

ENR 5358 Applied Vertebrate Physiological Ecology

(3 credit hours)

Spring 2022

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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 in-person 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 several 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 be outlined and the following two to three classes will be devoted to researching and solving that problem in small groups. 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 may join is to 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 each case study 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 and Extensions: Due to the discussion-based nature of this course, attendance is necessary to fully engage in the material. However, due to the current Covid situation, we will discuss as a class how best to deal with absences and extensions.

STUDENT EVALUATION

	%
Participation & In-Class Assignments	10
Content quizzes (6 x 5%)	30
#SciComm Assignment (2 x 5%)	10
Case Study Reports (top 5 x 10%)	50
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 (10%)

It is expected that students will attend **ALL** meetings (*note that we will discuss expectations in light of Covid at the first lecture*). 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 (or submitting on Carmen), 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 and larger group brainstorming sessions during lectures.*

Content quizzes (30%)

For each module there will be an on-line, open book quiz that students must complete. The goal of these quizzes is to ensure that students understand the underlying physiological principles discussed during each module. Quizzes will be available for the duration of the module but must be completed by the final lecture day of the module.

#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).

Optional Assignments (up to 3% on final grade)

There will be opportunities throughout the semester for students to gain additional points toward their final grade by completely optional assignments. For example, students may choose to peer-review several #SciComm submissions or provide a curated annotated bibliography for a module. These opportunities will be announced in class and on Carmen.

Written Assignments: Format and Submission

All written assignments are to be submitted electronically using Carmen 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 discussion.*

Tentative Schedule of Topics and Assignments*

Week	Date	Topics	Assignments Due
1	01/10	Introduction to course format and syllabus	
	01/12	Introduction to <i>applied</i> physiological ecology Practice Module: <i>Size and Metabolism</i>	
2	01/17	MLK Day – NO CLASS	
	01/19	Practice Module, cont'd: <i>Size and Metabolism</i>	
3	01/24	Metabolism	
	01/26	Module 1: <i>Metabolism and Climate change</i>	
4	01/31	Module 1	
	02/02	Module 1	Quiz 1
5	02/07	Respiration	Report 1
	02/09	Module 2: <i>Respiration and Hypoxia</i>	
6	02/14	Module 2	
	02/16	Module 2	Quiz 2
7	02/21	Endocrine Systems & stress	Report 2
	02/23	Module 3: (a) <i>Endocrine Systems and Stress</i>	
8	02/28	Endocrine Systems & pollution	
	03/02	Module 3: (b) <i>Endocrine Systems and Pollution</i>	Quiz 3a
9	03/07	Module 3:	#SciComm post 1 due
	03/09	Module 3:	Quiz 3b
10	03/14 03/16	Spring Break – NO CLASS	
11	03/21	Muscles and Locomotion	Report 3
	03/23	Module 4: <i>Movement and Resource acquisition</i>	
12	03/28	Module 4	Quiz 4
	03/30	Sensory Systems	Report 4
13	04/04	Module 5: <i>Sensory systems and Noise</i>	
	04/06	Module 5	

14	04/11	Module 5	Quiz 5
	04/13	Module 6: <i>Multiple stressors</i>	Report 5
15	04/18	Module 6	
	04/20	Module 6	Quiz 6
16	04/25	Last Day of Classes – NO CLASS	Report 6 #SciComm post 2 due

*This schedule is a living document and may change throughout the semester. Students will be notified in class or via Carmen and email in advance of any changes in the schedule.

Other Course Policies

Covid-19 Guidelines

As of Aug. 2, all students, faculty and staff are required to wear masks in classrooms and other shared indoor spaces, regardless of their vaccination status. These include common areas, conference rooms, shared office spaces, hallways, buses and shared vehicles on all Ohio State campuses. Individuals should not eat in classrooms. Individuals can take an occasional drink, but should take masks off only as necessary.

Masks continue to be required outdoors for unvaccinated individuals when they cannot maintain physical distancing. Vaccinated people are not required to mask outdoors.

Read more on the [Personal Safety Practices](https://safeandhealthy.osu.edu/) page. See: <https://safeandhealthy.osu.edu/> for additional guidelines and resources; as well as for any updates from the university regarding changes in policy and procedure.

Flexibility and Respect: As your instructors we understand the stress that the Covid-19 pandemic has caused in all of our lives. As we move into a new semester with all the uncertainties of the past year and a half, we will aim to work with all students to be flexible in our class policies in order to promote a safe learning space for all.

Discussion and Communication Guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style:**
 - **Emails:** Please write in a professional manner (i.e. use an appropriate salutation (e.g. Hi Dr. Gray,) and write in full sentences).
 - **For online discussions:** While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. A more conversational tone is fine for non-academic topics.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online. I will provide specific guidance for discussions on controversial or personal topics.

- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.

Academic Integrity Policy

See [Descriptions of Major Course Assignments](#) for specific guidelines about collaboration and academic integrity in the context of this online class.

Ohio State's Academic Integrity Policy

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](#) (studentconduct.osu.edu), 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.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- [Committee on Academic Misconduct](http://go.osu.edu/coam) (go.osu.edu/coam)
- [Ten Suggestions for Preserving Academic Integrity](http://go.osu.edu/ten-suggestions) (go.osu.edu/ten-suggestions)
- [Eight Cardinal Rules of Academic Integrity](http://go.osu.edu/cardinal-rules) (go.osu.edu/cardinal-rules)

Copyright for Instructional Materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member."

This course adheres to The Principles of Community adopted by the College of Food, Agricultural, and Environmental Sciences. These principles are located on the Carmen site for this course; and can also be found at <https://go.osu.edu/principlesofcommunity>. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity, Equity, and Inclusion (<https://equityandinclusion.cfaes.ohio-state.edu/>). If you have been a victim of or a witness to a bias incident, you can report it online and anonymously (if you choose) at <https://studentlife.osu.edu/bias/report-a-bias-incident.aspx>.

Your Mental Health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and Consultation Services (CCS) by visiting ccs.osu.edu or calling (614) 292- 5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at (614) 292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-(800)-273-TALK or at suicidepreventionlifeline.org

David Wirt, wirt.9@osu.edu, is the CFAES embedded mental health counselor. He is available for new consultations and to establish routine care. To schedule with David, please call 614-292-5766. Students should mention their affiliation with CFAES when setting up a phone screening. Accessibility Accommodations for Students with Disabilities

Requesting Accommodations

The university strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability including mental health, chronic or temporary medical

conditions, please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with [Student Life Disability Services \(SLDS\)](#). After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's [request process](#), managed by Student Life Disability Services.

Disability Services Contact Information

- Phone: [614-292-3307](tel:614-292-3307)
- Website: slds.osu.edu
- Email: slds@osu.edu
- In person: [Baker Hall 098, 113 W. 12th Avenue](#)

Accessibility of Course Technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations as early as possible.

- [CarmenCanvas accessibility](http://go.osu.edu/canvas-accessibility) (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- [CarmenZoom accessibility](http://go.osu.edu/zoom-accessibility) (go.osu.edu/zoom-accessibility)