

Human Physiology: BISC 302 – Fall 2022
Updated syllabus 9/12/22

Lecture Instructor: Claire Riggs; email: cr113@wellesley.edu

Classroom: Science Center, L220

Class time: Monday and Thursday 11:20 am - 12:35 pm

Office Hours: Monday 2-3:30 pm and by appt

Office: Science Center, E340

Lab Instructor: Sarah Barnes; email: sarah.barnes1@wellesley.edu

Lab time: Fridays 12:45 - 4:15 pm

Course Goals

- Understand how organ systems work (together and independently) to maintain homeostasis and how principles of physiology underpin their function
- Apply principles of physiology to explain data, disease, or solve physiological problems
- Grow in appreciation of complexity and imperfection of biology; in understanding of humans as animals
- Improve oral and written scientific communication

Course Description

This course will provide foundational knowledge and conceptual understanding of human physiology by exploring the role our organ systems play in maintaining homeostasis of our internal environment. The course will primarily focus on 5 major systems (cardiovascular, respiratory, digestive, renal, reproductive) plus the interaction between environmental extremes and these systems (environmental physiology). For each unit, we'll read articles to dig deeper into classic discoveries and current research, as well as reviews and popular science articles to broaden our perspective on a given topic. Class time will consist primarily of lecture and discussion. In pairs, students will facilitate one of the class discussions. Individually, each student will give a presentation on a topic of interest to them at the end of the term. This course should be useful for pre-med, pre-vet, and pre-graduate students, and interesting for anyone with a body.

Resources:

Highly recommended text:

Widmaier E, Raff H, Strang K. Vander's Human Physiology, 12th Ed. McGraw-Hill Education.

Vander's Physiology will provide useful background reading for understanding the concepts presented in lecture, and additionally will serve as a resource to better understand lecture material. Suggested readings are listed on the syllabus. Used and new copies of the 12th edition of Vander's Physiology are widely available online for purchase or rent. The library will also have two copies on reserve for you to use.

Assigned readings: readings are on the course google drive

Online resource:

Anatomy and Physiology available for free on OpenStax

<https://openstax.org/details/anatomy-and-physiology?Book%20details>

Schedule (subject to change – updated 9/19/22)

Week		Date	Topic	Assigned readings for discussion	Reading in Vander's	Important dates
1	Th	8-Sep	Introduction and course overview			
2	Mon	12-Sep	Homeostasis & other principles		1-15	
	Th	15-Sep	Diffusion and transport	Cannon 1929 (pgs TBA)	95-113	
3	Mon	19-Sep	Excitable cells		142-154	
	Th	22-Sep	Control: endocrine and neuro overview	Kadir et al. 2018; Hodgkin & Huxley 1939	311-350, 169-180	
4	Mon	26-Sep	The heart and cardiac cycle		353-275	
	Th	29-Sep	Cardiovascular system: hemodynamics and periph circulation	Zweifach 1959	377-396	
5	Mon	3-Oct	Cardiovascular system: regulation of blood pressure; presentations	Disease presentations	397-416	
	Th	6-Oct	Respiratory system: intro/overview	Williams et al. 2015 * - Skye & Michelle	435-448	
6	Mon	10-Oct	No class - Indigenous Peoples' Day			
	Th	13-Oct	Respiratory system: gas exchange		448-460	
7	Mon	17-Oct	Respiratory system: regulation of respiration; presentations	Disease presentations	460-469	
	Th	20-Oct	catch-up and exam review			
8	Mon	24-Oct	Exam 1			Exam 1
	Th	27-Oct	Energy balance and gastro-intestinal intro	Beall et al. 1998	516-528	
9	Mon	31-Oct	Immunology with Sarah (Claire at conference)			
	Th	3-Nov	Digestion; presentations	Disease presentations	528-544	
10	Mon	7-Nov	Digestion continued, control of metabolism	Diamond & Secor 1994; Diamond 1998 - Student-led	554-567	
	Th	10-Nov	Metabolic rate and body temperature		569-585	
11	Mon	14-Nov	Renal - overview of osmoregulation and kidneys; presentations	Disease presentations	475-480	
	Th	17-Nov	Renal physiology: urine production		480-487	
12	Mon	21-Nov	Renal physiology: concentrating urine and BP regulation	Guyton 1991 - Student-led	490-504	
	Th	23-Nov	No class - Thanksgiving Break			
13	Mon	28-Nov	Reproduction: male		586-602	
	Th	1-Dec	Reproduction: female	Boddy et al 2015 - Student-led	603-614	
14	Mon	5-Dec	Pregnancy and development; presentations	Disease presentations	614-631	
	Th	8-Dec	Environmental physiology	Ferretti and Costa 2003 - Student-led		
15	Mon	12-Dec	exam review			Reflection essay due
	Thurs	16-Dec	No class - reading period			
Finals Week	Mon-Thurs	12/19 - 12/22	Final Exam - self-scheduled			Final Exam, self-schedule

Assessment:

Exams

There will be two exams, one midterm and one final. These exams will be composed of essay and objective questions on material from readings, lecture, and class discussion.

