

IPODIA PHYSICS 100 – SPRING 2025 – SECTION 50320



Prof. Vahé Perroomian

Email address: peroomia@usc.edu

Office: SHS 360

Welcome to the iPodia PHYS 100Lxg: Physicists haven't come up with "physics makes the world go 'round!" to make themselves look important, they've come up with it as a gentle and constant reminder that this statement is 100% true. To quote a colleague here at USC, *physics seeks to understand the fundamental patterns underlying all of nature in a quantitative and predictive way.*

This course is a journey that begins in ancient times, when science and philosophy were intertwined, and often confused with one-another. Leaving the ancients behind, we ride the scientific revolution to our current understanding of the scientific method and how science research is carried out. Along the way, we may pick up a habit of thinking critically about the world we live in. We explore everything from curving free kicks in soccer, rocket flight and how the New York Times ridiculed Robert Goddard, the "father" of modern rocketry, how the spin of a figure skater is related to the process by which the planets in our solar system formed, black holes, dark matter (ok, maybe not... we still don't know what it is!), and more mundane matters like walking on hot coals and why the sky is blue. Imagine how popular you'll be at dinner parties, once we start having them again!

This course is designed specifically for those non-science majors who have very little, if any, background in the sciences and mathematics. The course is non-mathematical by prerequisite, but you will have to learn to do some calculations. However, these calculations will be very simple and will employ formulae that are easy to remember. You will have the opportunity to note that formulae represent ideas.

1. TEXTBOOK

Conceptual Physics, 12th Edition, by Paul G. Hewitt (Pearson), Pearson, 2016.

We will **NOT** be using the Mastering Physics website/homework system, and rented/used (and 11th edition) textbooks will be ok.

2. THE HYBRID LEARNING ENVIRONMENT

All learning activities (see Section 3) will take place via the **Microsoft Teams** System, so students can always learn, communicate, and collaborate with classmates continuously in a hybrid learning environment.

All students registered in this iPodia class will be provided with a Microsoft Teams account to participate in the learning activities. A "how to" guide for Microsoft Teams has been posted to the class Teams page.

For USC Students: Live attendance at the Tuesday morning lectures is mandatory.

3. LEARNING ACTIVITIES

iPodia students will follow the unique **iLearning** pedagogy to study context knowledge and create a contextual understanding of the topics listed in Section 9. iLearning, where "i" stands for "interactive," is the most important feature of an iPodia class. Unlike the traditional eLearning approach, iLearning guides students to "study content materials individually and then develop contextual understandings collaboratively." The five steps of the above iLearning process are:

1. The instructor **posts content materials** online.

To begin a weekly iLearning, a set of content materials of a learning module will be posted on Teams.

Each module's content will include slides, a study guide, and a number of short videos. Each module may cover one or more of the topics listed in Section 9 below.

2. Students **preview content materials**

Interested students could (optionally) preview the posted materials of the weekly learning module to familiarize themselves with the content, develop questions, and prepare for live discussions before attending the live class.

3. Students **attend the live class**:

All students can attend the weekly live class in their respective iPodia classrooms. They must also bring their own laptops with a webcam, microphone, and headset to log in to the iPodia virtual classroom so other remote students can see and interact with them.

4. Students **reflect on content** learned by participating in **online cohort discussions** to share contexts:

Cohorts of 3 – 4 students will be formed each week. Cohort members meet online in breakout rooms on Teams to compare their understandings and share their viewpoints on the weekly discussion topic(s) to produce required discussion deliverables. Student participation in cohort discussions will be tracked and used to compute each student's Online Discussion grade (see Section 4).

5. Students **answer quiz questions** to conclude a weekly learning module:

Upon completion of cohort discussions, all students must take a weekly quiz individually to assess their content knowledge and contextual understanding of the topics related to this learning module.

