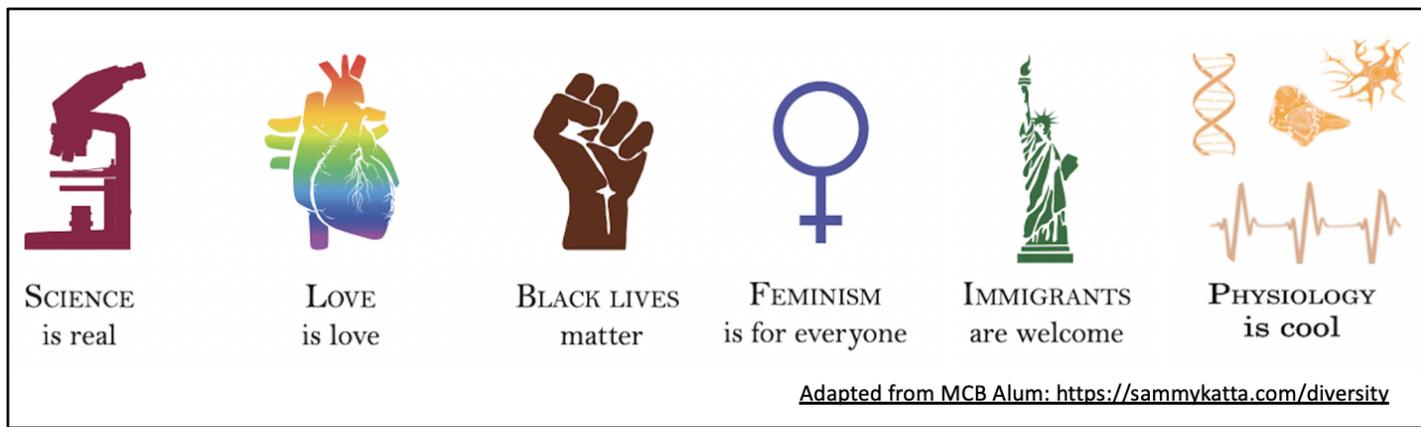


# MCB 136 Advanced Physiology

## Fall 2020 Syllabus



### **PROFESSORS**

Dr. Diana Bautista  
Office Hours: F 3-4pm

Dr. Polina Lishko  
Office Hours: Fri 3-4pm

Dr. Ellen A. Lumpkin  
Office Hours: F 3-4pm

### **GRADUATE STUDENT INSTRUCTORS**

Durga Kolla  
Sections: T 10-11am (101) & T 11-12pm (102)  
Office Hours: Tue 1-2pm

Matthew Kukurugya  
Sections: T 2-3pm (103) & T 3-4pm (104)  
Office Hours: Tue 4-5pm

Jordan Ngo  
Sections: F 9-10am (107), F 10-11am (108)  
Office Hours: Th 10-11am

Kim Nguyen  
Sections: T 11-12pm (111) & F 12-1pm (112)  
Office Hours: F 1-2pm

Maia Reyes  
Sections: F 12-1pm (109), F 1-2pm (110)  
Office Hour: W 12-1pm

Hiro Suzuki  
Sections: W 9-10pm (105), W 12-1pm (106)  
Office Hour: W 1-2pm

### **DIVERSITY STATEMENT:**

It is our intent that students from diverse backgrounds and with diverse perspectives will be well served by this course, that all students' learning needs will be addressed, and that the diversity that students bring to this class be viewed as a strength and benefit. It is our intent to present in a way that is respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated.

**DISCUSSION SECTION:** Sections start meeting the second week of classes (August 31). Attendance & participation counts towards your grade-you need to attend a minimum of 7 of 14 to pass MCB136. To change your official discussion section, you must find someone to swap with & obtain permission from faculty.

### **LECTURE NOTES**

Official lecture notes are available on bCourses in folders within the Files area. Buying or selling lecture notes is a breach of the honor code.

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### **TEXTBOOK: We do not require you to purchase a textbook.**

"Vander's Human Physiology" 13th (or any other Edition) is a good reference.

You can use any Physiology textbook such as Silverthorn Physiology

You can use a free physiology e-book from the UC library-<https://www.lib.berkeley.edu/research-support/books-ebooks>

For Neurophysiology lectures, you can review: Principles of Neural Science, 5th edition by Kandel et al Available as a free e-textbook from the UC library-  
<http://neurology.mhmedical.com/book.aspx?bookID=1049>

Your most useful resource will be the information uploaded by your instructors on the bCourses website: <https://bcourses.berkeley.edu/>. Please note that the emphasis in this course is on the material covered in lecture AND in the lecture notes.

