# Animal Physiology

Syllabus

**Welcome** to Animal Physiology! I look forward to working with each of you this semester as we explore the wonderful world of animals. This course is for you, so if there are specific ways that I can support you as you work to your goals, please let me know.

**Course Description.** Lectures and laboratories are concerned with the mechanisms by which animals function. The prevailing theme is the biology of the whole animal. Regulative and integrative mechanisms in animal organ systems are examined. Students may receive Biology elective credit for this course or BIOL 365/366 but not both. Restricted to majors. *Prerequisites:* Proficiency in Basic Requirement and BIOL 300 or BIOL 335. Offered every spring. Credits: 0–4.

## Course Meetings.

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| Monday, Wednesday, Friday | 9:30 am – 10:20 am | *Bailey 204* |
| Thursday Lab | 9:20 am – 12:20 pm | *ISC 203* |

**Instructor.** Dr. Mackenzie Gerringer ISC 255 gerringer@geneseo.edu

**Office Hours.** Weds. & Fri. 11:00 am – 12:30 pm, & By Appointment *ISC 239*

Office hours are your time for getting questions answered, course expectations clarified, advice on pursuing opportunities or careers in science and more. You can also come and work and listen in to other content questions peers are asking. Office hours an important opportunity for us to check in. Please consider office hours as a regular part of this course, rather than remedial. Please email me (gerringer@geneseo.edu) if you have questions or would like to set up a meeting outside of office hours. Office hours and appointments will be held in ISC 239.

## Course Objectives. In our course, we will:

- Explore the basic physiological principles common to animals, relating structure to function.
- Compare physiological systems across the animal kingdom, including through in-depth topic presentations.
- Integrate our understanding of physiology across levels, from molecular to organismal, and understand interactions between different physiological systems.
- Gain hands-on experience in animal physiology, hypothesis formation, experimentation, and data analysis through both established protocols and independent research projects in the lab.
- Synthesize original data and evidence from the literature and communicate our findings in written, oral, and visual form, improving our science communication skills.

## How this course fits into your biology education. This course serves the following Biology Program Learning Outcomes:

1. Students will have the knowledge base and intellectual (conceptual) framework to use reasoning and problem-solving skills to; (1) read critically, (2) evaluate support for competing hypotheses, and (3) critique experimental design. *Level: Mastery*.
2. Students will have the laboratory and inquiry skills and technical ability to formulate hypotheses, design and run experiments using instruments to test their hypotheses, and analyze and interpret the results. They will be able to build on earlier work to design further experiments. *Level: Mastery*.
3. Students will be able to communicate biological ideas from literature or their own laboratory investigations to audiences of biologists and non-biologists in a variety of formats including written reports, poster, and oral presentations. *Level: Reinforcement*.
4. Students will recognize the importance of scientific integrity and ethical research and applications of biology to science policy. They will be able to work independently and in teams for life-long learning. *Level: Reinforcement*.
5. Students will be able to demonstrate a broad and diverse background in biology and related sciences and a strong foundation for graduate and professional programs of study or employment. *Level: Reinforcement*.

## Integrative and Applied Learning in Animal Physiology. This course serves the following Integrative and Applied Learning objectives:

• Integrate multiple bodies of knowledge with their personal experience by asking meaningful questions about real-world problems.
• Apply skills, theories, and methods gained in academic study, professional experiences, and/or co-curricular experiences to new situations.
• Reflect upon changes in their learning and outlook over time and integrate into their future endeavors based on that self-reflection.

## Course Expectations.

Much of the value of this course will come from active engagement with our class activities and discussions. Therefore, active participation will be part of your course grade. There are many ways to be an active participant in this course, including attending class, asking questions, contributing to class discussions on Brightspace, posting current research in Animal Physiology to our Brightspace page, and coming to office hours. Full course expectations details are available on our Brightspace page and discussed in class. Plan on engaging regularly with Brightspace for announcements, discussions, and assignment submissions. See schedule below.

*Accessibility & Communication*. You will be expected to check email and Brightspace during the work week on our usual class days (Monday, Wednesday–Friday). Email and Brightspace will be important means of communication as a class. I will be accessible via email and will strive for a <24-hour turn-around to questions during the work week. For emails sent after 5 pm or on weekends, please expect a response the next business day. If you find yourself struggling with accessibility, please reach out. I am here to work with you.

