ENR 5358 Applied Vertebrate Physiological Ecology

(3 credit hours)

Spring 2019

Instructor: Dr. Suzanne Gray
Contact: Email: **gray.1030@osu.edu**
Phone: 614-292-4643
Office: 420b Kottman Hall
Office Hours: By appointment

Meeting time and place: Mondays and Wednesdays 3:00-4:20pm; 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 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. Synthesize current, primary literature in the field of applied physiological ecology.
5. 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 problem, 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 and peer-evaluations 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 animal 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 one of the animal physiology texts listed below to use as a resource for understanding basic physiological principles. However, other texts and resources can (and should!) also be used.

Recommended Texts:

Principles of Animal Physiology, 3rd Edition, 2008. Moyes and Schulte. Pearson Education, Inc. San Francisco.

Rent from Amazon.com: ~$38/semester

Buy *used* from Amazon.com: from $87 (or 2nd edition for ~$8)

**Two copies will be on course reserve at the CFAES Library*

Eckert Animal Physiology: Mechanisms and Adaptations, 5th 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

**Two copies will be on course reserve at the CFAES Library*

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

	%
Participation & In-Class Assignments	15
Study Notes	15
#SciComm Assignment	10
Case Study Reports	50
Take-Home Exam	10
Total	**100%**

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 (15%)

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 and larger group brainstorming sessions during lectures.*

Study Notes Wiki Page (15%)

In lieu of quizzes and midterms, each student will be required to create a set of study notes for each module, focusing on the basic physiological principles associated with the topic. For example, if we are doing a module about how climate change is expected to influence tropical lizards in forested versus deforested habitats, students would create a set of study notes on metabolism, relationship between metabolism and temperature in ectotherms, role of moisture in behavioral thermoregulation, etc. These are not meant to be exhaustive texts on ach subject, but rather a set of notes that will help students learn the main physiological processes needed to fully address the problem of each module (see detailed Study Notes Instructions on Carmen).

#SciComm Assignment (10%)

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 applied 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 (https://u.osu.edu/enr5358/). 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 may also be required to peer-review several posts.*

Case Study Reports (50%)

We will cover 5-7 major topics (in the form of modules) throughout the course. Each student is responsible for submitting a Case Study Report for each module 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 Case Report Instructions sheet).

Written Assignments: Format and Submission

All written assignments are to be submitted electronically using Carmen Dropbox by 11:59 pm on the date that they are due. Written assignments should have 1" margins, 12 pt Times New Roman font, double 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/). 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 without prior permission.*

University Resources

The university has a variety of resources in place to support students and a safe campus environment. Students experiencing stress, sleep problems, anxiety, depression, interpersonal concerns, death of a significant other, and alcohol use or *any event that has significantly impacted your concentration on education, work or family matters* are encouraged to contact the Office of Student Life at 614-292-9334 (https://studentlife.osu.edu/) and/or Counseling and Consultation Services (CCS) at 614-292-5766 (www.ccs.osu.edu) for assistance, support, and advocacy. CCS offers a number of FREE *drop-in-when-you-are-able* workshops (http://www.ccs.ohio-state.edu/drop-in-workshops/). No registration is necessary, no prior appointment is needed, and workshops are open to all enrolled OSU students.

Academic Integrity

This course adheres to the Code of Student Conduct (http://studentaffairs.osu.edu/csc/) and policies set by the OSU Committee on Academic Misconduct (http://oaa.osu.edu/coam.html). All students should familiarize themselves with these materials, and act appropriately. Academic misconduct is defined by the Ohio State University's Code of Student Conduct (Section 3335-23-04) 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. Academic misconduct will not be tolerated in this class. For more information, please feel free to review the "Ten Suggestions for Preserving Academic Integrity" http://oaa.osu.edu/coamtensuggestions.html or "Eight Cardinal Rules of Academic Integrity" http://www.northwestern.edu/provost/students/integrity/rules.html.

Accommodating Students' Learning

For circumstances approved by the university, we can make accommodations that facilitate your learning in this class. If you have university-approved circumstances that require special accommodations (e.g., student athlete, ROTC, Marching Band, a disability), it is your responsibility to let the instructor know at the beginning of the semester or as soon as it comes to your attention during the semester. You are also required to inform the instructor about a need to miss class prior to any excused absence. If you have a disability, then please register with the Office for Disability Services (ODS) as soon as possible by contacting (614) 292-3307, and let your instructor know.

Reporting Incidents of Bias

To ensure a safe learning environment, please speak to the instructor immediately if you feel that you have experienced bias (whether based on race, ethnicity, gender identity or expression, sexual orientation, religion, national origin, age or sex) within the classroom. You can also anonymously report any incidents of bias experienced on campus to the Bias Assessment Response Team (BART).

Career Services

The School of Environment and Natural Resources has a Career Services Office located in 210 Kottman Hall. Please call the main office at 614-292-2265 or email senr@osu.edu to schedule an appointment or use the available Express Walk-In Hours hosted every Friday 9am – 4pm.

Tentative Schedule of Topics and Assignments*

Week	Date	Topics	Assignments Due
1	01/07	Introduction to course format and syllabus Introduction to ***applied*** physiological ecology	
	01/09	Practice Module: *Size and Metabolism*	
2	01/14	Practice Module, cont'd: *Size and Metabolism*	
	01/16	**Metabolism**	
3	01/21	*MLK Day – NO CLASS*	Practice Study Notes
	01/23	Module 1: *Metabolism and Climate change*	
4	01/28	Module 1	
	01/30	Module 1	Study Notes 1
5	02/04	**Respiration**	Report 1
	02/06	Module 2: *Respiration and Hypoxia*	
6	02/11	Module 2	
	02/13	Module 2	Study Notes 2
7	02/18	**Endocrine Systems**	Report 2
	02/20	Module 3: *Endocrine Systems and Stress*	
8	02/25	Module 3	
	02/27	Module 3	Study Notes 3
9	03/04	Module 4: *Endocrine Systems and Pollution*	Report 3
	03/06	Module 4	
10	03/11 03/13	*Spring Break – NO CLASS*	
11	03/18	**Muscles and Locomotion**	Study Notes 4, Report 4
	03/20	Module 5: *Movement and Resource acquisition*	
12	03/25	Module 5	Study Notes 5
	03/27	**Sensory Systems**	Report 5
13	04/01	Module 6: *Sensory systems and Noise*	
	04/03	Module 6	Study Notes 6

14	04/08	Module 6	Report 6
	04/10	Module 7: *Multiple stressors*	
15	04/15	Module 7	
	04/17	Final Lecture: Review for Take-Home Exam	Study Notes 7, Report 7
16	04/22	No Class (LAST DAY OF CLASSES)	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.