BIOLOGY 14: PHYSIOLOGY WINTER 2024

Instructor:	Robert Hill, Ph.D.	Robert.Hill@dartmouth.edu
Class Meetings:	Tuesday and Thursday from 10:10-12:00 PM in LSC 201	
Office Hours:	Wednesdays 10:30 - 11:30AM, online via Zoom (link on Canvas) Fridays 3:30 - 4:30PM	
Lab Director:	Amanda Socha, Ph.D.	Amanda.L.Socha@dartmouth.edu
Lab Teaching Assistants:	Kathryn Bates	Kathryn.C.Bates.GR@dartmouth.edu
	Elisa Carloni	Elisa.Carloni.GR@dartmouth.edu
	Camilo Castelblanco	Camilo.A.Castelblanco.Riveros.GR@dartmouth.edu
	Hai Nguyen	Hai.N.Nguyen.JR.GR@dartmouth.edu

COURSE DESCRIPTION

This course focuses on the structure and function of cells, tissues, organs, and organ systems, and how combinations of these generate homeostatic mechanisms and adaptive responses that allow organisms to survive environmental changes. It will cover topics in human and animal physiology, often using a comparative approach and will also include select examples of pathophysiology. Topics include mechanisms underlying biological control (hormones, neurons) and coordinated body functions (reproduction, circulation, respiration, osmoregulation, digestion). The systems studied will also be considered on an integrative level, by analyzing how different organisms adapt to environmental demands and stresses (changes in ion and water balance, temperature, oxygen levels, pressure) and move through their environment (navigation, locomotion, exercise). Lectures are supplemented by lab sessions that include dissection, experimentation, and discussion of primary research articles, and serve as an introduction to physiological techniques, animal models, and scientific investigation.

LEARNING OUTCOMES

By the end of this course, students should be able to:

1) Demonstrate a fundamental understanding of how the human body works and how we are similar and different from other organisms.
2) Apply this knowledge to make logical inferences about pathological conditions or adaptations in humans and other organisms.
3) Describe how the scientific method is used to gain physiological knowledge, including the roles of hypotheses, predictions, experimental design, and statistical analyses.
4) Design and execute physiological experiments and communicate the results in a scientific report.
5) Critically read and evaluate the primary literature in the field of physiology and discuss this literature with peers and other scholars.

CLASS MEETINGS

Tuesday and Thursday from 10:10 - 12:00 pm in Room 201 of the Life Sciences Center (LSC). Rarely, lectures will also be held during the X-hour (Fridays from 3:30- 4:20 pm). Students are also required to attend a lab session once a week in LSC 204 during most weeks of the course. Class meetings will include lectures and group activities.

COURSE MATERIALS / RESOURCES

There is no required textbook for the course. All the materials needed will be provided on the Canvas website. This includes lecture videos, PowerPoint slides of the lectures, worksheets, and all lab materials. If you would like a textbook to supplement the lecture material, we recommend Principles of Animal Physiology by Christopher D. Moyes and Patricia M. Schulte, Pearson Benjamin Cummings, 3rd edition, 2016.

EVALUATION: Three exams worth 25% each will account for 75% of the overall grade. Exams will be held on Tuesdays during the term and the final exam will be held during the final exam period (see class schedule). Exams will cover material from lectures, worksheets, and labs. Exams will be taken in class. To maintain fairness to all students in the course, accommodations for taking an exam at a different time will only be made in emergency situations, such as serious illness or family crises. The lab grade will be determined by short answer assignments, discussions, and lab reports. Altogether, the lab activities account for 25% of the final grade. Any requests to re-evaluate the points assigned to exam questions, lab assignments or lab reports must be submitted within one week of receiving the results of the exam, assignment, or lab report. Requests to change grades will not be accepted more than a week after receiving the grade. A clear written explanation of why the question, assignment, or lab report should receive additional points must be provided. Exam questions should be submitted through Gradescope.