*Incomplete grades*. Geneseo's academic policies state that a temporary grade of "I" (incomplete) may be awarded when a student has been unable to complete a course due to circumstances beyond their control. Contact the instructor directly prior to the end of the semester for incomplete grade arrangements.

## Course Materials.

Our textbook is *Animal Physiology: From Genes to Organisms*. Sherwood, Klandorf, & Yancey. An e-book version can be purchased from the bookstore and there is a copy available on four-hour course reserve.

> *Making the most of the textbook:* Textbooks are a great resource, but highlighting every line and trying to memorize the book will only get us so far. Instead, try this approach: Before the lecture, spend 10–15 minutes skimming through that day's reading. Look for major themes, new vocabulary words, and important figures. Ask yourself what questions you have from looking briefly at this section. Jot down a few notes. Then, attend the lecture. After, write the major takeaways from that day down for yourself. What questions do you still have? Now, read the textbook. Your familiarity with the topics should make it easier to follow and remember the reading. Write down the important notes from this section. What questions do you still have? Post them in the discussions on Brightspace. To check your understanding and prepare for exams, try teaching the material to someone else. Vocabulary lists and learning objectives will set expectations on testable material, but you are encouraged to continue challenging yourself throughout the semester and to dive deeper into topics.

*Scientific Papers*. We will also explore current research in animal physiology. Four required readings from the primary literature are available on Brightspace. Article response worksheets will help you develop strategies for reading scientific papers and serve as notes for future reference. Please submit these article responses for three of the four readings. For

one reading of your choosing, we will have a mini-journal club to discuss the studies, questions we come across, and what we'd do next to advance the field.

*Course Technology*. Additional materials will always be available on Brightspace for those looking to dive deeper into these topics. We have discussion threads and pages for questions about the course, material, or research opportunities. If you see internship opportunities or neat physiology news, please share! We will also be learning and using some common tools for analyzing physiological data, including R. All software will be freely available to download, with links provided on Brightspace.

## Assignments & Assessment.

Assessment in this course will be based on the following, out of a total of 500 points.

Article Responses *10% of grade*

Four scientific journal articles will supplement the textbook reading and allow us to explore specific animal systems in detail. For three articles, write a short response on the worksheet provided (*10 points each*). Article responses must be written in your own words to receive credit. For one article, join the instructor in groups of three for a short (~25 min) journal club discussion on the reading *(20 points*). See schedule below for article due dates.

Comparative Physiology Talks *15% of grade*

We have the opportunity not only to explore physiological systems, but to compare the physiology of multiple animals to gain insight into adaptation and evolution. In a well-researched and well-synthesized talk, you will dive into a specific system and compare the physiology of ~three related species using the scientific literature. These 15-minute talks will take place throughout the semester, corresponding to our weekly content. At least two weeks prior to your talk, please submit a topic and formatted sources for review. The earlier you submit a topic, the earlier you will get feedback. You will be assigned two talks to peer review. Reviews should be submitted to Brightspace by the Monday after the talks. As audience members, you should ask at least one question every two weeks. You can ask questions either in person or on Brightspace. Thank you for keeping your comments supportive, respectful, and constructive. Speakers, please answer your questions on Brightspace by the Monday following your talk. Please note that you are responsible for keeping track of your talk and peer review deadlines.

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| Sign-Ups | By Feb. 9th | |
| Topic Submission | Two Weeks before Talk | *15 points* |
| Talks | Throughout Semester | *50 points* |
| Talk Reviews | Monday after Talks | *10 points* |

Adaptation Display *10% of grade*

Create a beautiful and informative interpretive sign for a public audience that would appear at a national park, describing multiple physiological adaptations of a species of your choice.

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| Topic & Source Check | Feb 23rd | *15 points* |
| Adaptation Displays | April 5th | *35 points* |

Mid-Term Exam March 5–6th *10% of grade*

Oral exam covering the first half of our semester (Ch. 1–6). Sign up for a 20-minute online meeting for your exam at least two weeks before the test. Students requiring testing accommodations should consult with the instructor in the first two weeks of class.

