

Physics 98

A Prelude to Physics: Berkeley and Beyond

Fall 2021

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Instructor of Record: Prof. Hitoshi Murayama

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Time: Wednesdays, 5 - 6 pm (Tentative)

Location: Preferably remote (Zoom), else a first floor room in Barrows Hall

Units: 1

Office Hours: To be Determined at the beginning of the semester

Course Description and Learning Objectives:

Physics is subtle; it can be intimidating, especially to someone just starting out. So we, as two senior physics majors, are here to share our experiences and give a head start to underclassmen who are interested in pursuing physics! This low-workload course is designed to acclimate students to UC Berkeley's physics department and provide an enriching survey of the various subfields that coexist in physics. Looking for an extra unit plus a chill class? This is the one.

We'll first go over the plethora of physics courses that the university has to offer, including the major requirements, electives and relevant graduate courses. Then we shall recommend possible chronologies for taking these courses. Afterwards, we believe the students would be able to sketch out a tentative four-year plan, which would be especially helpful for major declaration. Next, we will dive into the realms of each subfield of physics, focusing separately on theory and experiment, by going over some of the intriguing contemporary research problems and hearing anecdotes from vastly experienced guest lecturers. Elective courses will be mapped to each subfield so students can identify courses that would be useful in their research endeavours. We will also present ways to find research opportunities and positions with professor-led groups at UC Berkeley and LBL. The class will culminate in a movie that peeks into the life of one of the greatest physicists ever - Stephen Hawking!

Textbooks: There are no required textbooks for this class. The slides presented every week will be emailed to you and any additional resources or handouts will similarly be given out.

Prerequisites: This class is tailored for Freshmen and Sophomores who have a research interest in Physics and/or plan to pursue a major in Physics. There are no prerequisites. The key is having the enthusiasm to participate in active discussions and ask questions!

Website: bcourses.berkeley.edu

All announcements, course logistics, assignments and grades will be posted here.

Grading criteria: To pass this course (get a P),

- No more than 2 unexcused absences
- Turn in one-paragraph summaries by the end of Fridays (calendar mentions which weeks)
- Turn in a reasonable 4-year plan
- Turn in an acceptable report on field of interest

The report on field of interest will be a short writeup (2-page minimum, single spaced) on a particular subject of interest that falls within the intersection of two physics subfields.

If you need to miss a lecture due to extenuating or unavoidable circumstances, do not worry! Email one of the instructors beforehand with an explanation and it will be excused :). Given the current circumstances, the same applies for students who might be in a different time zone (unlikely, but possible). Also, if you have any feedback regarding the course throughout your time, please let us know so we can take the appropriate steps to make it more enjoyable for you.

Important Dates:

First meeting - - - - - August 25

4 year plan - - - - - September 15

Report on field of interest - - - - - December 1

Academic Misconduct: Plagiarism, cheating, or any other violation of the Berkeley Academic Code of Conduct is prohibited. See <https://sa.berkeley.edu/code-of-conduct> for details.

Accommodations for Students with Disabilities: Please contact the facilitators as soon as possible if you require specific accommodations. We will try to make all necessary arrangements.

Course Calendar:

Note -- Each presentation, from week 5 onwards, will go over contemporary research done in the field, the relevant research groups at Berkeley as well as relevant electives. Guest lecturers will be either a professor or graduate student working in the corresponding field.

Week #/Dates	Topic	Assignments
1 (Aug 25th)	Welcome! Introduction to class requirements, schedule a class picture	
2 (Sep 1st)	Physics major requirements, overview of electives, general class advice	
3 (Sep 8th)	Applying for research (URAP, cold emails, senior thesis), CVs/Resumes	4-year plan assigned
4 (Sep 15th)	List of subfields this course will cover, work in physics Guest Lecture	4-year plan due
5 (Sep 22nd)	Astrophysics, Astro major	1 paragraph on something you found interesting about this field
6 (Sep 29th)	Particle Physics (theory)	
7 (Oct 6th)	Particle Physics (exp) Guest Lecture	1 paragraph on something you found interesting about this field
8 (Oct 13th)	Condensed Matter (theory)	
9 (Oct 20th)	Condensed Matter (exp) Guest Lecture	1 paragraph on something you found interesting about this field
10 (Oct 27th)	AMO (theory)	
11 (Nov 3rd)	AMO (exp) Guest Lecture	1 paragraph on something you found interesting about this field
12 (Nov 10th)	Mathematical Physics Guest Lecture	1 paragraph on something you found interesting about this field
13 (Nov 17th)	Biophysics and Plasma Physics	1 paragraph on something you found interesting about these fields
14 (Nov 24th)	Non-instructional day (according to the Registrar's Office)	Report on field of interest Assigned

15 (Dec 1st)	Possible Movie Night (TBD): The Theory of Everything (2014) Closing remarks, big thank you!	Report on field of interest Due
16 (Dec 8th)	No class (RRR week)	

Tentative Guest Lectures:

- **Prof. Hitoshi Murayama**

(*Confirmed*, Week 4, A multi-disciplinary Theoretical physicist)

- **Richie Bonventre**

(*Confirmed*, Week 7, Experimental/Computational Particle Physics)

- **Tiancong Zhu and/or Canxun Zhang**

(*Confirmed*, Week 9, Experimental Condensed Matter Physics)

- **Madeline Bernstein and/or Jack Roth**

(*Confirmed*, Week 11, Experimental AMO Physics)

- **Prof. Ori Ganor**

(*Confirmed*, Week 12, String Theory/Mathematical Physics)