

**DRAFT 10-25-16**  
**ENR 5358 Applied Vertebrate Physiological Ecology**  
(3 credit hours)

Spring 2017

**Instructor:** Dr. Suzanne Gray  
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**Office Hours:** By appointment

**Meeting time and place:** Mondays and Wednesdays 3:00-4:20; Kottman Hall 245

**COURSE DESCRIPTION**

Animals are increasingly faced with rapid and severe environmental change driven by human activities. How do animals cope with these changes? This course will draw on theory from physiological ecology as it applies to understanding how animals respond to human-induced environmental change. For example, birds in urban environments and fish in high-boat traffic waters are faced with anthropogenic noise that masks reproductive signals. What physiological mechanisms are employed to deal with this altered environment? How might these compensatory mechanisms influence population-level processes? Students will be expected to delve into the current, primary literature to explore the responses of vertebrates (aquatic and terrestrial) at the individual level and the potential consequences of these responses at the population level.

**Course Goals:**

1. Explore current literature describing the physiological responses of vertebrates to human-induced environmental change.
2. Promote critical thinking about how environmental change influences individuals, and how this translates into population-level consequences.
3. Explore ways in which physiological ecology can be used in conservation and management initiatives.
4. Discuss ways to effectively communicate physiological ecology research to diverse audiences.

**Student Learning Objectives:**

1. Describe the basic physiological processes of vertebrates.
2. Develop familiarity with the concepts of *applied* physiological ecology.
3. Identify real world issues that could benefit from physiological ecology research.

4. Understand the link between organism-level responses and population, community and ecosystem processes.
5. Synthesize current, primary literature in the field of applied physiological ecology.
6. Demonstrate effective written and oral communication for a variety of audiences.

### **COURSE FORMAT AND EXPECTATIONS**

**Format:** This class will meet two times per week and will take the form of *Problem Based Learning*. Problem based learning focuses on student-led learning and research. Using this format, the course will be divided into a number of modules, each focused on a particular applied physiological ecology problem. First, you will be provided with one to two lectures that describe the physiological principles needed to understand the topic. Second, a specific applied problem will then be outlined and the following two to three classes will be devoted to researching and solving that problem. For each “module” or case study, students will work in small groups to identify the critical information needed to fully understand the concepts presented and will work in class to gather and synthesize that information. In-class assignments will be used to evaluate group work as part of the Participation grade. Third, at the end of each module each student will individually write and submit a report on the topic. In addition to topical modules, a number of guest lecturers will provide insight into how physiological ecology is used in research and conservation management.

#### **Readings:**

To be successful in this class you will need to understand some of the basic principles of physiology and to apply those principles to complex, real-world problems. This will require extensive research from basic physiology texts to peer-reviewed journal articles. I **STRONGLY** suggest that you purchase or rent the Animal Physiology text below to use as a resource for understanding basic physiology principles. However, other texts and resources can also be used.

**Recommended Text:** Eckert Animal Physiology: Mechanisms and Adaptations, 5<sup>th</sup> Ed.; Randall, Burggren, and French. WH Freeman and Company, New York.

Rent from Amazon.com: ~\$13/semester

Buy *used* from Amazon.com: from \$6 ~ \$40

**Supplemental readings:** Papers for case studies will be made available online through CARMEN. The readings are a critical part of this course, therefore, students are expected to come to class ready to discuss all readings.

**Participation:** Participation scores will be based on each student’s participation in classroom discussions and case study activities. Regular attendance is mandatory. Reading and thinking about the assigned reading before class are critical to achieving a good participation grade.

**Absences:** All absences must be approved in advance by contacting the instructor prior to the date you plan to miss. In the case of unforeseen emergencies please contact the instructor as soon as possible. Unexcused absences will negatively influence your Participation grade.

### STUDENT EVALUATION

	<b>%</b>
Participation & In-Class Assignments	20
#SciComm Assignment	15
Case Study Reports (5 x 6%)	30
Midterm Exams (2 x 10%)	20
Take-Home Exam	15
<b>Total</b>	<b>100%</b>

### Grading Scheme

93-100%	A	80-82	B-	66-69	D+
90-92	A-	77-79	C+	60-65	D
87-89	B+	73-76	C	<60	E
83-86	B	70-72	C-		

### Participation & In-Class Assignments (20%)

It is expected that students will attend **ALL** meetings. Attendance will be noted and a series of in-class assignments will be used to gauge participation and engagement with the course material. During the lecture portion of each module, there will often be readings assigned for lectures. Students should come prepared to actively discuss the assigned readings\*. Preparation for discussions and in-class assignments may include bringing a list of questions to class, responding to discussion questions, etc. During the group-work portion of each module students are expected to be actively engaged with their group and in solving the problem presented. This may include researching unfamiliar terms or concepts, finding and bringing additional articles or information to share with your group. Your ability to function as a group will depend upon communication, organization, and participation among all group members. A lack of such organization will result in much more time outside of class required to complete your research and reports. As part of each report you will be given the opportunity to evaluate the participation of each group member. These evaluations will form a small percentage of your overall Participation grade.