Final Exam May 13th *15% of grade*

Open-book exam synthesizing the content we've learned throughout our semester (Ch. 1–16). Students requiring testing accommodations should consult with the instructor in the first two weeks of class. Exam instructions will be available on May 8th. Final exams should be submitted to Brightspace.

Lab Assignments *7% of grade*

To make the most of our lab time, please read the lab protocol thoroughly prior to our lab session. Each lab will have an accompanying worksheet (*5 pts each*) that should be submitted in person or to Brightspace before the beginning of lab the following week.

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| Lab Worksheets | Week Following Lab | *35 points total* |

Lab Research Projects *23% of grade*

In our lab, we will conduct independent research projects in animal physiology. In small groups, you will develop hypotheses, devise, and conduct an experiment, collect and analyze your data, and write up your findings in a scientific manuscript. We will break down these large projects into multiple assignments, giving you the chance to pace your work and get feedback prior to the final paper.

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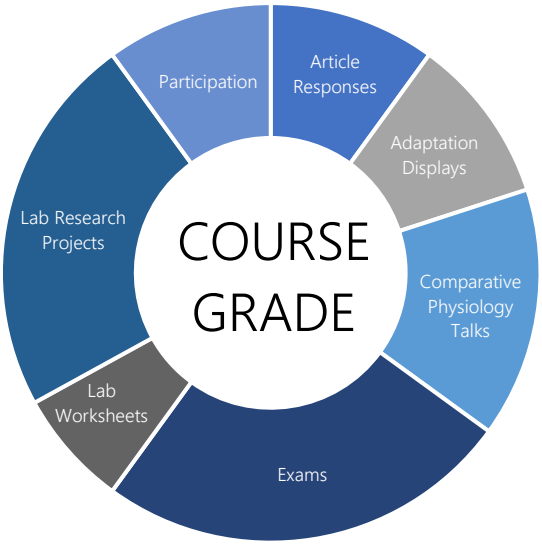
|---|---|---|
| Research Proposal & Collaboration Plan | March 28th | *15 points* |
| Research Update & Intro | April 11th | *10 points* |
| Research Paper Draft | April 25th | *35 points* |
| Research Paper | May 2nd | *50 points* |

Participation Every Class *10% of grade*

Earn full credit for participation (*50 pts*) by attending class when safe to do so, actively engaging in discussions and activities, and contributing to discussions on Brightspace. You will not be evaluated on whether your insights are "right" or "wrong" during discussions or check-ins, think critically and be actively involved. All submitted work and discussion responses should be written in your own words to receive credit. If you need to miss a synchronous class session due to illness, please complete the module for that day's subject and turn in your answers to the questions with the next check-in assignment on Brightspace. To help you actively engage, to identify study and participation strategies that work well for you, and to make participation assessment transparent, you will submit a weekly check-in on Brightspace, due Sundays by 11:59 pm. Check-ins will be a place to keep track of attendance or asynchronous make-ups, readings, discussion, and in-class engagement, and will serve as another forum for content or course expectations questions.




*Grade Breakdown.* Letter grades are displayed in Brightspace throughout the semester to help you track progress toward your goals. Grades in the course are set as follows, without rounding. A 100–94%; A- <94–90%; B+ <90–87%; B <87–84%; B- <84–80%; C+ <80–77%; C <77–74%; C- <74–70%; D <70–60%; E <60%.

## Resources & Policies.

Lab Policies. Safety is our first priority. Close-toed shoes and long pants/skirt are required for participation in lab. Please be mindful of your own safety and the safety of your peers. Detailed lab policies will be discussed in class and available on Brightspace and in the lab worksheets.

Some lab activities involve measuring aspects of our own physiology, such as heart rate. These self-subject experiments can be valuable learning opportunities but are entirely voluntary. Students will not be penalized for electing to not participate as a subject. Please see the instructor for alternative

activities the week before the lab. Note that all experiments are for educational, rather than medical, purposes. Consult your primary care physician for health recommendations.

