**Physics 110Lgx Syllabus**

**The Physical World and the Universe**

**Preliminary Syllabus**

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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 not use a formal textbook for this course. I will provide lecture notes for each of the covered topics.

2. **Course Plan**

   **Units 1-5: General Principles of Physics**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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   | 1 and 2 | Newton’s Laws  
   *Themes: the how and why of motion* |
   | 3 | Energy and Momentum  
   *Themes: production and transfer of energy as well as collisions* |
   | 4 | Rotational Motion  
   *Themes: dynamics of rotating systems, including stars and planetary systems, torque, angular momentum* |
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>5</td>
<td>Gravity</td>
</tr>
<tr>
<td></td>
<td>Themes: not just on Earth, but planetary orbits as well</td>
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**Units 6-10: Matter, Energy, Waves**

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<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tr>
<td>6</td>
<td>States of Matter</td>
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<tr>
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<td>Themes: solid, liquid, gas, and plasma</td>
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<td>7</td>
<td>Thermodynamics</td>
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<td>Themes: transfer of energy by heat, entropy</td>
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<td>8</td>
<td>Waves and Sound</td>
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<td>Themes: oscillations, mechanical waves, propagation of sound waves</td>
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<tr>
<td>9</td>
<td>Electricity and Magnetism</td>
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<td>Themes: forces on charged particles in electric and magnetic fields</td>
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<tr>
<td>10</td>
<td>Light</td>
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<td>Themes: interactions of light and matter, spectroscopy</td>
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**Units 11-14: Astrophysics, Theoretical Physics, and Cosmology**

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<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>11</td>
<td>Special and General Relativity</td>
</tr>
<tr>
<td></td>
<td>Themes: The consequences of relativity: time dilation, length contraction, simultaneity, the equivalence principle, gravitational lensing, gravitational time dilation, gravitational waves</td>
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<tr>
<td>12</td>
<td>Formation of the Solar System</td>
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<td>Themes: Using the concepts of energy and angular momentum to explain the formation of the Sun and planets</td>
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<tr>
<td>13</td>
<td>The Life Cycle of Stars</td>
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<td>Themes: Bring in concepts related to the formation of heavy elements: we are “star stuff.”</td>
</tr>
<tr>
<td>14</td>
<td>Cosmology: Birth of the Universe</td>
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<td></td>
<td>Themes: Where did our universe come from? Fundamental forces of nature.</td>
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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 (combined for Phys 110/111)
  - 30% Final exam (combined for Phys 110/111)

- **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.

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 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