phone (491-4127) or e-mail (paul.ode@colostate.edu). I'm often in my office!

Alison: Office hours will be held in Plant Sciences Building W-004, M, W, Th: 10:00-10:50 AM.

Questions and comments about lectures, course management, and readings are always welcome in class, by e-mail, or by office visits. We will make every effort to meet with you or respond to your questions as quickly as possible. However, please be aware that more students make appointments in the days immediately prior to exams.

Contacting you: Please make sure that you have your correct/preferred e-mail address on file with the University so that we can get in touch with you (as a class or individually).

Resources for Disabled Students (RDS): If you have a disability that requires special accommodation in this class (e.g. dyslexia, ADD, ADHD, Irlen Syndrome, etc.) you may be eligible for accommodations/auxiliary aids under the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973. Please contact Resources for Disabled Students in 100 General Services Building, 491-6385, (website: rds.colostate.edu), to determine eligibility for accommodations or auxiliary aids during this class.

Text: *Gullan PJ, Cranston PS. 2014. The Insects: an outline of entomology. 5th Edition. Wiley-Blackwell Publishing.* This text is **highly** recommended (but not required). It is available at the CSU bookstore (purchase: \$106.50 new, \$80.00 used; rent: \$64.00 new, \$37.50 used) and, in limited quantities, from Amazon.com, Alibris, and from other online booksellers. This book is an excellent resource and supplements lecture in much greater depth than I can provide in class. Note: the 3rd and 4th editions are completely adequate; the 2nd edition is also useful if you can find a copy.

Lecture handouts: Handouts (lecture outlines and pdfs of slides) will be available on Canvas the night before each lecture (I write/revise many of these lectures the night before class). Lecture outlines will contain the outline of the lecture as well as key words, concepts, and any figures.

Handouts and slides are not a substitute for attending lectures. This is intentional. The process of listening to a lecture, asking questions and making comments, taking notes, and then transcribing them is one of the most effective methods of learning new material. Please let us know if you have difficulty accessing any course material from Canvas and we will get it to you in another way.

Exams (take-home + in-class = 100 points for each exam):

Take-home portion (20 points): There are three assigned scientific research articles (one for each of the first three exams), which you should begin reading as they are assigned – approximately one week before each exam. The purpose of this is two-fold. First, these articles reinforce the content presented in lecture. Second, learning how to critically read scientific articles is an important skill for anyone in the sciences. Scientific research articles report original research findings. These types of articles are the primary, authoritative means by which research is reported and made public to other researchers and practitioners (e.g. extension agents, pest control consultants, medical/veterinary professionals, etc., etc.). All other ‘secondary’ sources (e.g. brochures – printed or online, Wikipedia, extension bulletins, newspapers and periodicals, etc.) obtain their information from primary literature sources. Therefore, it is important for anyone whose profession is related to the sciences be able to read and critically evaluate primary scientific literature.

The article and questions will be posted in the ‘Assignments’ section of Canvas. See the separate handout posted on Canvas, ‘Tips for Effectively Reading Scientific Articles,’ for guidelines regarding active reading and evaluation of scientific articles and the types of questions that you should be prepared to answer on the exams. We will give you a standard set of questions for each article designed to get you to critically read the article; e.g., what were the objectives of the study?, what was the reason for conducting the study (the motivation of the authors), what were the most important findings of the article and how do these relate to one or more of the themes of this course? **Your responses will be due by 8:30 am the day of the exam; we strongly encourage you to submit your responses as soon as you can!** before the exam, because you will be asked these questions on the exam! If you have any questions about what you should be getting out of these articles, please don’t hesitate to contact either of us.

In-class portion (80 points): In-class exams will be a combination of short answer essays (1-2 sentences), fill-in-the blank questions/labeled figures, and multiple-choice questions. Exams will emphasize material presented during lecture, and any handouts.

Bring pencil (#2) or pen (dark ink) to the in-class exams. Exams are closed book; you may not use notes, calculators, cell phones, laptops, iPads (or similar), your neighbors’ exams, etc. Make-up exams are NOT possible without prior arrangement AND a letter from your physician or a letter from your instructor (for CSU field trips). After-the-fact excuses are not acceptable unless you have documentation demonstrating that a crisis preventing you from taking the exam came up last minute that was beyond your control (e.g. physician/hospital note). In general, I will try to accommodate illnesses, family crises, etc., but you must let me know

beforehand. Note: the final grade for the class is based on 300 total points (see 'Grading' section at the end of this handout for more information).

