UC San Diego

PHYS 1B Syllabus



Welcome to the Course

Course Information

Course Description	*This is the second course in the 3-quarter introductory physics series geared towards life-science majors. We will learn about how charged particles interact with each other. We will discuss several examples of where these interactions show up in day-to-day life and in medical technology.*
Credits	*3 units (~5hr of class and ~10hr self-study per week)*
Pre-requisites	*PHYS 1A or 2A and Math 10A or 20A.*
Instructor	*Tapan Goel (tagoel@ucsd.edu)* *Office Hours:*
IA/TA	*Pan Xia,* Ruoyu Yin
Class meetings	MTuWTh 9:30am-10:50am PDT. https://ucsd.zoom.us/j/99170719178 (also available through CANVAS)
Course website	
Piazza Page	
Course Discord server	

Course Learning Outcomes

Upon completion of this course, you will be able to:
1. Explain and quantify the effects of external electric fields and source charges on charged objects.
2. Explain and quantify the effects of external magnetic fields and source currents on moving charges and on currents.
3. Combine concepts of electrical/magnetic forces, electric potential and electric potential energy with concepts of Kinematics, Newton's laws and Rotational motion from PHYS 1A to calculate motion of charged particles in response to electromagnetic effects
4. Develop an appreciation for how electromagnetic phenomena are harnessed to create biomedical devices.
5. Develop pro-active instead of reactive problem-solving strategies.
6. Become a responsible and engaged member of an online learning community.

Course Format

Lectures

1. Lectures will be delivered live during scheduled class hours on Mon, Tue and Wed.
2. Thursday lectures (except for Wk1 and Wk5) will be reserved for quizzes.
3. In lieu of the Thursday live lecture, a recorded lecture will be posted on canvas which you'll be expected to view before the following Monday lecture.
   So, Thursday of Wk1, we'll have a live lecture. For Thursdays of Wk2-4, we'll have quizzes during class time and I'll upload a recorded lecture for you to see before the following Monday.

Day/Time: MTuW 9:30am-10:50am PDT. Thursday lecture hour will be used for quiz.
Zoom URL: https://ucsd.zoom.us/j/99170719178 (also available through CANVAS)

The lectures will also be recorded and made available for later viewing on the course canvas website.

At the end of lecture 2 (June 29th), you will be required to commit to either viewing the lectures live or only viewing them as recordings.

For the **live viewing option**, you are required to attend the full duration of live Zoom lectures three times (MTuW) a week during the scheduled class time and participate in all in-class polls. Two absences will be automatically excused as part of the illness/emergency policy.

For the **view recording option**, you are required to watch the recorded lectures (videos will be released as soon as possible after the lecture time) and submit alternative written participation assignments for each lecture in lieu of live attendance. Assignments must be received by the specified deadline for full credit. 2 missing participation assignments will be excused. Details of

assignments will vary weekly but are expected to constitute 15 - 30 minutes of effort per lecture.

Class participation:
10% of the course grade will be based on class participation.
If you pick the live viewing option, this credit will be earned by responding (irrespective of whether your answer is correct or not) to poll questions asked during the live lecture. If you decide to view the recordings only instead, the class participation credit will be earned by submitting answers to questions sent to you after each lecture (details will be sent to you later).

Note 1: Irrespective of whether you watch the lectures live or through recordings only, all students are required to take the quizzes during scheduled lecture hours on Thursdays of Week 2,3 and 4. One specific alternative quiz time will be scheduled for overseas students, and it will be announced by Lecture 3 during Week 1.
Note 2: All lectures will be available for later viewing to EVERYONE, even if you choose the live viewing option. The live-vs-recording option is to ensure that everyone can get participation credit.
Note 3: Once you decide which option you are going to use, you will not be allowed to switch! This is to ensure that you do not get double counted for class participation credit. Please choose carefully according to your schedule and stick with your choice for the rest of the course.

Course Calendar (Tentative)

	Mon	Tue	Wed	Thu
Week 1	Class Wk_01a **06/28** B01: Electric Charge B01: Electric Force	Class Wk_01b **06/29** B02: Electric Fields Motion of a charged particle in a field	Class Wk_01c **06/30** B03: Electric Flux B03: Gauss' Law B03: Charge on Conductors	Class Wk_01d **07/01** B04: Electric P.E. B04: Electric Potential
Week 2	**07/05** **HOLIDAY** Independence Day	Class Wk_02b **07/06** B04: Charge Distributions B05: Capacitance	Class Wk_02c **07/07** B05: Series/Parallel Circuits B05: Energy in Capacitor	Class Wk_02d **07/08** Quiz 01
Week 3	Class Wk_03a **07/12** B06: Electric Current B06: Resistance, Ohm's Law	Class Wk_03b **07/13** B07: EMF, Electric Power B07: RC Circuits	Class Wk_03c **07/14** B07: Kirchhoff's Rules	Class Wk_03d **07/15** Quiz 02
Week 4	Class Wk_04a **07/19** B08: Magnetic Fields	Class Wk_04b **07/20** B08: Magnetic Forces	Class Wk_04c **07/21** B08: Magnetic Forces	Class Wk_04d **07/22** Quiz 03