*\*Graduate students are expected to be able to lead small group discussions during lectures (but will be paired with other grad students for the group-work portion of each module).*

### **#SciComm Assignment (15%)**

One of the challenges for the relatively new field of Applied Physiological Ecology, or ‘Conservation Physiology’, is communicating to both academic and public audiences about the significance of research within the field. One of the ways this challenge can be met is through training students to be versed in the language of physiological ecology and to effectively communicate that language to diverse audiences. Increasingly, Scientific Communication (#SciComm) is facilitated through social media outlets such as Twitter, Facebook, personal or lab blogs, etc. and some researchers argue that to remain relevant in the field one must keep up with these trends.

The goal of this assignment is for students to present a set of information on a current, relevant physiological ecology topic that is accessible to science and society through on-line forums. These can take the form of written blogs, sound clips, videos, animations, etc. Each student is required to make a **minimum of two posts\*** to the class website (SITE TBD). Students are encouraged to post on more than two topics and to direct the public to their posts via social media. Posts will be graded based on accuracy of content and accessibility to a diverse audience. If a student posts more than twice, the top two grades will be used to determine the final #SciComm grade. (Details on #SciComm Instructions sheet).

*\*In addition to submitting their own posts, graduate students will also be required to peer-review several posts*

### **Case Study Reports (30%)**

We will cover 6 to 8 major topics (in the form of modules) throughout the course. Each student is responsible for submitting a Case Study Report for all modules and all reports will be graded; however, only the top 5 report grades will be counted toward your overall grade for this component of the course. Failure to submit a report will result in a 5 percentage point reduction of your overall Case Study Reports grade. For example, if you submit only 5 out of a possible 7 reports and receive a total of 28% (out of 30%), I will deduct 5 percentage points for each report not submitted, making the final grade for this component 18%. (Details on Report Instructions sheet)

### **Exams (35%)**

There will be two mandatory Midterm examinations that will cover material presented in lectures. Midterms will not be cumulative. The final take-home exam will be given to students in the last week of class and they will have at least one week to complete and submit the exam via

Carmen. The take-home exam will test the student's ability to integrate knowledge gained throughout the course through assessment of a final case study.

**Written Assignments: Format and Submission**

All written assignments are to be submitted electronically using Carmen Dropbox by 5:00 pm on the date that they are due. Written assignments should have 1" margins, 12 pt Times New Roman font, 1.5 line spacing, and all pages should be consecutively numbered, including the cover page. All written assignments should include a cover page that provides your name, name.#, title of the assignment, and the date. In-text citations and reference lists should follow the instructions found in the Author Guidelines for the journal Conservation Physiology ([http://www.oxfordjournals.org/our\\_journals/conphys/for\\_authors/](http://www.oxfordjournals.org/our_journals/conphys/for_authors/)). A single file saved as a Word document with your name and assignment title as the file name (e.g. "GRAY\_Annotated Bibliography") should be submitted. *Late assignments will not be accepted.*

### **Academic Misconduct Statement**

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute "Academic Misconduct."

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

### **Disability Statement**

Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact the Office for Disability Services at 614-292-3307 in room 150 Pomerene Hall to coordinate reasonable accommodations for students with documented disabilities.

### Tentative Schedule of Topics and Assignments\*

Week	Date	Topics	Assignments Due
1	01/09	Introduction to course format and syllabus Introduction to <i>applied</i> physiological ecology	
	01/11	Mini-Module: Problem Based Learning example	
2	01/16	<i>MLK Day – NO CLASS</i>	
	01/18	Module 1: Metabolism and Energy Balance	
3	01/23		
	01/25		
4	01/30	Module 2: Respiration and Gas Exchange	Report 1
	02/01		
5	02/06		
	02/08	Module 3: Osmoregulation	Report 2
6	02/13		
	02/15		
7	02/20		
	02/22	Midterm #1 (modules 1-3)	Midterm 1
8	02/27	Module 4: Nerves, muscles, and movement	Report 3
	03/01		
9	03/06		
	03/08		Report 4
10	03/13		
	03/15		
11	03/20	Module 5: Endocrine systems	
	03/22		
12	03/27		
	03/29	Module 6: Reproduction	Report 5
13	04/03		
	04/05		
14	04/10	Midterm #2 (modules 4-6)	
	04/12	Module 7: Sensory systems and noise	Report 6
15	04/17		
	04/19		Final day to post #SciComm
16	04/24	Final Lecture: Review for Take-Home Exam	Report 7
	04/26	No Class	
17	05/01	No Class	Take-Home Exam due

\*This schedule may change. Students will be notified in class or via Carmen and email in advance of any changes in the schedule.