

MCB 32: Introduction to Human Physiology, Fall 2021

Lectures Tu/Th 12:30-2pm (via Zoom)

Instructor

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All instructor office hours will be posted on bCourses. You can get 1 extra credit point during the semester for coming to an office hour or UGSI study session.

Course description

This course is intended as an introduction to human physiology for non-MCB majors. We will start off the course reviewing basic cell biology, which will be necessary for understanding how the human body works. We will then cover all the major organ systems of the human body, including the endocrine system, reproductive system, nervous system, muscles, cardiovascular physiology, respiratory system, urinary system and digestive system. By the end of the semester, you will have an understanding of how your organs function and how your body regulates the different organ systems to help maintain homeostasis and keep you alive.

Course format

This course is organized into 28 different modules. Modules are on bCourses and will become available at the start of each week. The modules consist of 3-6 webpages with written explanations, figures and short video lectures. You should work through the modules on your own time and complete the homework assignment at the end of each module. Keep up with the modules and homework assignments using the schedule at the end of the syllabus. You will not do well in this course if you wait until right before the exams to study the modules!

During the lecture time, we will meet on Zoom to go over some of the material in the modules, do practice problems and work through case studies. You will sometimes be put into breakout rooms to work with other students. The lectures will also give you opportunities to ask questions about the modules using the chat function. Expect the lectures to be informal and interactive. The Zoom lectures will all be recorded and posted in bCourses after class.

Please work through the modules on your own before the Zoom lectures and attend the lectures if you are able. You will get more from the class if you come to the live lectures.

Discussion sections

Discussion sections will take place in person or via Zoom and you should attend the section you are enrolled in. You are highly encouraged to attend discussion section. Students from past semesters recommended regular attendance at section, because it gives you a chance to interact with other students. Discussion sections will give you more opportunities to work through the material, form study groups and ask questions. There will be extra study questions available in discussion only, which

you will work on with other students. Talking through the material is the best way to learn it! Check out the discussion section pages on bCourses for more details and Zoom links for the remote sections.

| Section | Time | Location | GSI | LA |
|----------------|-------------|---------------------|------------|-----------|
| 101 | M 10am | 88 Dwinelle | Rayan | Eric |
| 102 | M 12pm | <i>Remote</i> | Aminta | Jacob |
| 103 | M 1pm | <i>Remote</i> | Aminta | Isabel |
| 104 | T 2pm | 136 Social Sciences | Rayan | Lilli |
| 105 | W 9am | 243 Dwinelle | Rayan | Char |
| 106 | W 1pm | <i>Remote</i> | Rachel | Areej |
| 107 | W 3pm | <i>Remote</i> | Rachel | Izzy |
| 108 | Th 9am | 151 Social Sciences | Kaitlin | Courtney |
| 109 | Th 10am | 243 Dwinelle | Kaitlin | Kailey |
| 110 | F 12pm | <i>Remote</i> | Nate | Daniela |
| 111 | F 1pm | <i>Remote</i> | Nate | Henry |
| 112 | F 2pm | <i>Remote</i> | Haruna | Elizabeth |

Learning assistants

Learning assistants (LAs) took MCB 32 in previous years and they are eager to help you succeed in the class. LAs will attend discussion section and help students with the worksheets. In addition, they will hold study sessions each week where you can ask questions and work on practice problems. If you feel uncomfortable attending office hours with a professor or GSI, then perhaps study sessions will be a great place for you to get help from your peers. The schedule and links for study sessions will be posted on bCourses.

Covid-19 policies

We are still in the pandemic and we expect everyone to follow the current guidelines announced by the campus. You are expected to have a green campus access badge, having been vaccinated or frequently getting tested. You should fill out the daily symptom screener before coming to campus. Whenever you are indoors, including in discussion sections or office hours, you should wear a mask over your nose and mouth.

If you have tested positive for Covid-19 or if you are feeling ill or have been asked to quarantine, please **do not come to in-person classes**. We want to keep our community safe, so please always follow the rules set out by the University and your instructors.

Recommended textbook

Cindy L. Stanfield, *Principles of Human Physiology*, Pearson, 6th edition

The textbook for this course is recommended, **but not required**. If you are going to get the textbook, I recommend buying an older edition or a used copy, because it will be cheaper. The 4th or 5th edition are nearly the same as the newest edition.