Late Work Policy. Late work will only be accepted with extenuating circumstances and opportunities for submitting late work are limited throughout the semester. All late work accommodations need to be discussed in advance of the due date. Talk deadlines will vary depending on which subject you sign up for. It is your responsibility to keep track of all deadlines. If you have questions, please don't hesitate to ask. Because the speaker will not get the benefit of your feedback if the reviewer is absent, no make-ups are available for talk peer reviews. Any questions on assignment grades need to be submitted within one week of receiving feedback for grade revisions to be considered.

Land Acknowledgement**.** We'd like to begin our course with a land acknowledgment to protect and honor the history and people of the land on which we live. We believe that connecting to indigenous knowledge and practices increases our understanding of the natural world and thus acknowledging the original stewards of this land is an important part of biology education. Geneseo resides on the homeland of the Seneca Nation of Indians and Tonawanda Seneca Nation. We encourage you to learn more about these original occupants and those indigenous to other places you have lived using resources like the Native Land app and websites such as sni.org to learn more about the community of more than 7,000 enrolled Indigenous Peoples, who continue to contribute to the region and beyond.

Geneseo Mission and Values. SUNY Geneseo has several core documents that articulate our shared commitments and learning objectives. These include:

- SUNY Geneseo Mission, Vision, and Values:
  - https://www.geneseo.edu/about/mission-vision-and-values
- Community Commitment to Diversity, Equity, and Inclusion:
  - https://www.geneseo.edu/diversity/commitment
- Geneseo Learning Outcomes for Baccalaureate Education:
  - https://www.geneseo.edu/provost/globe-geneseo-learning-outcomes-baccalaureate-education

Academic Support Services. The campus provides a range of support services to help students thrive in their classes. These services include Tutoring, both drop-in and by-appointment, with student tutors in the Writing Learning Center, the Math Learning Center, and a range of department-based tutoring centers

- Online tutoring through the SUNY-wide STAR-NY system (www.starny.org/tutoring_schedule)
- Supplemental Instruction, in which trained student assistants review lecture material from specific classes. Information on times and locations is available through the Center for Academic Excellence website

Additionally, the college offers several peer mentoring programs that are designed to reinforce good academic habits. These include:

- Academic Peer Mentors in the Office of Academic Planning and Advising provide students with promising study strategies and can host on-going appointments with students seeking an "accountability buddy". More information is available at: https://www.geneseo.edu/dean_office/academic-peer-mentors-0
- The ONYX Academic Success workshop series sponsored by the GOLD Leadership Program introduces students to a variety of study skills, time management techniques, and instruction on how to access campus resources for academic and career guidance. A full list of GOLD workshops can be accessed at
    - https://www.geneseo.edu/gold/app/browse

- Tutoring, both drop-in and by-appointment, with student tutors in the Writing Learning Center, the Math Learning Center, and a range of department-based tutoring centers

Course Accessibility. SUNY Geneseo is dedicated to providing an equitable and inclusive educational experience for all students. We will be happy to make reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities. Accommodations will be made for medical conditions related to pregnancy or parenting. The Office of Accessibility will coordinate reasonable accommodations for persons with physical, emotional, or cognitive disabilities to ensure equal access to academic programs, activities, and services at Geneseo. Students with letters of accommodation should submit a letter to each faculty member and discuss their needs at the beginning of each semester. Please contact the Office of Accessibility Services for questions related to access and accommodations.

Office of Accessibility Services
Erwin Hall 22
(585) 245-5112
access@geneseo.edu
www.geneseo.edu/accessibility-office

Roles & Responsibilities. Student: inform the instructor no later than the second week of the semester of any accommodation(s) you will or may potentially require.

Instructor: maintain strict confidentiality of any student's disability and accommodations; support all students to meet the learning objectives of this course.

All course materials are available on Brightspace, and I've made every attempt to ensure that they are accessible to everyone. If you have difficulties accessing any materials (including needs for alternative formats), please let me know as soon as possible and I will rectify the situation.

Library Research Help. Fraser Hall Library has an award-winning staff trained in finding the best information using library resources and advanced search strategies. Students may ask questions about using library services, locating materials, or conducting research projects. There is a librarian who specializes in the subject matter for each major. Students can book a research help meeting during the librarians' office hours or email their questions to libraryhelp@geneseo.edu. Learn more at https://library.geneseo.edu/research-help.