Week 5	Class Wk_05a **07/26** B09: Biot-Savart Law B09: Ampere's Law	Class Wk_05b **07/27** B09: Farday's Law B10: Motional EMF	Class Wk_05c **07/28** B10: Inductance B10: RL Circuits	Class Wk_05d **07/29** B12: EM Waves	
	07/30 Final Exam				

Course Materials and Tools

Technology Requirements

Required Textbook: Physics for Life Sciences Online Textbook and Homework System through Kudu $50 for first quarter, $25 for second quarter, no charge for any subsequent quarters of Phys1-series.
Sign up and make online payment at Kudu.com; **course ID: TBD**
Scientific Calculator (non-graphing type) – no internet access or text/equation storage.
Zoom-capable device and internet connectivity for students choosing synchronous lecture participation.
A photo-capable device for taking and submitting photos of your hand-written work for exams.

Discussion forums

1. **Piazza**: Please use piazza to ask questions and clarifications about class material, homework questions and quiz questions. This space will be monitored by the Instructor and TA, who will respond to the questions within 24 hr. As a student you can also answer your classmates' questions.
2. **Discord**: Please use the discord server to connect with your classmates, form study groups or share memes. The aim is to help simulate some of the casual conversations that we are all missing out on because of remote instruction. Please follow the UCSD Principles of Community as you interact with your classmates on this forum. While the space will not be aggressively monitored by the instructor, any complaints of violation of the principles of community or misuse of the server for academic dishonesty will be met with appropriate action and an immediate ban from the discord server.
3. **Email**: Questions can also be emailed to the TA or/instructor. **Please do not ask the TAs about course logistics/ technological issues/accommodations – direct all such questions to the instructor.**

Additional Text/Readings/Other Material (NOT REQUIRED)

The following materials are NOT required for success in this class. These are merely friendly suggestions for those who might be interested in taking a deeper dive into some of the course topics:

1. OpenStax College Physics is a great online textbook for intro physics if you are looking for more reading material or practice problems.
2. PhET is an interactive simulations project headed by Dr. Kathy Perking at CU Boulder where you play around and visualize a lot of the concepts we learn in class.
3. "Electricity and Magnetism" by Purcell which is the 2nd volume of the Berkeley Physics Course.

Assignments, Projects, and Grading

Attendance and class participation
Live, synchronous lectures will be given during the scheduled class times via Zoom. To encourage and maintain attendance, 10% of your course grade will consist of participation through the in-class polling system, with ***two absences allowed*** without penalty (see Illness and Grading sections below). Students who foresee an inability to regularly attend live Zoom lectures may choose an asynchronous option in which they watch the recorded lectures and participation scores are earned by an alternative written submission. Students will be asked to commit to one option or the other by the second lecture.

Homework:
There will be 5 homework sets for this class – one each week.
Only your best 4 scores will be counted, and each homework will contribute to 10% of your overall grade.
Homework sets will be made available every Tuesday by 12 noon and will be due the following Monday by 11:59pm.
Each homework set will have 2 parts:
Part1: 20 Multiple choice and numerical answer problems on Kudu.
Part2: A long form written assignment to be submitted through Canvas.

Quizzes and Final exam:
During the Thursday lectures in Wk2, Wk3 and Wk4, we will have quizzes instead of the lecture. In these sessions, we will have 2 back-to-back 30-minute quizzes – so a total of 6 weekly quizzes.
The final exam will be a series of 4 back-to-back 30-minute quizzes.
Only your best 8 scores out of 10 quizzes (6 weekly + 4 final) will be counted, and they will contribute to 50% of your overall grade.

Please read the Quiz logistics document to see how the quiz will be administered.

Note that irrespective of whether you take the live-lecture viewing option or the recordings only option, you will be required to take these quizzes (and the final) during the allotted lecture time on Thursday (9:30am-10:50pm).

Extra credit opportunities:
1. Pre-lecture warm-up: A pre-lecture "Warm-up" will be released on Kudu everyday containing 2 short questions from the material for the lecture on the next day. This is to incentivize you to read ahead before the lecture. Answers can be submitted upto 5minutes before the relevant lecture.
You can earn upto 0.5% of the final grade by correctly answering > 80% of pre-lecture quizzes.

2. Extra Credit for Extra Practice Problems: 15-20 problems per week will be made available every Tuesday by 12 noon and will be due the following Tuesday by 11:59pm. You can earn upto 1% of the final grade by correctly answering > 80% of these questions.

Illness Policy:

We will NOT accept any late submissions or conduct make-up exams for this course due to academic integrity and logistical reasons. The short duration of the summer session makes it extremely hard to catch up if you fall behind on assignments or lectures. For a class this size, it is also logistically hard to allow late submissions or conduct make-up exams.
But people fall sick and must deal with emergencies – life happens.

So, we will have a simple alternative:

1. For quizzes, only your top 8 quiz scores (out of 10) will count towards your grade.
2. For HW, only your 4 scores will be counted towards your grade.
3. For class participation, 2 absences from lecture for people taking the live option or, 2 written participation assignments for people taking the view-recording option, will be forgiven.