### **ADVICE FROM INSTRUCTORS:**

A key element in doing well in this class is attending lectures and participating in discussions. It is also imperative you keep up to date with your studying. Looking at the assigned reading the same day as the lecture and reviewing the uploaded lecture notes after lecture has proven to make an enormous difference in the final result. Do not hesitate to ask the instructors questions. **Each lecture in turn uses the material in previous lectures.** It is easy to get left behind if you do not master the material previously presented.

**Please attend and ask questions in office hours.** We will be happy to answer them. The best time to ask them is after reviewing your notes - hopefully you will be doing so sometime soon after each lecture. Piazza is also a good way to get questions answered. Email should only be used for administrative purposes, not for questions on course content.

### **COURSE MECHANICS:**

#### **Problem Sets & Due Dates:**

Students will have one week to complete problem sets.

Problem Set I: 9/18; Problem Set II: 10/14; Problem Set III: 11/18

#### **Exams:**

Mid-terms will be available on Friday afternoon and must be submitted via gradescope on Monday no later than 11:00 AM Pacific Time. Midterm I: Oct 2-5; Midterm II: Nov 6-9; **Midterm III: Dec 4-6** and Final exam: Due Monday 12/14.

#### **Grades:**

Your grade will be based on a total of 300 points. We do not use a curve, though the total number of points used to determine percentages (and letter grades) may be decreased to work in your favor.

Standard UC Grade distribution:

A+=100%, A= 93-99, A-= 90-92, B+=89-86%, B= 85-88, B-= 80-84, C+=79-76%, C= 75-78, C-= 70-74,

D+=69-66%, D= 65-68, D-= 60-64, F=59-0. From: [https://ieor.berkeley.edu/wp-](https://ieor.berkeley.edu/wp-content/uploads/2019/10/GPA_Conversion_Chart2.pdf)

[content/uploads/2019/10/GPA\\_Conversion\\_Chart2.pdf](https://ieor.berkeley.edu/wp-content/uploads/2019/10/GPA_Conversion_Chart2.pdf)

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3 Problem Sets = 25 points each= total 75 points

Midterm 1=50 pts; Midterm 2=50pts; Midterm 3=50pts; Final=50 pts = total 200 points

Discussion Sections: 25 points total

### **COURSE POLICIES**

#### **Accommodations**

Your experience in this class is important to us. If you have already established accommodations with the DSP office please communicate your approved accommodations to us at your earliest convenience so we can discuss your needs in this course.

#### **Late Work Policy**

Be sure to pay close attention to deadlines. We do not offer alternate exam dates/times. You must take/submit all work on the scheduled date. If you must miss a deadline because of an emergency, or professional school interview, please reach out to the faculty and your GSI and your grade for the course will be based on the remaining exams/assignments.

**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.” The hope and expectation is that you will adhere to this code. Collaboration and Independence: Reviewing lecture and reading materials and studying for exams can be enjoyable and enriching things to do with fellow students. This is recommended. However, unless otherwise instructed, homework assignments and exams are to be completed independently and materials submitted as homework should be the result of one’s own independent work.

#### **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 work place 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](mailto:ask_ophd@berkeley.edu), or go to <http://survivorsupport.berkeley.edu/>.

#### **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 can 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

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matter how much you may have learned in this class, you have failed to learn perhaps the most important lesson of all.

### **Cheating**

Cheating and plagiarism will not be tolerated. UC Berkeley's cheating policy (<http://bulletin.berkeley.edu/academic-policies/#studentconductappealstext>) will be followed. Test papers are routinely photocopied before they are handed back and answers are analyzed using plagiarism detection software. In fairness to students who put in an honest effort, students that copy another's answers during an exam, use a smartphone, plagiarize, or use other forms of cheating, will automatically be assigned a zero for that entire test and the Office of Student Conduct will be notified. A good lifetime strategy is always to act in such a way that no one would ever imagine that you would consider cheating. In order to guarantee that you are not suspected of cheating, please keep your eyes on your own materials and do not communicate with others during quizzes and exams, unless they are assigned as group projects.

