Physics 98

Beginner's Guide to the **Universe**

Fall 2019

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Office Hours:	TBD
Instructor of Record:	Jessica Lu
Time & Location:	Monday 5:00-6:30pm (lecture), Wednesday 5:00-6:00pm (discussion)
Location:	131 Campbell
Course Number:	Astronomy 98
Units:	2 units, P/NP
Prerequisites:	None

Course Description

Physics, broadly the study of motion and interaction in nature, captivates as much as it bemuses. As a centuries old "hot topic," physics today is filled with thriving research in quantum information, cosmology, planetary astrophysics, nonlinear dynamics, and countless others subfields. Yet the subject is often cloaked with inaccessible jargon, with the big picture ideas obscured behind seemingly insurmountable prerequisites and confounding pseudoscience. *In this class, we qualitatively summarize the broad and vibrant landscape of physics as it is today.*

Learning Objectives

At the close of the semester, the student will have the ability to critically assess physics as it appears in popular expositions. The student will understand overarching themes within physics and will be broadly informed on the body of knowledge and nature of contemporary work in physics.

Enrollment

To enroll, students should fill out an online enrollment application on the DeCal website (form). Students will then be admitted by the discretion of the instructor.

There are no prerequisites for this course. Though the course will contain some mathematical asides for completeness, students will only be expected to understand the physics at a qualitative, conceptual level. In general, this course will emphasize broad concepts and large results with little regard for mathematical detail.

As such, this class should be accessible to all students of any year and major. Though there are no enrollment restrictions, physics majors (especially upper division students) are slightly discouraged from taking this course as it will generally reiterate concepts from the standard physics curriculum.

This course is affiliated with Democratic Education at Cal (DeCal, decal.berkeley.edu).

Grading

Attendance	35%
Participation	15%
Homework	20%
Final Paper	30%

A cumulative grade of 70% or above and a final paper submission is required to pass the class.

Attendance & Participation

The class will meet twice a week in 131 Campbell for lecture (for the exposition of new topics) and discussion (for extra topics and dialogue). *Attendance for both the lecture and discussion sections is mandatory.* The instructor should be notified by email of absences known in advance.

The participation grade will be assessed holistically based off of a student's willingness to comment and participate in discussions. Note that attendance of discussion sections is prerequisite to participation.

Homework

Homework worksheets will be posted on BCourses at least one week in advance and will be due before the lecture section on the Monday following the topical lecture, unless otherwise specified. Late homework without an exemption will be accepted for a maximum of 50% credit up to a week late.

Final Paper

At the end of the semester, students will submit a final paper ~ 1000 words (~ 4 pages double-spaced) reviewing a topic of physics of the student's choice. The paper should reflect an educated assessment of the given topic. In order to pass the class, a student *must* submit a final paper. *A passing grade will not be awarded to any student who does not submit a final paper, regardless of their grade percentage in the class.*

This assignment will be due via email by the end of the day on **Monday, 9 December 2019** (during reading/review/recitation week).

Academic Misconduct

Cheating, plagiarism, and other forms of academic dishonesty will not be tolerated. While students are encouraged to cooperate and discuss assignments outside of class, they should write assignments separately reflective of their own effort and understanding. First violations will result in a zero on the assignment, and any subsequent violations may result in administrative action in accordance with the Berkeley Campus Code of Student Conduct.

Schedule

Below is a schedule of class meetings along with a (tentative) curriculum.

week	meetings	topic
1	9/4	overview
2	9/9, 9/11	classical dynamics
3	9/16, 9/18	electromagnetism and optics
4	9/23, 9/25	special relativity
5	9/30, 10/2	general relativity
6	10/7, 10/9	thermodynamics and fluid mechanics
7	10/14, 10/16	astrophysics
8	10/21, 10/23	cosmology
9	10/28, 10/30	quantum mechanics
10	11/6	review
11	11/11, 11/13	quantum information
12	11/18, 11/20	particle physics
13	12/2, 12/4	solid state physics

credit: Zach Weinersmith, Saturday Morning Breakfast Cereal