Participation

Our exploration of human physiology this term will be enriched by each of your contributions to the course. As such, each student is expected to contribute to class by:

- Facilitating a paper discussion (in pairs)
- contributing to discussions
- asking questions in class
- coming to office hours
- participating in in-class exercises

Presentation

You will also give a brief (10 min) presentation on **a disease of your choosing**. Your presentation should cover the cause(s) of the disease process, what aspect(s) of homeostasis has been disrupted, the physiological response, and the symptoms of the disease. This is an opportunity to explore a topic of interest to you and for us to all learn more about human physiology.

Reflection essay

You will write a short essay (2-3 pages) on how your perspective on human physiology has changed (more details to come).

Grading – 1000 points possible

Lecture: 700 points

Two lecture exams:

- Exam 1 (midterm): 200
- Exam 2 (final): 250

Participation: 100 points

Presentation: 100 points

Reflection essay: 50 points

Lab: 300 points

Communication: Between classes, I will communicate with you (as necessary) by email. If you have any questions or would like to speak with me between classes, please stop by my office hours or contact me by email. I am happy to arrange another time to meet (either in-person or on zoom) if you are not able to come to my schedule office hours.

Grading policies: Assignments are due as indicated on the schedule. There will be a 5%/day deduction for late work, and no credit for assignments turned in after they are returned to students. Exams will only be rescheduled in extenuating circumstances.

Attendance: Attending lecture and contributing to in-class discussion and exercises is an important part of this course. Your presence is expected in each class. To receive full credit for participation you may have no more than one unexcused absence. Please contact me if you anticipate missing class.

Honor Code: Students are reminded that the college Honor Code applies to all written work in this course. Expectations for independent vs group work will be communicated for each assignment. In this class you will be graded on assignments as individuals, but we will frequently work together in groups during class and I also encourage you to work together outside of class.

Departmental Inclusion Statement: We in the Wellesley College Department of Biological Sciences, including all faculty, staff and students participating in the department, are devoted to improving equity and enhancing student experiences of community, engagement and belonging. We believe that the diversity of our community is central to intellectual growth and development. We are committed to being a learning community that embraces and supports the identities, abilities, life experiences, and aspirations of every member of our community.

Additional Campus Resources:

Class deans: <https://www.wellesley.edu/advising/classdeans> (any issues, health/financial hardships/family issues etc)

Office of Student Success: <https://www.wellesley.edu/studentlife/intercultural/studentSUCCESS> (any issues, health/financial hardships/family issues etc)

Stone Center: <https://www.wellesley.edu/counseling> (mental and emotional wellbeing)

Wellesley College's Accessibility and Disability Services: If you have a disability or condition, either long-term or temporary, and need reasonable academic adjustments in this course, please contact Wellesley College's Accessibility and Disability Resources (ARD) to get a letter outlining your accommodation needs, and submit that letter to me. You should request accommodations as early as possible in the semester, or before the semester begins, since some situations can require significant time for review and accommodation design. If you need immediate accommodations, please arrange to meet with me as soon as possible. If you are unsure but suspect you may have an undocumented need for accommodations, you are encouraged to contact ADR. They can provide assistance, including screening and referral for assessments. ADR can be reached at accessibility@wellesley.edu, at 781-283-2434, by scheduling an appointment online at their website www.wellesley.edu/adr, or by visiting their offices on the 3rd floor of Clapp Library, rooms 316 and 315.

Office of the Ombuds: Provides confidential and neutral meetings, either in person or virtual, in order to assist students, faculty and staff in exploring options for resolving problematic issues on campus between individuals or due to other college-related factors. <https://www.wellesley.edu/administration/ombuds>

Discrimination and Harassment: Wellesley College considers diversity essential to educational excellence, and we are committed to being a community in which each member thrives. The College does not allow discrimination or harassment based on race, color, sex, gender identity or expression, sexual orientation,

ethnic or national origin or ancestry, physical or mental disability, pregnancy or any other protected status under applicable local, state or federal law. If you or someone you know has experienced discrimination or harassment, support is available to you:

Confidential reporting:

- Students can report their experiences to Health Services (781.283.2810); Stone Center Counseling Service (781.283.2839); or Religious and Spiritual Life (781.283.2685). These offices are not required to report allegations of sexual misconduct to the College.

Non-confidential reporting:

- You can let me know. As faculty members, we are obligated to report allegations of sex-based discrimination to the Nondiscrimination/Title IX Office.
- You can report directly to the Nondiscrimination/Title IX Office (781.283.2451) to receive supports, and to learn more about your options for a response by the College or about reporting to a different institution.”