At the beginning of each module, it will say what pages in the textbook correspond to the material and you may occasionally see references to specific figures, but you do **not** need to know extra material in the textbook that was not discussed in the module/lecture. Use the textbook to clear up confusing points from the modules and lecture, and to review the figures.

Course website

<https://bcourses.berkeley.edu/> or find it via CalCentral.

We will be using bCourses extensively for this class. The course is organized into modules and each module on bCourses has several webpages of reading. Most pages also have practice questions and a mini video lecture. Read the page, study the page, watch all the video lectures and take notes. This is where the bulk of the material will be covered.

All the homework assignments will also be through bCourses. Announcements to the class will be through bCourses, so check them often or change your settings, so they are emailed to you automatically.

Grades

| | | |
|---------------------------------|------------|---------------|
| Midterm exams (best 2 out of 3) | 2 x 80 pts | 160 pts |
| Final exam (cumulative) | | 125 pts |
| Homework (best 25 out of 28) | 25 x 4 pts | 100 pts |
| Medical racism discussions | 5 x 10 pts | 50 pts |
| <u>Paper</u> | | <u>40 pts</u> |
| Total | | 475 pts |

This course is not curved. You are not in competition with other students in the class. We encourage you to study together. Everyone can do well in the class as long as you keep up with the material. See the FAQ page on bCourses for information about grading.

Exams

Three midterms cover material immediately preceding these sections of the course. You will have 80 minutes for each exam. The exams will be a combination of multiple choice and short answer questions and are worth 80 points each. Your lowest midterm score will be dropped, so if you miss a midterm exam for whatever reason, it will not affect your grade.

If you have a legitimate excuse for missing an exam (you are sick or have some internet/technology issue), contact an instructor to take a make-up exam. We can only give make-up exams up to 2 days after the exam. If you need to miss a midterm exam for whatever reason, then that will be your dropped exam score.

The final exam is required and worth 125 points and covers material from the entire course. You will get 3 hours to take the final exam starting Thursday Dec 16 at 12pm (noon) until Friday Dec 17 at 12pm (noon).

The exams will be available to take through Gradescope, which you can get to through our bCourses page. You will answer the questions directly in Gradescope, typing in your answers. The exams will be available for 24 hours on the day indicated in the schedule. Once you start the exam you will have 80 minutes (or 3 hours for the final) to complete it.

The exams will be open-note, so you may use your notes, the textbook, or bCourses. You will not have time to look up every single answer, though, so you do still need to study for the exam. You are not allowed to work together during the exam or to share information about the exam with another student in the class. We trust you to complete your own work.

Homework

The homework assignments will be posted on bCourses in the Assignments section. There will be a homework assignment at the end of each module. You will get three chances to get the correct answers and your highest score will be recorded in bCourses. The homework assignments are a good place to test your understanding of the material before the exams. Your lowest three homework scores will be dropped at the end of the semester.

Homework assignments for the assigned modules for a week are due Sundays at 11:59pm. You will be deducted 2% (0.08 points) for each day the assignment is late up to 10% total deduction (0.4 points) for homework that is 5 days late or more. The final due date for the homework is by the next exam date.

Medical racism discussions

This course is taught from an anti-racist perspective. This means that we will be actively interrogating false biological notions of race and emphasizing that race is a social construct. Racism is a root cause of health disparities and has tangible effects on health and well-being. Racism affects medical research, pharmaceutical development and how patients are treated by the medical establishment. Health inequities are caused by racist policies that affect who has access to healthy foods, housing and quality healthcare. We will learn more about how racism affects medicine in the context of the different organ systems we will be covering in the modules.

There will be five reading and discussion assignments throughout the semester. Each assignment addresses a different aspect of medical racism and will relate to the physiology we are learning in class. For each assignment you will be given articles to read. You will write a couple of paragraphs in response to the reading in a discussion assignment on bCourses. You will receive full credit if you complete a thoughtful response and respond to one other student's post. You will also have an opportunity to discuss some of the nuances of these topics in discussion section.