### **Letters of Recommendation**

Any of the three instructors may be asked for a letter of recommendation. So that we may prepare effective evaluations we ask that you do the following: be sure to attend the instructor's office hours, as well as lectures. Ask your GSI to co-write the letter based on your discussion section participation. Provide both the GSI and Professor a copy of your unofficial transcript, CV and finalized personal statement, along with a waiver form/statement from AMCAS, Interfolio, graduate/professional school admissions office, or other letter service providers. Only confidential letters will be provided.

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Date	Lecture	Topic	Lecturer	Problem Sets
26-Aug- Wed	1	Intro to Physiology/Diffusion, Osmosis, and Membrane Transport	DB	
28-Aug- Fri	2	Ion Channels and Transporters: Principles of Operation	DB	
31-Aug- Mon	3	Membrane Potential/ Nernst/GHK	DB	
2-Sep- Wed	4	Graded/Action Potential	DB	
4-Sep- Fri	5	K channel structure/function/Voltage gated channel diversity/gating	DB	
<b>7-Sep- Mon</b>		<b>No classes</b>	<b>NA</b>	
9-Sep- Wed	6	Action potential Propagation-MS	DB	
11-Sep- Fri	7	Synaptic Transmission	EAL	
14-Sep- Mon	8	Techniques to probe nervous system/CNS/PNS/ Basic Neuroanatomy	EAL	
16-Sep- Wed	9	Somatic and Autonomic Nervous Systems	EAL	
18-Sep- Fri	10	Sensory 1	EAL	<b>PS1 Due 11am</b>
21-Sep- Mon	11	Sensory 2	EAL	
23-Sep- Wed	12	Channelopathies	DB	
25-Sep- Fri	13	Skeletal Muscle (Molecular Basis of Contraction)	PL	
28-Sep- Mon	14	Skeletal Muscle (Regulation and Disease)	PL	
30-Sep- Wed	15	Smooth Muscle and Cardiac Muscle: Differences and Similarities	PL	
<b>2-Oct- Fri</b>		<b>Midterm I (Lectures 1-12)</b>	<b>NA</b>	
5-Oct- Mon	16	In a Heartbeat. The Heart: Anatomy, Physiology and Regulation	PL	
7-Oct- Wed	17	Cardiovascular Regulation Part I	PL	
9-Oct- Fri	18	Cardiovascular Regulation Part II	PL	
12-Oct- Mon	19	Blood componentent and chemistry	PL	
14-Oct- Wed	20	Respiration Anatomy, Mechanics and Ventilation	PL	<b>PS2 Due 11am</b>
16-Oct- Fri	21	Gas Exchange, Transport and Regulation of Respiration part I	PL	
19-Oct- Mon	22	Gas Exchange, Transport and Regulation of Respiration part II	PL	
21-Oct- Wed	23	Immunology	DB	
23-Oct- Fri	24	Endocrinology part I	EAL	
26-Oct- Mon	25	Endocrinology part II	EAL	
28-Oct- Wed	26	GI	DB	
30-Oct- Fri	27	GI	DB	
2-Nov- Mon	28	Metabolism (pancreas, obesity, metabolic disorder & obesity)	DB	
4-Nov- Wed	29	Neural Control of Hunger	DB	
<b>6-Nov- Fri</b>		<b>Midterm II (Lectures 13-27)</b>	<b>NA</b>	
9-Nov- Mon	30	Introduction to Renal Physiology	EAL	
<b>11-Nov- Wed</b>		<b>No classes</b>	<b>NA</b>	
13-Nov- Fri	31	Regulation of Fluid and Electrolytes by the Kidney	EAL	
16-Nov- Mon	32	Systemic Regulation of Fluid Balance & Thirst	EAL	
18-Nov- Wed	33	Reproduction part 1	PL	<b>PS3 Due 11am</b>
20-Nov- Fri	34	Reproduction part 2	PL	
23-Nov- Mon	35	Aging	TBD	
<b>25-Nov- Wed</b>		<b>No classes</b>	<b>NA</b>	
<b>27-Nov- Fri</b>		<b>No classes</b>	<b>NA</b>	
30-Nov- Mon	36	Physiology of Disease I	EAL	
2-Dec- Wed	37	Physiology of Disease II	TBD	
<b>4-Dec- Fri</b>		<b>Midterm III (Lectures 28-35)</b>	<b>NA</b>	
7-Dec- Mon		RRR-Review I		
9-Dec- Wed		RRR-Review II		
11-Dec- Fri		RRR-Review III		
<b>14-Dec- Mon</b>		<b>Final Exam</b>		