

BIOLOGY 14: PHYSIOLOGY

Fall 2020

Instructor:	Hannah ter Hofstede
Instructor Email:	Hannah.ter.Hofstede@Dartmouth.edu
Class Meetings:	Online via Zoom: Tue and Thu 10:20-11:05 OR 11:15-12:00
X-Hours:	Online via Zoom: Fri 4:00-4:50. X-hours will be used for group office hours
Office Hours:	Online via Zoom: Wed 9:00-10:00, Thu 12:00-1:00, Fri 4:00-5:00
Lab Director:	Nick Sylvain, PhD; Email: Nicholas.R.Sylvain@dartmouth.edu
Teaching Assistants:	Clare Doherty; Email: Clare.Doherty.GR@dartmouth.edu Liz Studer; Email: Elizabeth.A.Studer.GR@dartmouth.edu

COURSE DESCRIPTION

This course examines 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, animal, and plant physiology, often using a comparative approach, and will also include select examples of pathophysiology. The systems studied will also be considered on an integrative level, by analyzing how different organisms adapt to a variety of environmental demands and stresses (ion and water balance, temperature regulation, changes in O₂ availability) and move through their environment (navigation, locomotion, exercise). Lectures are supplemented by lab sessions that include virtual dissections, data analysis 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:

- Demonstrate a fundamental understanding of how the human body works and how we are similar to or different from other animals.
- Apply this knowledge to make logical inferences about pathological conditions or evolutionary adaptations in humans and animals.
- Describe how the scientific method is used to gain physiological knowledge, including the roles of hypotheses, predictions, experimental design, and statistical analyses.
- Critically read and evaluate the primary literature in the field of physiology and discuss this literature with peers and scholars.

LECTURES AND CLASS MEETINGS

Lectures will be provided as videos to be watched at home prior to class meetings. Lecture videos, Powerpoint slides, worksheets and the Zoom link and password for class meetings will be made available on the course Canvas website. For the first lecture and class meeting on Tue. Sep. 15, the entire class will meet at 10:20 am via Zoom. Starting Thu. Sep. 17, half the class will attend class meetings 10:20 am - 11:10 am and the other half of the class will attend class meetings from 11:15 am - 12:05 pm. Class meetings will be used to review lecture material and participate in group activities (usually in the form of worksheets). Lab sessions are synchronous and students are required to attend a lab session at a specific time once per week during most weeks of the course. See the class schedule at the end of the syllabus for dates.

COURSE MATERIALS / RESOURCES

There is no required textbook for the course. All the materials needed for the course 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

Five quizzes worth 15% each will account for 75% of the overall grade. Quizzes will be held on Mondays every two weeks during the term and the final quiz will be held during the final exam period (see class schedule on p. 4). Quizzes will cover material from lectures, worksheets and labs, focusing on material from the previous two weeks of the course. Quizzes will be taken through the Canvas website. Each quiz will be 1 hour in length. You may take the quiz anytime between 8:00 am – 8:00 pm EDT on the day of the quiz, but once you start the quiz, you must complete it in 1 hour. You must start the quiz before 7:00 pm EDT to have the full hour for the quiz. Unless students have made alternative arrangements with Prof. ter Hofstede **prior to the start of the quiz**, students who do not take the quiz during the schedule time will receive a quiz grade of zero. To maintain fairness to all students in the course, accommodations for taking a quiz 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 quizzes, short answer assignments, discussions and lab reports. Please see the lab syllabus for the breakdown of grades for the lab section. Altogether, the lab activities account for 25% of the final grade.

Any requests to re-evaluate the points assigned to quiz questions, lab assignments or lab reports must be submitted **within one week** of receiving the results of the quiz, 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. Quiz questions can be submitted by email to Prof. ter Hofstede. Lab grade questions should be submitted by email to Dr. Sylvain.

Grades will be determined by the percentage of the total points possible. While 90% or above will be A or A- and more than 60% will be required to pass the course, the grades associated with the remainder of the scores may be adjusted slightly depending upon the distribution of the class. *Typical (but not necessarily final)* percentages and corresponding grades are: ≥ 93 (A); 90-92 (A-); 87-89 (B+); 83-86 (B); 80-82 (B-); 77-79 (C+); 70-76 (C); 66-69 (C-); 61-65 (D); ≤ 60 (E).