The topics we will cover and the modules they relate to are:

| Module | Topic | Discussion due date |
|------------------------|--|----------------------------|
| 4. Cells | Introduction to medical racism | Sun Sept 5 |
| 8. Reproductive system | Birth control clinical trials | Sun Sept 19 |
| 13. Sensory systems | Stereotypes about pain sensation | Sun Oct 10 |
| 18. Heart | BiDil race-based medication | Sun Oct 24 |
| 23. Kidney | Race-based estimate of kidney function | Sun Nov 7 |

Paper

You will write a two-page research paper (double-spaced) due **Friday December 3** at 11:59pm through bCourses. You will choose one of the following topics:

1. Medication paper

You will research how a medication of your choice functions and affects human physiology in order to help the patient. The paper is your opportunity to apply all that you have learned to a real-world medical problem.

2. Medical racism paper

You will research another aspect of medical racism or go more into the details of one of the topics we discussed in class this semester. You will need to go into the research literature to find out how racism

and racist policies lead to differing health outcomes. We expect you to apply what you have learned from the discussion assignments to write a well-researched paper.

We will give you more details about each paper assignment, including detailed grading rubrics later in the semester.

Accommodations

Students who need academic accommodations, should request them from the Disabled Students' Program, 260 César Chávez Center, 642-0518 (voice or TTY), <https://dsp.berkeley.edu>. DSP is the campus office responsible for verifying disability-related need for academic accommodations, assessing that need, and for planning accommodations in cooperation with students and instructors as needed and consistent with course requirements.

We are committed to fully supporting our students with disabilities, including meeting accommodations listed in a DSP letter. If you would like to discuss your accommodations with an instructor, please reach out to us.

Honor code

The student community at UC Berkeley has adopted the following Honor Code: “As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others.” We expect that you will adhere to this code.

Cheating: A good lifetime strategy is always to act in such a way that no one would ever imagine that you would even consider cheating. Anyone caught cheating on an exam in this course will receive a failing grade in the course and will also be reported to the University Center for Student Conduct. Consulting with another student during an exam is considered cheating.

Plagiarism: To copy text or ideas from another source without appropriate reference is plagiarism and will result in a failing grade for your assignment and usually further disciplinary action. We will check your papers for plagiarism, so please be careful about this. For additional information on plagiarism and how to avoid it, see, for example:

<http://www.lib.berkeley.edu/instruct/guides/citations.html> - Plagiarism

<http://gsi.berkeley.edu/teachingguide/misconduct/prevent-plag.html>

Academic Integrity and Ethics: Cheating on exams and plagiarism are two common examples of dishonest, unethical behavior. Honesty and integrity are of great importance in all facets of life. They help to build a sense of self-confidence, and are key to building trust within relationships, whether personal or professional. There is no tolerance for dishonesty in the academic world, for it undermines what we are dedicated to doing – furthering knowledge for the benefit of humanity.

Your experience as a student at UC Berkeley is hopefully fueled by passion for learning and replete with fulfilling activities. And we also appreciate that being a student may be stressful. There may be times when there is temptation to engage in some kind of cheating in order to improve a grade or otherwise advance your career. This could be as blatant as having someone else sit for you in an exam, or submitting a written assignment that has been copied from another source. And it could be as subtle as glancing at a fellow student's exam when you are unsure of an answer to a question and are looking for some confirmation. One might do any of these things and potentially not get caught. However, if you cheat, no matter how much you may have learned in this class, you have failed to learn perhaps the most important lesson of all.

Safe, Supportive, and Inclusive Environment

Whenever a faculty member, staff member, post-doc, or GSI is responsible for the supervision of a student, a personal relationship between them of a romantic or sexual nature, even if consensual, is against university policy. Any such relationship jeopardizes the integrity of the educational process. Although faculty and staff can act as excellent resources for students, you should be aware that they are required to report any violations of this campus policy. If you wish to have a confidential discussion on matters related to this policy, you may contact the Confidential Care Advocates on campus for support related to counseling or sensitive issues. Appointments can be made by calling (510) 642-1988.

The classroom, lab, and workplace should be safe and inclusive environments for everyone. The Office for the Prevention of Harassment and Discrimination (OPHD) is responsible for ensuring the University provides an environment for faculty, staff and students that is free from discrimination and harassment on the basis of categories including race, color, national origin, age, sex, gender, gender identity, and sexual orientation. Questions or concerns? Call (510) 643-7985, email ask_ophd@berkeley.edu, or go to <http://survivorsupport.berkeley.edu/>.