Academic Integrity and Plagiarism. All work submitted in this class needs to be in your own words. This includes article responses, lab worksheets, and exams. For lab worksheets, you may discuss questions in groups, but each person needs to write their own original responses to questions. Submitting uncredited work in any form will result in a zero for the assignment. Plagiarism also includes using text written by a generation system as one's own (for example, entering a prompt into an artificial intelligence tool and using the output in an assignment) and submitting work completed for another assignment or class instead of doing the assigned work.

Writing is not only important for communicating but serves as an invaluable tool for thinking. When we write, we step back from the lab bench, look at the big picture and consider the context of our science. We ask questions, we read the literature, we find new ideas, we see where results may be confusing or don't fit our expectations. This process of doing our own writing is *part of the scientific method*. To allow you to engage with and continue to develop this vital tool for science, all assignments in this course need to be written in your own words to receive credit.

The library offers online workshops to help students understand how to paraphrase, quote, and cite outside sources properly. These sessions are meant to educate about the importance of using original ideas and language, and how to incorporate paraphrases and quotes into writing. The complete list of library workshops can be found at:

www.geneseo.edu/library/library-workshops

Academic dishonesty includes cheating, knowingly providing false information, plagiarizing, and any other form of academic misrepresentation. Academic dishonesty will not be tolerated in this course. College policies and procedures regarding academic dishonesty are available at:

www.geneseo.edu/handbook/academic-dishonesty-policy

Technology Support. For the fastest response to technical questions or issues, please call the CIT HelpDesk at 585-245-5588. If you are unable to reach us by phone, please leave a voicemail, and we will follow up within one business day. You can also submit a ticket through the CIT Service Desk Portal. If you prefer, for non-critical issues, you may also submit a ticket via email at helpdesk@geneseo.edu.

Religious Observations and Class Attendance. New York State Education Law 224-a stipulates that "any student in an institution of higher education who is unable, because of [their] religious beliefs, to attend classes on a particular day or days shall, because of such absence on the particular day or days, be excused from any examination or any study or work requirements" (see https://www.geneseo.edu/apca/classroom-policies). SUNY Geneseo has a commitment to inclusion and belonging, and I want to stress my respect for the diverse identities and faith traditions of students in my class. If you anticipate an absence due to religious observations, please contact me as soon as possible in advance to discuss your needs and arrange make up plans.

Bias-Related Incidents. "We are here to listen, to learn, to teach, to debate, to change, to grow. We should all be safe to pursue these goals at SUNY Geneseo while being who we are. Together, we commit ourselves to pluralism, cultivating a community that respects difference and promotes a sense of inclusion and belonging."

As this excerpt from our Community Commitment to Diversity, Equity, and Inclusion states, here at SUNY Geneseo, we want to provide a space where everyone feels welcome to learn and grow in their identities as well as in their role as students, faculty, and staff. If in the unfortunate instance you experience an incident of bias, we encourage you to reach out to the Chief Diversity Officer (routenberg@geneseo.edu) or the Interim Director of Multicultural Affairs (nweathers@geneseo.edu). In trying to create an environment that facilitates growth through diverse thoughts and ideas, reporting incidents of bias—including threats, vandalism, and microaggressive behaviors—can help bring a better understanding of our campus climate as well as provide opportunities for learning and restoring harm. Hateful speech or actions will not be ignored in our class.

Student Well-Being is a priority in this class, to support the achievement of academic goals and alleviate stress. Your health and wellbeing are foundational to your ability to learn, and if you find that you are feeling unwell, mentally, or physically, and it is impacting your ability to complete your coursework, please reach out. Eating nutritious foods, getting enough sleep, exercising, avoiding drugs and alcohol, maintaining healthy relationships, and building in time to relax all help promote a healthy lifestyle and general well-being. Concerns about academic performance, health situations, family health and wellness (including the loss of a loved one), interpersonal relationships and commitments, and other factors can contribute to stress. Students are strongly encouraged to communicate their needs to faculty and staff and seek support if they are experiencing unmanageable stress or are having difficulties with daily functioning. Please feel free to reach out to me if you have questions or concerns. The Dean of Students (585-245-5706) can also assist and provide direction to appropriate campus resources. For more information, see www.geneseo.edu/dean_students.

