

PHYSICS 110LGX SYLLABUS

THE PHYSICAL WORLD AND THE UNIVERSE

PRELIMINARY SYLLABUS

Instructors: Prof. Vahé Perroomian, Department of Physics and Astronomy
and Prof. Dana Milstein, Dornsife Writing Program

Email addresses: peroomia@usc.edu, danamils@usc.edu

1. Course Description:

Taken as a complement to Physics 111, this course examines a variety of natural phenomena and the physical theories that have been developed to describe them. Just as you don't have to be a sculptor to appreciate art or a violinist to appreciate music, you don't have to be a nuclear theorist to appreciate physics. Physics 110 is intended for the non-science major without much previous background in the sciences and mathematics. The course is primarily conceptual, i.e., there will be very few instances in which you will be required to perform long calculations or to memorize complicated formulas.

Learning will be experiential and parallel the themes and activities of Physics 111, through developing scientific papers and posters about Physics Labs in mechanics, acoustics, spectroscopy, and optics; reading of fiction and scientific works; completing digital humanities projects in space cartography, music, and art appreciation field trips; and training in, creating, and exhibiting our own artistic renderings of Space based on our semester's learning.

We will use Paul G. Hewitt's *Conceptual Physics*, 12th Edition, for this course.

2. Course Plan, Reading, and Activities

Units 1-5: General Principles of Physics

Week	Topic	Reading / Activities
1 and 2	Newton's Laws <i>Themes: the how and why of motion</i>	Read. Hewitt <i>Conceptual Physics</i> Chapters 1 – 6 Physics Lab: Newtonian Motion
3	Energy and Momentum <i>Themes: production and transfer of energy as well as collisions</i>	Read. Hewitt <i>Conceptual Physics</i> Chapters 6 - 7
4	Rotational Motion	Read. Hewitt <i>Conceptual Physics</i> Chapter 8

	<i>Themes: dynamics of rotating systems, including stars and planetary systems, torque, angular momentum</i>	Physics Lab: Rotational Motion
5	Gravity <i>Themes: not just on Earth, but planetary orbits as well</i>	Read. Hewitt <i>Conceptual Physics</i> Chapters 9 and 10

Units 6-10: Matter, Energy, Waves

Week	Topic	Reading / Activities
6	States of Matter <i>Themes: solid, liquid, gas, and plasma</i>	Read. Hewitt <i>Conceptual Physics</i> Chapters 11 - 14 Physics Lab: States of Matter
7	Thermodynamics <i>Themes: transfer of energy by heat, entropy</i>	Read. Hewitt <i>Conceptual Physics</i> Chapters 15, 16, and 18
8	Waves and Sound <i>Themes: oscillations, mechanical waves, propagation of sound waves</i>	Read. Hewitt <i>Conceptual Physics</i> Chapters 19 - 21 Physics Lab: Waves and Sound, Acoustics
9	Electricity and Magnetism <i>Themes: forces on charged particles in electric and magnetic fields</i>	Read. Hewitt <i>Conceptual Physics</i> Chapters 22 and 24
10	Light <i>Themes: interactions of light and matter, spectroscopy</i>	Read. Hewitt <i>Conceptual Physics</i> Chapters 26, 27, and 29 Physics Lab: Optics

Units 11-14: Astrophysics, Theoretical Physics, and Cosmology

Week	Topic	Humanities
11	Special and General Relativity <i>Themes: The consequences of relativity: time dilation, length contraction, simultaneity, the equivalence principle, gravitational lensing, gravitational time dilation, gravitational waves</i>	Read. Hewitt <i>Conceptual Physics</i> Chapters 35 and 36
12	Formation of the Solar System	Read. Sagan, Carl. <i>Pale Blue Dot</i> .

	<i>Themes: Using the concepts of energy and angular momentum to explain the formation of the Sun and planets</i>	Read. Selections from Lawrence Krauss, <i>Atom</i> . Physics Lab: Planetary Compositions / Spectroscopy
13	The Life Cycle of Stars <i>Themes: Bring in concepts related to the formation of heavy elements: we are “star stuff.”</i>	Read. The Women Who Mapped the Universe and Still Couldn’t Get Any Respect Read. Selections from Lawrence Krauss, <i>Atom</i> .
14	Cosmology: Birth of the Universe <i>Themes: Where did our universe come from? Fundamental forces of nature.</i>	Read. Selections from Lawrence Krauss, <i>Atom</i> . Physics Lab: The Drake Equation and Fermi Paradox

3. Course Guidelines

3.1 Registration and administration

Your registration for this course consists of two separate parts: the lectures and the laboratory. You must register for each of them.