Diversity statement

The University of California considers the diversity of its students, faculty, and staff to be a strength and critical to its educational mission. Our community is enriched and enhanced by diversity along a number of dimensions, including race, ethnicity, national origins, gender, sexuality, class and religion. We welcome all our students in our class and hope that you always feel included. If there are aspects of the instruction within this course that result in barriers to your inclusion, please let us know. Your suggestions are encouraged and appreciated.

Mental Health and Wellness

All students – regardless of background or identity – may experience a range of issues that can become barriers to learning. These issues include, but are not limited to, strained relationships, anxiety, depression, alcohol and other drug problems, difficulties with concentration, sleep, and eating, and/or lack of motivation. Such mental health concerns can diminish both academic performance and the capacity to participate in daily activities.

In the event that you need mental health support, or are concerned about a friend, UC Berkeley offers many services, such as free short-term counseling at University Health Services. A list of resources can be found here: <https://uhs.berkeley.edu/sites/default/files/mhresources.pdf>

A campus website having links to many resources is: <https://recalibrate.berkeley.edu/>

Remember that seeking help is a good and courageous thing to do – both for yourself and for those who care about you.

Services for Students Encountering Food and Housing Insecurity

If you are in a situation where you are facing challenges in gaining access to nutritious, affordable food during the semester, you can find help by going to the UC Berkeley basic needs program at <http://basicneeds.berkeley.edu/> or the UC Berkeley Food Pantry at <https://pantry.berkeley.edu/>. You may be eligible for the CalFresh program as well.

A list of important resources for all students is on our bCourses page listed in the left menu as “Student Resources”. You will find links for mental health, medical needs, sexual harassment, the Gender Equity Resource Center, emergency food/cash/housing needs, legal support and disability accommodations. Please use these resources whenever you need them.

Class schedule

| Date | Lec | Modules covered | Assignments |
|--|-----|-----------------------------------|---|
| Week 0 | | | |
| Th 8/26 | 1 | Module 1 | HW 1 due Aug 29 |
| Week 1 | | | |
| Tu 8/31 | 2 | Module 2+3 | |
| Th 9/2 | 3 | Module 4 | HW 2-4 due Sept 5 Discussion #1 due Sept 5 |
| Week 2 | | | |
| Tu 9/7 | 4 | Module 5 | |
| Th 9/9 | 5 | Module 6 | HW 5-6 due Sept 12 |
| Week 3 <i>Sept 15 is last day to add/drop classes (for a fee)</i> | | | |
| Tu 9/14 | 6 | Module 7 | |
| Th 9/16 | 7 | Module 8 | HW 7-8 due Sept 19 Discussion #2 due Sept 19 |
| Week 4 | | | |
| Tu 9/21 | | Exam 1 (modules 1-8) | Last call for HW 1-8 |
| Th 9/23 | 8 | Module 9+10 | HW 9-10 due Sept 26 |
| Week 5 | | | |
| Tu 9/28 | 9 | Module 11 | |
| Th 9/30 | 10 | Module 12 | HW 11-12 due Oct 3 |
| Week 6 | | | |
| Tu 10/5 | 11 | Module 13 | |
| Th 10/7 | 12 | Module 14 | HW 13-14 due Oct 10 Discussion #3 due Oct 10 |
| Week 7 | | | |
| Tu 10/12 | 13 | Module 15 | |
| Th 10/14 | 14 | Module 16 | HW 15-16 due Oct 17 |
| Week 8 | | | |
| Tu 10/19 | | Exam 2 (modules 9-16) | Last call for HW 9-16 |
| Th 10/21 | 15 | Module 17+18 | HW 17-18 due Oct 24 Discussion #4 due Oct 24 |
| Week 9 <i>Oct 29 last day to change grade option</i> | | | |
| Tu 10/26 | 16 | Module 19 | |
| Th 10/28 | 17 | Module 20 | HW 19-20 due Oct 31 |
| Week 10 | | | |
| Tu 11/2 | 18 | Module 21+22 | |
| Th 11/4 | 19 | Module 23 | HW 21-23 due Nov 7 Discussion #5 due Nov 7 |
| Week 11 | | | |
| Tu 11/9 | 20 | Module 24+25 | |
| Th 11/11 | 21 | <i>No lecture (Veteran's Day)</i> | HW 24-25 due Nov 14 |