Mental Health Resources. We can experience a range of challenges that can impact mental health and thus impact learning; common examples include increased anxiety, shifts in mood, strained relationships, difficulties related to substance use, trouble concentrating, and lack of motivation, among many others. These experiences may reduce our ability to participate fully in daily activities and affect academic performance.

SUNY Geneseo offers free, confidential counseling for students through Student Health and Counseling, and seeking support for your mental health can be key to your success at college. You can learn more about the various mental health services available on campus www.geneseo.edu/health. To request a counseling appointment, please complete the online form through myhealth.geneseo.edu.

Parents. Students who are parenting will be supported in this class. I ask that all students work with me to create a welcoming environment that is respectful to all forms of diversity, including diversity in parenting status. All exclusively breastfeeding babies are welcome in our class sessions as often as is necessary. For older children and babies, I understand that unforeseen disruptions in childcare and pandemic-related changes often put parents in the position of having to miss class to care for a child. While not a long-term childcare solution, occasionally bringing a child to lecture to cover gaps in childcare is perfectly acceptable. Children should not be brought to lab for safety reasons. If babies and children come to class, I ask that you be mindful to avoid disrupting learning for other students.

Finally, I understand that often the largest barrier to completing your coursework as a parent is the tiredness many parents feel in the evening once children have gone to sleep. While I maintain the same high expectations for all students in my classes regardless of parenting status, I am happy to problem-solve with you in a way that makes you feel supported as you strive for school-parenting balance.

Military Obligations and Class Attendance. Federal and New York State law requires institutions of higher education to provide an excused leave of absence from classes without penalty to students enrolled in the National Guard or armed forces reserves who are called to active duty. If you are called to active military duty and need to miss classes, please let me know and consult as soon as possible with the Dean of Students.

Food Security. There are resources available for students who are food insecure. If you're unfamiliar with the phrase "food insecurity," you can learn more at the following link on Feeding America's website: Understanding Food Insecurity (https://hungerandhealth.feedingamerica.org/understand-food-insecurity/).

The Pantry at Geneseo, our on-campus food pantry, works in partnership with the Geneseo-Groveland Emergency Food Pantry (GGEFP) and is facilitated by interns and volunteers working out of the Office of Student Volunteerism and Community Engagement as well as the School of Business, and the GOLD Leadership and Student Athlete Mentors programs.

Any student who is food insecure can submit a request here: Food Pantry Request Form (https://docs.google.com/forms/d/e/1FAIpQLSfFL6Vrdsv5kxTLd6yK_mXOL8NGeZtv5x8mzYAhHyiRJepLxA/viewform?usp=sf_link) to receive a bag of food that will provide them with items that will last a few days, including nonperishables and when available fresh fruits, vegetables, meat, and dairy. Once submitted, interns will connect directly with the student to communicate next steps and the time of your pickup. Pickups will take place in the MacVittie College Union, Room 114 - the GOLD Leadership Center.

This program will provide individuals with a bag of food up to once a month. We will do our utmost to ensure anonymity, while also working to destigmatize food insecurity in our community.

Students are also able to access the Geneseo-Groveland Emergency Food Pantry (https://ggefoodpantry.org/) on their own if that is their preference. It is located at 31 Center St. and is open Tuesdays and Thursdays 10 AM - 2 PM and Wednesdays 4 - 6:30 PM.

If you have any questions about this process or anything relating to food insecurity, or have a need beyond what is outlined above, please refer to our website or contact us directly at foodpantry@geneseo.edu / 585-245-5893 or the Dean of Students at 585-245-5706.

Diversity and Equity. It is my intent to create a learning environment that supports all students. I believe the diversity that you bring to this class should be viewed as a resource, strength, and benefit. I strive to present materials and activities that are respectful of gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture. Your suggestions are encouraged to improve the course's effectiveness personally, or for other students or student groups. I recognize that this feedback may not be easy to give. I will listen to feedback in whatever

form it is given and work to be mindful of my own power and privilege. For ideas, questions, or concerns related to diversity, equity, and inclusion in the Biology Department, please reach out to bio-diversity@geneseo.edu.