HONOR PRINCIPLE: During this course, it is expected that students will abide by the Honor Principle. The Dartmouth College Student Handbook states "Fundamental to the principle of independent learning are the requirements of honesty and integrity in the performance of academic assignments, both in the classroom and outside. Dartmouth operates on the principle of academic honor, without proctoring of examinations. Any student who submits work which is not their own, or who commits other acts of academic dishonesty, violates the purposes of the College and is subject to disciplinary actions, up to and including suspension or separation."
Honor Principle: https://student-affairs.dartmouth.edu/policy/principles-community

STUDENT ACCESSIBILITY SERVICES: Students requesting disability-related accommodations and services for this course are required to register with Student Accessibility Services (SAS; Apply for Services webpage; student.accessibility.services@dartmouth.edu; 1-603-646-9900) and to request that an accommodation email be sent to me in advance of the need for an accommodation. Then, students should schedule a follow-up meeting with me to determine relevant details such as what role SAS or its Testing Center may play in accommodation implementation. This process works best for everyone when completed as early in the quarter as possible. If students have questions about whether they are eligible for accommodations or have concerns about the implementation of their accommodations, they should contact the SAS office. All inquiries and discussions will remain confidential.

STUDENT WELLNESS: The academic environment at Dartmouth can be challenging, the terms can be intensive, and classes are sometimes not the only demanding part of your life. There are several resources available on campus to support your wellness, and you are encouraged to use these resources and take care of yourself throughout the term. These resources include: Undergraduate Deans: http://www.dartmouth.edu/~upperde/, Counseling and Human Development: http://www.dartmouth.edu/~chd/, Student Wellness Center: http://www.dartmouth.edu/~healthed/. At Dartmouth, we value integrity, responsibility, and respect for the rights and interests of others, all central to our Principles of Community. We are dedicated to establishing and maintaining a safe and inclusive campus where all have equal access to the educational and employment opportunities Dartmouth offers. We strive to promote an environment of sexual respect, safety, and well-being. In its policies and standards, Dartmouth demonstrates unequivocally that sexual assault, gender-based harassment, domestic violence, dating violence, and stalking are not tolerated in our community. The Sexual Respect Website (https://sexual-respect.dartmouth.edu/) provides a wealth of information on your rights and obligations about sexual respect and resources that are available to all in our community. As a faculty member, we are obligated to share disclosures regarding conduct under Title IX with Dartmouth's Title IX Coordinator. Should you have any questions, please feel free to contact Dartmouth's Title IX Coordinator Kristi Clemens.

STUDENT RELIGIOUS OBSERVANCES: Dartmouth has a deep commitment to support students' religious observances and diverse faith practices. Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your participation in the course, please meet with me as soon as possible—before the end of the second week of the term at the latest—to discuss appropriate course adjustments.

LABORATORIES: See the class schedule for the weeks during which labs are held. Students are required to attend their assigned lab during the scheduled time. Switching lab sections will not be allowed once labs are assigned. Please see the lab syllabus, the Canvas website, and individual lab instructions for detailed descriptions of each laboratory.

CLASS SCHEDULE

DATE	TOPIC
Week 1	NO LAB
Thu 1/4	Lecture 1: Course Intro / Molecules and Cells
Week 2	Lab 1: Nervous System
Tue 1/9	Lecture 2: Nervous System 1
Thu 1/11	Lecture 3: Nervous System 2
Week 3	Lab 2: Visual System
Tue 1/16	Lecture 4: Nervous System 3
Thu 1/18	Lecture 5: Endocrine System
Week 4	NO LAB
Tue 1/23	**EXAM 1**
Thu 1/25	Lecture 6: Cardiovascular 1
Week 5	Lab 3: Cardiovascular Anatomy and Function
Tue 1/30	Lecture 7: Cardiovascular 2
Thu 2/1	Lecture 8: Respiratory
Fri 2/2	X-hour Lecture 9: Low O_2
Week 6	Lab 4: Cardiopulmonary Anatomy and Function
Tue 2/6	Lecture 10 Muscle
Thu 2/8	Lecture 11: Locomotion / Exercise
Week 7	NO LAB
Tue 2/13	**EXAM 2**
Thu 2/15	Lecture 12: Gastrointestinal system 1
Week 8	Lab 5: GI System
Tue 2/20	Lecture 13: Gastrointestinal system 2
Thu 2/22	Lecture 14: Ion and water balance
Week 9	Lab 6: Renal System
Tue 2/27	Lecture 15: Reproduction
Thu 2/29	Lecture 16: Immune
Week 10	NO LAB: Independent Project
Tue 3/5	Lecture 17: Thermoregulation
Mon 3/11	**EXAM 3 - 9:00 - 11:00 AM**