HONOR PRINCIPLE

During this course, it is expected that students will abide by the Dartmouth Academic Honor Principle. Please read and think carefully about the policy posted on the Office of Judicial Affairs website: <https://students.dartmouth.edu/judicial-affairs/policy/academic-honor-principle>. The Dartmouth College Student Handbook (page iii) 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. Students who submit work which is not their own or who commit other acts of academic dishonesty forfeit the opportunity to continue at Dartmouth.*" Although we encourage you to discuss class material with classmates for learning purposes, anything you submit for grading must be **entirely your own work**. If you have any questions or concerns regarding the honor principle during the course, please contact Prof. ter Hofstede.

STUDENTS WITH DISABILITIES

Students with disabilities who may need disability-related academic adjustments and services for this course are encouraged to contact Prof. ter Hofstede privately within the first week of classes. Students requiring disability-related academic adjustments and services must consult the [Student Accessibility Services office](mailto:Student.Accessibility.Services@Dartmouth.edu) (Student.Accessibility.Services@Dartmouth.edu, Carson Hall, Suite 125, 646-9900). Once SAS has authorized services, students must provide the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to their professor. As a first step, if students have questions about whether they qualify to receive academic adjustments and services, they should contact the SAS office. All inquiries and discussions will remain confidential.

STUDENTS' RELIGIOUS OBSERVANCES

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 contact Prof. ter Hofstede before the end of the second week of the term to discuss appropriate accommodations.

WELLNESS AND RESPECT

The academic environment at Dartmouth is challenging, our terms are intensive, and classes are not the only demanding part of your life. There are a number of resources available to you to support your wellness, including your undergraduate dean (<http://www.dartmouth.edu/~upperde/>), Counseling and Human Development (<http://www.dartmouth.edu/~chd/>), and the Student Wellness Center (<http://www.dartmouth.edu/~healthed/>).

Dartmouth is 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>) at Dartmouth provides a wealth of information on your rights with regard to sexual respect and resources that are available to all in our community.

Please note that, as a faculty member, Prof. ter Hofstede is obligated to share disclosures regarding conduct under Title IX with Dartmouth's Title IX Coordinator. Confidential resources are also available, and include licensed medical or counseling professionals (e.g., a licensed psychologist), staff members of organizations recognized as rape crisis centers under state law (such as WISE), and ordained clergy (see <https://sexual-respect.dartmouth.edu/reporting-support/all-resources/confidential-resources>).

Should you have any questions, please feel free to contact Dartmouth's Title IX Coordinator or the Deputy Title IX Coordinator for the Guarini School. Their contact information can be found on the sexual respect website at: <https://sexual-respect.dartmouth.edu/reporting-support/all-resources/campus-resources>

LABORATORIES

There are six labs during the term. See the class schedule for the weeks during which labs are held. Labs will be conducted via zoom and are scheduled for 3 hours. 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

Week	DATE	TOPIC
1	Tue - Fri	NO LAB
	Tue 9/15	Lecture 1: Course Introduction / Molecules and Cells
	Thu 9/17	Lecture 2: Nervous System 1: Functional Organization
2	Tue - Thu	Lab 1: Neurobiology 1
	Tue 9/22	Lecture 3: Nervous System 2: Cell Structure and Function
	Thu 9/24	Lecture 4: Nervous System 3: Sensory Systems
3	Tue - Thu	Lab 2: Neurobiology 2
	Mon 9/28	QUIZ 1
	Tue 9/29	Lecture 5: Endocrine System
	Thu 10/1	Lecture 6: Muscle
4	Tue - Thu	NO LAB
	Tue 10/6	Lecture 7: Cardiovascular Physiology 1
	Thu 10/8	Lecture 8: Cardiovascular Physiology 2
5	Tue - Thu	Lab 3: Cardiovascular Anatomy and Function
	Mon 10/12	QUIZ 2
	Tue 10/13	Lecture 9: Respiratory Physiology
	Thu 10/15	Lecture 10: Exercise
6	Tue - Thu	Lab 4: Cardiopulmonary Anatomy and Function
	Tue 10/20	Lecture 11: Locomotion
	Thu 10/22	Lecture 12: Low O ₂ Environments
7	Tue - Thu	NO LAB
	Mon 10/26	QUIZ 3
	Tue 10/27	Lecture 13: Gastrointestinal (GI) System 1
	Thu 10/29	Lecture 14: Gastrointestinal (GI) System 2
8	Tue - Thu	Lab 5: GI Function
	Tue 11/3	Lecture 15: Ion and Water balance
	Thu 11/5	Lecture 16: Plant physiology
9	Tue - Thu	Lab 6: Renal physiology
	Mon 11/9	QUIZ 4
	Tue 11/10	Lecture 17: Reproduction
	Thu 11/12	Lecture 18: Immune system
10	Tue - Thu	NO LAB
	Tue 11/17	Lecture 19: Thermoregulation
	Final Exam Slot	QUIZ 5