Resources for Physiology & Biomedical Sciences Grad Program. Let's talk jobs in office hours!

> https://www.physiology.org/career/teaching-learning-resources/graduate-physiology-biomedical-science-catalog?SSO=Y

## Information Regarding the Use of Animals for Teaching Purposes.

The course attempts to introduce students to the discipline of physiology by examining physiological organ-systems, as well as the molecular principles that underlie higher level integrative bodily functions. The laboratory component of the course serves to emphasize and reinforce the topics discussed in lecture. Many of the laboratory exercises in this class use reductionist models, computer simulations, and/or use student subjects for non-invasive measurements of physiological parameters. In some cases, however, it is not possible to effectively teach physiological principles by these methods. Therefore, a few laboratory exercises use animal subjects to demonstrate the importance of the physiological principles being discussed. Every effort is made to ensure humane treatment of these animals. Disrespectful treatment of lab subjects will not be tolerated.

Some students find it difficult to take part in the experiments in which animals are used. These students should meet with the instructor as soon as possible. In cases in which the student does not wish to participate in these experiments, alternative exercises may be assigned instead. If you think that you may have difficulties with the animal experiments, please talk to me as soon as you can.

For information regarding responsible use of animals in teaching and biomedical research, please visit the web sites of the following societies/organizations:

- American Physiological Society (www.the-aps.org)
- Federation of American Societies for Experimental Biology (www.faseb.org)
- American Association for Laboratory Animal Science (www.aalas.org)
- Office of Laboratory Animal Welfare (OLAW). Office of Extramural Research, National Institutes of Health, U.S. Department of Health, and Human Services (www.grants.nih.gov/grants/olaw/)
- Institutional Animal Care and Use Committee (www.iacuc.org)

# BIOL 364: ANIMAL PHYSIOLOGY 2024

# SCHEDULE

## Week 1: Foundations of Physiology

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|---|---|---|
| Jan. 22 | Welcome to Animal Physiology | *1.1* |
| Jan. 24 | Foundations of Physiology | *1.2–1.4* |
| Jan. 25 | Lab 1: Lab Orientation, Animal Diversity | |
| Jan. 26 | Homeostasis & Feedback | *1.5–1.7* |
| | Comparative Physiology Talks: Expectations & Resources | |

## Week 2: Homeostasis, Feedback, & Animals

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| Jan. 29 | The Animal Kingdom | |
| Jan. 31 | Cellular & Molecular Physiology | *2.1–2.6* |
| Feb. 1 | Lab 2: Countercurrent Exchange Lab | |
| Feb. 2 | Cellular & Molecular Physiology | *2.7–2.13* |

## Week 3: Cells & Molecules

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| Feb. 5 | Membrane Physiology | *3.1–3.3* |
| Feb. 7 | Membrane Physiology | *3.4–3.5* |
| Feb. 8 | Lab 3: Metabolism Lab | |
| Feb. 9 | Neuronal Physiology | *4.1–4.4* |
| | Adaptation Displays: Expectations & Resources | |
| | Due: Sign up for a Comparative Physiology Talk | |
| | Complete *Avoiding Plagiarism Tutorial* on Brightspace | |

## Week 4: Neuronal Physiology

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| Feb. 12 | Neuronal Physiology | |
| | Due: Sign up for your Journal Club Time Slot | |
| Feb. 14 | Nervous Systems | *4.5–4.8* |
| Feb. 15 | Lab 4: Physiological Genomics Lab | |

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| Feb. 16 | Nervous Systems | *5.1–5.3* |
| | Due: Article Response: Kendall-Bar *et al.* 2023, Seal Sleep | |

## Week 5: Nervous Systems

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| Feb. 19 | Nervous Systems | *5.4–5.7* |
| Feb. 21 | Sensory Physiology | *5.8–5.9* |
| Feb. 22 | Lab 5: Earthworm Action Potential Lab | |
| Feb. 23 | Sensory Physiology & Neuro Talks | 6.1–6.5 |
| | Due: Adaptation Display Topic & Source Check | |