| Week 12 | | | |
|----------------------------------|---|--|------------------------|
| Tu 11/16 | | Exam 3 (modules 17-25) | Last call for HW 17-25 |
| Th 11/18 | 22 | Module 26 | HW 26 due Nov 21 |
| Week 13 | | | |
| Tu 11/23 | | <i>No lecture</i> | |
| Th 11/25 | | <i>No class (Thanksgiving)</i> | |
| Week 14 | | | |
| Tu 11/30 | 23 | Module 27 | |
| Th 12/2 | 24 | Module 28 | HW 27-28 due Dec 5 |
| Fr 12/3 | Paper due Friday Dec 3, 11:59pm on bCourses | | |
| RRR week | | | |
| Tu 12/7 | | Final review 1 | Last call for HW 26-28 |
| Th 12/9 | | Final review 2 | |
| Finals week | | | |
| Th 12/16 12pm - Fr 12/17 12pm | | Final exam (covers all modules) | |

Module topics

| Module | Topics | | |
|---------------|---|----|--|
| 1 | Introduction and homeostasis | 15 | Skeletal muscle |
| 2 | Chemistry review and biomolecules | 16 | Voluntary movement and reflexes |
| 3 | Enzymes and energy | 17 | Cardiovascular system overview and blood vessels |
| 4 | Cells and tissues | 18 | Heart anatomy and electric conduction |
| 5 | Membrane transport | 19 | Cardiac cycle |
| 6 | Intercellular signaling | 20 | Blood pressure regulation |
| 7 | Endocrine system | 21 | Respiratory system: ventilation |
| 8 | Reproductive system | 22 | Respiratory system: gas exchange and transport |
| 9 | Neurons: structure and membrane potential | 23 | Urinary system and kidneys |
| 10 | Action potential and propagation | 24 | Osmoregulation |
| 11 | Synaptic transmission and integration | 25 | Renal control of blood pressure |
| 12 | Central nervous system | 26 | Digestive system |
| 13 | Sensory physiology: somatosensory system | 27 | Metabolism and diabetes |
| 14 | Autonomic nervous system | 28 | Exercise physiology |



How to succeed in MCB 32

1. Attend lecture and discussion section regularly.
2. Read the modules and watch the video lectures [before](#) attending the Zoom lectures.
3. Take notes for the modules and video lectures. Rewrite the material in your own words and redraw the figures yourself. Use the textbook to clear up confusing points. You can use your notes during exams, so keep your notes organized and up to date.
4. Keep up with the material in the modules and with the homework (try answering the questions without using your notes the first time).
5. Post and respond to questions on Piazza (available in bCourses).
6. Form study groups with friends or other students in your discussion section. Meet regularly with your study group to discuss the concepts from class. Quiz each other and teach each other. The best way to learn new material is to teach it to someone else.
7. Make flash cards to review vocabulary and anatomy. Quiz yourself often.
8. When you are going about your day, think about what is happening in your body. If you are walking, think about what is happening in your motor neurons and skeletal muscles each time you contract your leg muscles. Talk yourself through the process to review the material.
9. Before the exams, actively study your notes again (just reading the notes is not going to help you). Redraw diagrams. Do the practice problems from the modules, worksheets and homework questions.
10. More information about [effective study techniques](#) is available on bCourses.

Advice from former MCB 32 students

- I would suggest that you stay on top of each modules as it is being taught during the week and attend lecture.
- Don't try to do all the assignments at once because it is a lot of information to take in. Study a couple of lessons, do something else, and then come back to do more. As you go through the lessons, try to connect the new information with the information from the past modules.
- Do all of the homework assignments well in advance before they are due! Study the practice exams because they are super helpful and similar to the actual exams.
- Take handwritten notes!! Even though it takes a while I found drawing out the diagrams on paper was the best way to really understand the material.
- I would suggest going to section, because working with classmates was helpful for understanding and getting the sense of community.
- I recommend reading the materials in modules before going to the Zoom lectures so that you have a better idea of what topic is described. While reading the materials in modules, you should note anything that you do not understand and ask them during the Zoom lecture.
- It helped to do review every week, so by time the exam rolled around I didn't feel like I needed to cram a bunch of information, which can feel stressful.
- In my opinion drawings and mind maps are the best way to truly learn the material, while flashcards help with learning the vocabulary, the tests focus more on the overall function of the body rather than facts.
- Times are tough given the pandemic so it is often hard to find time to study especially with responsibilities like work and extracurriculars but do the best you can and stay on track. **YOU GOT THIS!**