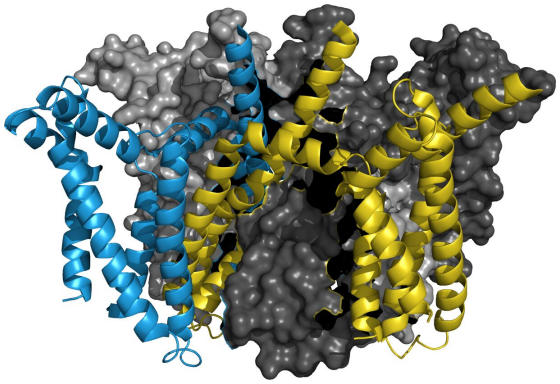
SYLLABUS: Physics 5C
Physics for Life Sciences
Electricity, Magnetism, and Modern Physics
Spring 2024



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Instructor	Brian Naranjo (bnaranjo@ucla.edu)
TA	Zeyuan Xuan (zeyuan.xuan@physics.ucla.edu)
Course administrator	Mary Tran (mtran@physics.ucla.edu)
Lectures	MWF 2-2:50PM, PAB 1425
Discussion sections	4A: F 8-8:50AM, PAB 1434A 4B: F 9-9:50AM, PAB 2434 4C: F 10-10:50AM, PAB 2434 4D: F 1-1:50PM, PAB 1434A
Instructor's office hours	M 11AM-1PM, W 9-10AM, F 10-11AM, or by appt., Knudsen 3-168
Final	Wednesday, June 12, 3-6PM, Location TBA
Required textbook	Knight, Jones, and Field, *University Physics for Life Sciences* (Inclusive Access & Mastering Physics)
Prerequisite	Physics 5A

[1]The figure above shows the KCNQ2 voltage-gated potassium channel. It is a membrane transport protein that passively transports potassium ions in human neurons, but only for a specific range of *transmembrane potentials*. Once a threshold electric field within the membrane is exceeded, the four peripheral charge-carrying voltage-sensing domains undergo a conformational change, acting to close the central pore. In week 8, we will discuss such voltage-gated ion channels and their role for signaling in the nervous system.

Tentative schedule

Week	Topic	Reading
01	Electric field	21
02	Electric potential	22 (22.7 not covered on either midterm)
03	Capacitance	23 (skip 23.4 and 23.5)
04	Current	24
05	Circuits	25 (skip 25.8)
06	Magnetic field	26 (skip 26.7)
07	Electrodynamics	27
08	Biophysics	review 22.7; read 23.4, 23.5, 25.8, and 26.7
09	Modern physics I	28, 29 (topics TBA)
10	Modern physics II	30 (topics TBA)

- **Mastering Physics** assignments are due Saturdays at 11:59 PM.
- **Problem sets** are due Mondays at 11:59 PM. Submit via Gradescope.
- **MT1** (covers weeks 1-3) Wednesday, April 24, 2-2:50PM, PAB 1425
- **MT2** (covers weeks 4-7) Wednesday, May 22, 2-2:50PM, PAB 1425
- **Final** (cumulative) Wednesday, June 12, 3-6PM, Location TBA

Grading scheme

- Grades are weighted according to:

Mastering Physics	5%
Problem sets	5%
Lab	15%
First midterm	20%
Second midterm	20%
Final	35%

- Problem sets and exams are scored on the following hundred-point scale:

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
$[100, 97]$	(97,93]	(93,90]	(90,87]	(87,83]	(83,80]	(80,77]	(77,73]	(73,70]	(70,67]	(67,63]	(63,60]	< 60

- Your course letter grade is determined using the same hundred-point scale, with rounding.
- Your overall Mastering Physics score is given by the cumulative percentage of points earned during the quarter. You have unlimited attempts with no loss of credit for incorrect answers.
- Your overall problem set score is given by the average of the equally-weighted problem set scores.

- Each of the three exams is curved separately. The curves will be set so that approximately 30% of the exams will be in the A range, 30% will be in the B range, 30% will be in the C range, and the remaining 10% will be Ds and Fs. I try to write exams that yield a broad distribution of scores, and I will only curve scores toward higher grades.
- Based on Spring 2024 department guidelines, the target class GPA is 3.1.

Homework policy

- Discussing homework with classmates is encouraged.
- No matter what assistance or guidance that you received in your understanding of a problem, your actual write-up must be your own work.
- Don't post my problems on Chegg or Chegg equivalents. You will find all the help you need in discussion, office hours, or Campuswire. Reader will give zero points to Chegg'd solutions.
- No late homework, either Mastering Physics or problem sets, will be accepted without an extension granted *prior* to the due date.
- The reader is limited to six hours per week, so only a few randomly chosen problems will be graded each week.

Exam policy

- Format of exam questions is similar to that of the problem sets.
- Calculators are not needed and are not permitted during exams.
- Exams are closed-book with no outside notes permitted.
- BruinCard photo ID required.
- Missing a midterm requires a physician's note. Make-up will be determined at my discretion.
- The window for submitting regrade requests will be 72 hours following the return of exams. Please submit a detailed explanation to the grader.

Lecture

- Lecture and discussion attendance, while strongly encouraged, is not strictly mandatory.
- During lectures, I will write out notes on a tablet, whose display is projected onto the large screen in the lecture hall. To those who really must miss a lecture, I provide both these handwritten notes and my corresponding typeset notes on BruinLearn. Please keep in mind that a student's class attendance is known to have an extremely high positive correlation with their resulting grade.[2]

[2] M. Credè, S. Roch, and U. Kieszczynka, "Class attendance in college: A meta-analytic review of the relationship of class attendance with grades and student characteristics." *Rev. Educ. Res.* **80** (2010) 272

Lab

Lab is a required component of this course. Please make sure that you are enrolled and attending the proper lab section. See https://uclaphys5labs.weebly.com

Campuswire

We will be using Campuswire for class discussion. Outside of office hours, this is the fastest and most efficient way to get help from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, you are encouraged to post your questions on Campuswire. Full anonymity is enabled, so you may choose to post anonymously. The join link and code are available on BruinLearn.

Textbook

This course is part of the UCLA Inclusive Access program. Your course materials are being automatically provided to you, digitally, through BruinLearn before the first day of class or upon enrollment. You will receive e-mail from the UCLA Store with program details and cost sent directly to your email address on file with the UCLA Registrar. It is your responsibility to read all communication coming from the bookstore. Check your spam folder if not received.

Mastering Physics, a component of this course, is only available through Inclusive Access, so do not choose to opt out. Any questions regarding the Inclusive Access program can be directed to inclusiveaccess@asucla.ucla.edu.

Academic Misconduct

I will follow University policies on cheating and other forms of academic misconduct. Please see the Dean of Students' summary of these issues for details, including definitions of various forms of academic misconduct.

Title IX

Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the CARE Advocacy Office for Sexual and Gender-Based Violence, 1st Floor Wooden Center West, CAREadvocate@caps.ucla.edu, (310) 206-2465. In addition, Counseling and Psychological Services (CAPS) provides confidential counseling to all students and can be reached 24/7 at (310) 825-0768. You can also report sexual violence or sexual harassment directly to the University's Title IX Coordinator, 2241 Murphy Hall, (310) 206-3417. Reports to law enforcement can be made to UCPD at (310) 825-1491.

Faculty and TAs are required under the UC Policy on Sexual Violence and Sexual Harassment

to inform the Title IX Coordinator should they become aware that you or any other student has experienced sexual violence or sexual harassment.