We aim to grade and return exams within one week. University policy dictates that we return exams directly to each of you. We cannot leave exams in a box or folder for you to pick up. Once exams are graded, you may pick them up at any time at the end of class or from my office.

The final exam will be cumulative and will not have an in-class portion.

Academic Integrity: A summary of the University's Academic Integrity Policy and Misconduct Procedures may be found at the following website: <http://facultycouncil.colostate.edu/faculty-manual-section-i/#1.5>

Cheating on exams or submitting plagiarized work demoralizes everyone in the class and will not be tolerated. The minimum penalty for cheating and/or plagiarism in this class is a zero for the exam and this score will count towards your final grade. Students caught cheating on exams will be reported to the Office of Conflict Resolution and Student Conduct Services. Major infractions may result in a hearing and a permanent notation on your transcript that you were found guilty of academic dishonesty, and possible dismissal from the University.

Even if you think you know what plagiarism is, we encourage you to take the 'Plagiarism Self Test' on the TILT website: <http://tilt.colostate.edu/integrity/resources/quiz/index.cfm> for more information about what constitutes plagiarism.

Title IX: Sexual Assault, Sexual Violence, Sexual Harassment: CSU's Discrimination, Harassment, Sexual Harassment, Sexual Misconduct, Domestic Violence, Dating Violence, Stalking, and Retaliation policy designates faculty and employees of the University as "Responsible Employees." This designation is consistent with federal law and guidance, and requires faculty to report information regarding students who may have experienced any form of sexual harassment, sexual misconduct, relationship violence, stalking or retaliation. This includes information shared with faculty in person, electronic communications or in class assignments. As "Responsible Employees," faculty may refer students to campus resources (see below), together with informing the Office of Support and Safety Assessment to help ensure student safety and welfare. Information regarding sexual harassment, sexual misconduct, relationship violence, stalking and retaliation is treated with the greatest degree of confidentiality possible while also ensuring student and campus safety.

- Any student who may be the victim of sexual harassment, sexual misconduct, relationship violence, stalking or retaliation is encouraged to report to CSU through one or more of the following resources:
 - Emergency Response 911
 - Deputy Title IX Coordinator/Office of Support and Safety Assessment (970) 491-1350
 - Colorado State University Police Department (non-emergency) (970) 491-6425

Visit: <http://oeo.colostate.edu/title-ix-sexual-assault> for more information.

Grading:		Letter Grade	Percentage	Total Points
*Exam 1	100	A	≥ 93	≥ 279
*Exam 2	100	A-	≥ 90	≥ 270
*Exam 3	100	B+	≥ 87	≥ 261
<u>*Cumulative Final</u>	<u>100</u>	B	≥ 83	≥ 249
Maximum points:	300	B-	≥ 80	≥ 240
		C+	≥ 77	≥ 231
		C	≥ 70	≥ 210
		D	≥ 60	≥ 180
		NP	< 60	< 180

*Lowest score is dropped (e.g. if one exam is not taken, this counts as the lowest score)

Applied and General Entomology –Lecture Schedule

BSPM 302 – Fall 2017, Clark A-104, 9:00-9:50 AM, MWF

(suggested readings are from Gullan PJ, Cranston PS. 2014. The Insects: an outline in entomology. 5th Edition. Wiley-Blackwell, West Sussex, UK; ISBN 978-1-84615-5; 3rd and 4th Editions are also suitable)

NOTE: while we will adhere as closely as possible to this schedule, please be aware that this is subject to change. Changes to this syllabus, if needed, will be announced in class and posted on Canvas. Exams 1 through 3 will cover material presented through the Wednesday before the exam (exams are always on Fridays). The final is cumulative.

21-Aug	M	Introduction to Course
23-Aug	W	Why Study Insects? Suggested reading: Gullan & Cranston - Chapter 1 (both editions), Importance, Diversity, and Conservation of Insects.
25-Aug	F	Evolution of Arthropods Suggested reading: Gullan & Cranston - Chapter 8 (both editions), Insect Evolution and Biogeography.
28-Aug	M	Key Points in Insect Evolution; Size and Physical Interactions with the Environment
30-Aug	W	<i>Last day to 'Add' or 'Drop' this class!</i>
30-Aug	W	Insect Diversity - Dr. Boris Kondratieff. Suggested reading: Gullan & Cranston – Chapter 7 (both editions)
1-Sept	F	Insect Diversity (continued) - Dr. Boris Kondratieff. Suggested reading: Gullan & Cranston – Chapter 7 (both editions)
4-Sept	M	<i>Labor Day: University Holiday – NO CLASS.</i>
6-Sept	W	External Anatomy – Head: eating and sensing Suggested reading: Gullan & Cranston - Chapter 2, External Anatomy pp. 26 – 45 (23 – 52 in 4 th edition), pp. 96-111.
8-Sept	F	External Anatomy – Head: insect vision Gullan & Cranston - pp. 117 – 122 (insect vision) (pp. 113 - 118 in 4 th edition).