The Undergraduate Physics Office in ACB 439 deals with all administrative aspects of this class. Additional help regarding administrative issues is available from Kimberly Burger in ACB 439 with phone number (213) 740-7728 and email address burgerk@usc.edu.

3.2 Disabilities

Students who need to request accommodation based on disability are required to register each semester with the Office of Disability Services and Programs (DSP). This office can be found at STU 301 with phone number 231-740-0776. A letter of verification to the instructor from the DSP is needed for the semester you are enrolled in. If you have any further questions please contact the DSP or the instructor.

3.3 Grading

Your grade will be determined according to the following key:

80% lectures:

- 10% Homework
- 10% Participation
- 30% Midterm Exam
- 30% Final exam

20% laboratory

Broadly speaking, grading is done by the distribution curve of the combined scores of exams, homeworks and lab. No rigid percentage marks (such as, e.g., a rule that 90% corresponds to an A–, or similar) are used. Further details about the grading procedure are given in class. **You cannot pass the course if you do not earn a passing grade (14/20 or 70%) on the lab portion of the course.**

Participation

I use a gradual release model of teaching, which means every week will combine lecture, large and small group, and individual activity that gives you more responsibility and agency for your own work. Attendance and participation in this model is a necessary component of learning. Participation can take several forms according to your personal way of receiving, processing, and expressing information—we will discuss this more in class.

Homework

Homework assignments will be due approximately every other week, at midnight on Wednesdays. Homework can be turned in up to 24 hours late for 50% credit. You can set up reminders for assignments that are due through Mastering Physics. Please note that exceptions will not be made to homework deadlines.

I expect that it will take a couple of hours to complete each of your homework sets. The homework sets are the central means by which to master the course material, and, consequently, to perform well in the exams

Homework will count for 10% of your total score. Each of the 7 assignments listed below will be worth 100 points, and a cumulative score of 500 out of the maximum 700 points will equate to a 100% homework grade (this is equivalent to, but better than, dropping two homeworks as you can use all 7 assignments to reach the 500 points).

4. Support

You have a variety of opportunities for support available to you.

4.1 LECTURE

Do not underestimate the value of questions during the lecture period. In large lectures, many students are reluctant to pose questions that they fear might seem silly to their instructor or to their peers. Almost always, if one student asks a question, there are several other students who were wondering about the same issue. Often such questions tell the instructor what material might benefit from a more detailed discussion.

4.2 INSTRUCTOR OFFICE HOURS

I will have three hours of office hours each week, but these office hours will be open to all of the courses that I teach. You can also make an appointment to see me if you cannot make it to any of the office hours listed on the first page of the syllabus. In this case, it is best to contact me by email at least one day before you'd like to meet, or see me immediately after class.

4.3 ELECTRONIC ASSISTANCE

Everyone registered in this course should find a link to the course in their *Blackboard* account. All information about the course will be posted on *Blackboard* at <http://blackboard.usc.edu>.

5. Obtaining Your Grades

You will be able to access your grades in Physics 220 via *Blackboard* at <http://blackboard.usc.edu>.

6. Student Ombudsman

All courses in the Department of Physics & Astronomy have an assigned Student Ombudsman to serve students as a confidential, neutral, informal, and independent resource when they wish to discuss issues concerning their course without directly confronting their instructor. The Student Ombudsman for this course is Prof. Chris Gould, gould@usc.edu, 213-740-1101, SSC 204.

7. *Feedback*

Feedback regarding all aspects of these lectures is very much appreciated and welcome at any time. Please get in touch with your instructor via email, after lectures, or during office hours.

8. *Statement on Academic Conduct and Support Systems*

8.1 ACADEMIC CONDUCT:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

8.2 SUPPORT SYSTEMS:

Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline – 1 (800) 273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class. equity.usc.edu

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.

Provides overall safety to USC community. dps.usc.edu

9. SOME USEFUL DATES

August 26	Spring semester classes begin
September 2	Labor Day (University Holiday)
September 26	Midterm 1
September 13	Last day to drop class without a mark of “W,” and last day to change enrolment option
October 24	Midterm 2
November 15	Last day to drop class with mark of “W”
November 21	Midterm 3
December 6	Fall semester classes end
December 12, 2:00 pm – 4:00pm	Final exam