So, if you miss a quiz or a homework set, it will automatically count as your lowest scored quiz/homework.

Note:: the illness/emergency policy is designed to account for any-and-all unforeseen / unavoidable situations , including power outages, internet failures, family emergencies, and all health-related issues - both mental and physical (including COVID-19 related issues). The policy is NOT intended for skipping out on a homework set, lecture, or taking or studying for any particular quiz. Students are expected to give their full efforts on all portions of this course; the illness/emergency policy is intended - as the name implies - to account for the emergencies and illnesses that expectedly (if not predictably) occur during any particular academic quarter. Do not "count on" dropping an early low score - that is not the purpose or intent of the "drop" policy ; it is an illness/emergency policy. End-of-quarter Illnesses and emergencies have a habit of hitting those students were "counting on" dropping earlier scores. ***No extra drops will be given, and there will be absolutely no make-up exams.*** *At the end of the quarter all permitted drops will be automatically applied to the lowest scoring assignments for each student. This is done automatically so that the instructor is not put in the position of having to judge the severity or validity*

of individual illnesses or emergencies, and so students aren't compelled to exaggerate or fabricate reasons for deserving an emergency/illness drop.

*** If you have a major / extended medical emergency, please keep documentation in case a university academic petition becomes necessary at the end of the quarter and contact the professor as soon as possible. The final exam will consist of 4 back-to-back short quizzes, each of which is eligible as one of the two allowed dropped quizzes.*

Grade Breakdown:

10% Class participation –

Responding (correctly or incorrectly) to all in class poll questions or, submitting all required participation assignments.

40% Homework

50% Quizzes

Extra credit

1. Up to 0.5% for correctly answering > 80% of all pre-lecture warm-up questions
2. Up to 0.5% for correctly answering > 80% of all Extra Credit for Extra practice problems.

Grading Scale

A: ≥ 90.00 **A-**: ≥ 87.00
B+ : ≥ 83.00 **B**: ≥ 80.00 **B-** : ≥75.00
C+ : ≥ 70.00 **C** : ≥ 65.00 **C-** : ≥ 60.00
D : ≥ 55.00 **F**: < 55.00

The class has a straight scale. There will be **no** curving of grades.
There will be no rounding up. A score of 80.00 will receive an B. A score of 79.99 will receive a B-. *A course grade of A+ can be given at the professor's discretion*

Academic Integrity Policy

Academic dishonesty of any kind will not be tolerated and is grounds for a failing grade in the class. Students ***are*** encouraged to study together to facilitate learning, but all final products that directly affect the grades in the course must represent the effort and work of the individual student. This includes all exams and quizzes, homework and extra credit assignments, and responding to clicker questions. Cheating, plagiarism, and all other forms of academic dishonesty will be dealt with according to the **UCSD Policy on Integrity and Scholarship** as found in the UCSD General Catalog. The Policy **is considered required reading for this course.**

Campus Policies

UC San Diego policies and statements to include within your syllabus.

- UC San Diego Principles of Community
- UC San Diego Policy on Integrity of Scholarship
- Religious Accommodation
- Nondiscrimination and Harassment
- UC San Diego Student Conduct Code

Resources for Support and Learning

Learning and Academic Support	
Ask a Librarian: Library Support *Chat or make an appointment with a librarian to focus on your research needs* **Course Reserves, Connecting from Off-Campus and Research Support** *Find supplemental course materials* **First Gen Student Success Coaching Program** *Peer mentor program that provides students with information, resources, and support in meeting their goals* **Office of Academic Support & Instructional Services (OASIS)** *Intellectual and personal development support*	**Writing Hub Services in the Teaching + Learning Commons** *One-on-one online writing tutoring and workshops on key writing topics* **Supplemental Instruction** *Peer-assisted study sessions through the Academic Achievement Hub to improve success in historically challenging courses* **Tutoring – Content** *Drop-in and online tutoring through the Academic Achievement Hub* **Tutoring – Learning Strategies** *Address learning challenges with a metacognitive approach*
Support for Well-being and Inclusion	
Basic Needs at UCSD *Any student who has difficulty accessing sufficient food to eat every day, or who lacks a safe and stable place to live is encouraged to contact:* foodpantry@.ucsd.edu | basicneeds@ucsd.edu | (858) 246-2632 **Counseling and Psychological Services**	**Community and Resource Centers** **Office of Equity, Diversity, and Inclusion** *As part of the Office of Equity, Diversity, and Inclusion the campus community centers provide programs and resources for students and contribute toward the evolution of a socially just campus* (858).822-.3542 | diversity@ucsd.edu **Get Involved**

Confidential counseling and consultations for psychiatric service and mental health programming **Triton Concern Line** *Report students of concern:* (858) 246-1111 **Office for Students with Disabilities (OSD)** *Supports students with disabilities and accessibility across campus*	*Student organizations, clubs, service opportunities, and many other ways to connect with others on campus* **Undocumented Student Services** *Programs and services are designed to help students overcome obstacles that arise from their immigration status and support them through personal and academic excellence*