# Physics of the Human Body 2

**PHYS 0411**, section **29049**, **Spring 2020** (2204)

Meeting times: **Wednesdays 4:00-4:50 pm**
Lecture room: **105 Allen Hall**
Instructor: **Dr. Matteo Broccio**, mbroccio@pitt.edu
Office hours: 217 Allen Hall, by appointment

## Course description and goals

This Honors supplement to the first half of algebra-based introductory Physics sequence for life sciences applies physics concepts to the human body and its interactions with the physical environment. The topics explored in this course include: human proportions and scaling laws, locomotion, internal forces, strength and balance, elasticity, blood circulation. This course is recommended for those students who plan a career in the medical and health professions.

At the end of this course, the successful student will be able to apply physics principles to the human body, as well as show a moderate competence in modeling complex situations. It is generally recommended that students have already completed PHYS 0111 before enrolling in this course; however students with some background in waves, electricity, and optics, taking PHYS 0111 concurrently will also be permitted to enroll.

## In-class participation

Before class, you are expected to look at the **preview** posted on Courseweb by the instructor. Lectures will begin in the form of brief review conceptual discussions about processes. For the remainder of the time, students will be asked to collaborate in small groups at the solution of physiology-based problems. To guarantee general fairness, you will be held accountable for understanding the problem solution as you may be selected individually to discuss it. To further clarify, mere attendance will only get you a fraction of the earnable credit. Your *active* participation in the classroom will weigh 80% in your overall assessment. I will expect you to always come to class on time, out of respect for your classmates and instructor.

## Out-of-class assignments

There is no regular homework for this supplement. From time to time, there may be some brief take-home practice assignments, which are usually designed as a continuation of an in-class activity. Performance of these tasks will be counted as part of your participation grade. Details will be explained in class by the instructor.

## Final presentation

There are **no in-class exams**. You will be asked to deliver a 5-minute **final presentation** on a human body topic of your preference, chosen from a list circulated by the instructor with at least three weeks notice. You will submit a readable preview of your final presentation by the due date announced by the instructor. (You should also be ready to answer some questions from the audience.) Your final presentation will weigh 15% in your overall assessment.

## Peer review of presentations

While you are preparing for your presentation, you will also be asked to anonymously review *two* other presentations (chosen at random) indicating their strengths and weaknesses. Clear guidelines for the peer review will be distributed by the instructor. The mandatory completion of the two peer reviews will weigh 5% in your overall assessment.

## Calculation of grade

Every student who has been an active participant in class, has delivered his/her final presentation and has submitted the two peer reviews will be deemed to have satisfactorily completed the course. The weights of various components are as shown in the following table.

| **Assessment component** | **Weight** |
|---|---|
| In-class participation (one excused absence) | 80% |
| Final presentation (required) | 15% |
| Peer review of presentations (required) | 5% |

## Course schedule

| **Meeting** | **Tentative topics** |
|---|---|
| 1: | intro; standing waves; hearing |
| 2: | sound perception; voice production |
| 3: | lungs and breathing |
| 4: | physics of alveoli |
| 5: | vision; imaging by the eye |
| 6: | vision impairments |
| 7: | electricity and the body; electric shocks |
| 8: | tbd |
| 9: | *Spring Recess* |
| 10: | nerve conduction |
| 11: | properties of cell membranes |
| 12: | electrical properties of the heart |
| 13: | touch, taste, smell; scaling of senses |
| 14: | **Final Presentations, Session 1** |
| 15: | **Final Presentations, Session 2** |

## Disability Resource Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Office of Disability Resources and Services, 140 William Pitt Union, 412-648-7890, as early as possible in the term. Disability Resources and Services will verify your disability and determine reasonable accommodations for this course.

## E-mail Communication Policy

Each student is issued a University e-mail address (username@pitt.edu) upon admittance. This e-mail address may be used by the University for official communication with students. (For the full E-mail Communication Policy, go to `www.bc.pitt.edu/policies/policy/09/09-10-01.html`.)

## Update policy

Any updates to formats, policies, or schedule shown in this document will have to be announced by the instructor *both* in the classroom and and electronically on Courseweb to be in effect.