11-Sept M **External Anatomy – Thorax: locomotion**
Suggested reading: Gullan & Cranston - Chapter 2, External Anatomy pp. 45 – 52 (pp. 41 – 49 in 4th Edition), pp. 57 – 63 (pp. 56 – 60 in 4th Edition).
Also Chapter 8, pp. 238 – 241 (pp. 231 – 234 in 4th Edition).

13-Sept W **Insect Flight (continued, if necessary)**
External Anatomy – Abdomen: reproduction
Suggested reading: Gullan & Cranston - Chapter 2, External Anatomy pp. 23 – 52 (21 – 48 in 3rd Ed.), pp. 231 – 234 (pp. 208 – 211 in 3rd Ed.).

Review session: Thursday, September 14th, 4:00 – 5:00 PM, Clark A-102 (not our classroom!)

15-Sept F Exam 1

18-Sept M **Circulation, Gas Exchange, Digestion, and Excretion**
Suggested reading: Gullan & Cranston - Chapter 3 (both editions), Internal Anatomy and Physiology.

20-Sept W **Development and Molting**
Suggested reading: Gullan & Cranston - Chapter 6 (both editions), Development and Life Histories.

22-Sept F **Development and Molting (continued)**

25-Sept M **Mating & Reproduction, Life cycles**
Suggested reading: Gullan & Cranston - Chapter 5 (both editions), Reproduction.

Last day to withdraw from this class is today (September 25th)...

27 Sept W **Nervous & Sensory Systems**
Suggested reading: Gullan & Cranston - Chapter 3, Internal Anatomy and Physiology pp. 63 – 69 (pp. 60 – 66 in 4th Edition), Chapter 4 (both editions), Sensory Systems and Behavior.

29-Sept F **Semiochemicals and Behavior**
Suggested reading: Gullan & Cranston – Chapter 4 (both editions), Sensory Systems and Behavior.

2-Oct M **Plant–Insect Relationships: pollination**
Suggested reading: Gullan & Cranston - Chapter 11 (both editions), Insects and Plants.

4-Oct W **Plant–Insect Relationships: herbivory**
Suggested reading: Gullan & Cranston - Chapter 11 (both editions),
Insects and Plants.

Review session: Thursday, October 5th, 4:00 – 5:00 PM, Clark A-102 (not our classroom!)

6-Oct F Exam 2

9-Oct M **Plant-Insect Relationships: herbivory (cont.); Social Insects**
Suggested reading: Gullan & Cranston – Chapter 12 (both editions), Insect
Societies.

11-Oct W **Social Insects (cont.); Carnivory: Predation and Parasitism, part 1**
Suggested reading: Gullan & Cranston - Chapter 13 (both editions), Insect
Predation and Parasitism.

13-Oct F **Carnivory: Predation and Parasitism, part 2**
Suggested reading: Gullan & Cranston - Chapter 13 (both editions), Insect
Predation and Parasitism.

16-Oct M **Pesticide Classes and Modes of Action** - Dr. Whitney Cranshaw.

18-Oct W **Pesticide Classes and Modes of Action** - Dr. Whitney Cranshaw.

20-Oct F **Medical and Veterinary Entomology**
Suggested reading: Gullan & Cranston - Chapter 15 (both editions),
Medical and Veterinary Entomology.

23-Oct M **Pest Management: insects as pests, resistance, biological control**
Reading: Gullan & Cranston - Chapter 16 (both editions), Pest
Management.

25-Oct W **Pest Management: insects as pests, resistance, biological control**
Reading: Gullan & Cranston - Chapter 16 (both editions), Pest
Management.

Review session: Thursday, October 26th, 4:00 – 5:00 PM, Clark A-102 (not our classroom!)

27-Oct F Exam 3

30-Oct M NO CLASS

1-Nov W NO CLASS

Review session: Thursday, November 2nd, 4:00 – 5:00 PM, Clark A-102 (not our classroom!)

3-Nov F Cumulative Final Exam (9:00–9:50 AM in Clark A-104)