## Week 6: Sensory Physiology

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|---|---|---|
| Feb. 26 | Sensory Physiology | *6.6–6.9* |
| Feb. 27 | *Diversity Summit* | |
| Feb. 28 | Sensory Physiology | |
| Feb. 29 | Lab 6: Sensory Physiology Lab | |
| Mar. 1 | Sensory Physiology & Talks | Cato *et al.* 2009 |
| | Due: Article Response: Cato *et al.* 2009, Mosquito Hearing | |

## Week 7: Mid-Semester Check-In

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| Mar. 4 | Mid-Term Review | *Ch 1–6 Summaries* |
| Mar. 5–6 | Mid-Term Exam, 20 min meetings | |
| Mar. 7 | Lab 7: Thermoregulation Lab | |
| Mar. 8 | Professional Development in Animal Physiology | |

Mar. 9–16: Spring Break

## Week 8: Endocrine Systems

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| Mar. 18 | Endocrine Systems | *7.1–7.4* |
| Mar. 20 | Endocrine Systems | *7.5–7.8* |
| Mar. 21 | Lab 8: Introduction to our Research Projects | |
| Mar. 22 | Endocrine Systems & Talks | *8.3–8.4* |
| | Due: Article Response: Patak & Baldwin 1993 Emu Muscles | |

## Week 9: Muscle Systems

| | | |
|---|---|---|
| Mar. 25 | Muscle Physiology | *8.5–8.6* |

| | | |
|---|---|---|
| Mar. 27 | Muscle Physiology | *8.7–8.8* |
| Mar. 28 | Lab 9: Research Projects | |
| | Due: Research Proposal & Collaboration Plan | |
| Mar. 29 | Skeletal Systems & Talks | |

## Week 10: Circulation

| | | |
|---|---|---|
| Apr. 1 | Circulatory Systems | *9.1–9.5* |
| Apr. 3 | Circulatory Systems | *9.6–9.10* |
| Apr. 4 | Lab 10: Research Projects | |
| Apr. 5 | Circulatory Systems & Talks | *9.11–9.16* |
| | Due: Adaptation Displays | |

## Week 11: Defense & Respiration

| | | |
|---|---|---|
| Apr. 8 | *Solar Eclipse, No Classes* | |
| Apr. 10 | Defense Systems | *10.1–10.4* |
| Apr. 11 | Lab 11: Research Projects | |
| | Due: Research Update & Introduction | |
| Apr. 12 | Defense Systems & Talks | *10.5–10.8* |

## Week 12: Respiration & Excretion

| | | |
|---|---|---|
| Apr. 15 | Respiratory Systems | 11.1-11.5 |
| Apr. 17 | Respiratory Systems | *11.6–11.10* |
| Apr. 18 | Lab 12: Research Projects | |
| Apr. 19 | Excretory Systems & Talks | *12.1–12.10* |
| | Due: Article Response: Swann *et al.* 2020, Anglerfish Immune Systems | |

## Week 13: Fluid & Acid-Base Balance

| | | |
|---|---|---|
| Apr. 22 | Fluid Balance | *13.1–13.4* |
| Apr. 24 | *GREAT Day* | |
| Apr. 25 | Lab 13: Research Projects | |
| | Due: Research Paper Drafts | |
| Apr. 26 | Acid-Base Balance & Talks | *13.5–13.8* |

Week 14: Digestion & Thermoregulation

| | | |
|---|---|---|
| Apr. 29 | Digestive Systems | *14.1–14.5* |
| May 1 | Digestive Systems | *14.6–14.10* |
| May 2 | Lab 14: Research Symposium | |
| | Due: Final Research Papers | |
| May 3 | Thermal Physiology & Talks | *15.1–15.8* |

Week 15: Putting it Together

| | | |
|---|---|---|
| May 6 | Reproductive Physiology | *16.1–16.7* |
| May 8 | Putting it Together: Final Review | *Ch 1–16 Summaries* |
| | Final Exam Available from 11:00 am | |

Week 16: Final Exam

| | | |
|---|---|---|
| May 13 | Final Exam Due by 5 pm | |