In addition to the weekly material outlined above, students will also have the following individual assignments:

- Starting in Week 2 and approximately every other week (see Lab Schedule in below), students will be required to complete an online lab. Since this course satisfies the GE-E requirement for USC students, **completion of the labs and earning a passing grade in the lab portion of the course (70%) is required.** The purpose of the laboratory is to give you some feeling for making and interpreting observations, thereby reinforcing some of the course material by direct experience. Indeed, without such experience, some of the theoretical material could appear a little too abstract. During the weeks when we have labs due, our TA will post a short “how-to” video explaining the steps needed to complete the lab assignment, along with the lab worksheet that will need to be completed.

Lab #	Title	Due Date
1	Basic Aspects of Physics	Friday, January 24, 2025
2	Video Analysis of Motion	Friday, February 7, 2025
3	Conservation Laws of Motion	Friday, February 21, 2025
4	Waves and Sound	Friday, March 7, 2025
5	Thermal Energy	Friday, March 28, 2025
6	Light & Color	Friday, April 11, 2025
7	Lab #7 TBD	Friday, April 25, 2025

- There will be one 50-minute midterm exam during Week 9. The exam will go live on Teams on Monday March 3, 2025 and will be available till 11:59pm on Friday March 7, 2025.
- There will be one 80-minute final exam during Finals Week. The exam will go live on Teams on Wednesday May 7, 2025 and will be available till 11:59pm on Monday May 14, 2025.

4. LEARNING ASSESSMENTS AND GRADING CRITERIA

The following weights, which total 100%, will be used to assess student's performance in each learning activity (see Section 3). Note that the first three activities are part of the iLearning cycle, and students' performances will be evaluated weekly. The last two activities will be evaluated at the exercise/project completion time by the responsible faculty.

1. **Live Class Attendance and Participation (15%)**

Due to the highly interactive nature of this class, attendance at live classes is required for on-campus students. 1% will be deducted for each missing week.

2. **Cohort Discussion Participation (15%)**

Active participation is required in the weekly cohort discussions. Each week's discussion will be worth 1% of your total grade.

3. Weekly Quizzes (10%)

Each of the weekly quizzes, comprising of up to 10 multiple choice questions, is worth 1% of your total grade. The quizzes will cover the material presented in class as well as the cohort discussions. The quizzes will be automatically graded.

4. Lab Reports (20%)

Your scores for each of the 7 labs in the course will be averaged, and your average lab score will represent 20% of your final grade in the course. The labs are described in Section 3 above.

5. Midterm exam (20%).

The midterm exam will be administered during Week 9.

6. Final exam (20%)

The cumulative final exam will be administered during Finals Week.

Grades will not be assigned to individual quizzes exams. The class will be curved so that the class average is a high B / B+.

Students taking the course Pass / No Pass must reach a minimum overall score of 70% to pass the course, regardless of the manner in which letter grades are assigned to students taking the class for a letter grade.

5. SUPPORT

My goal is for everyone to succeed in this course. Please note the following opportunities available to all students in the course.

5.1 Live Lectures

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. In our smaller classroom, questions will serve to enhance the learning experience for everyone.

5.2 Instructor office hours

I welcome everyone to my office hours, whether it is to chat about astronomy, photography, a course-related question or issue, or any concern you may have that you'd like to share with me.

I will have several hours of formal office hours each week, but these office hours will be open to all of the courses that I teach. Office hours will be held in person in SHS 360/363, on Zoom, and via Microsoft Teams. Most of my time is filled by teaching or office hours, but if I'm in my office during other times, you're welcome to stop by for a quick question (less than five minutes). 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.

In addition, both the class TA and I are available to answer questions via Microsoft Teams. We will respond to any questions you may have as quickly as possible.

5.3 Contacting Me

Emailing me at peroomia@usc.edu is the best way of contacting me. I will answer emails within 24 hours at the latest, and often much sooner, including weekends. You may also contact me via the class Teams page, and once again I will respond as quickly as possible.

6. OBTAINING YOUR GRADES

You will be able to access your grades via the Grades tab in Microsoft Teams. We will NOT use Brightspace for this course, whether or not you are a USC student.

7. GUIDELINES AND SUPPORT FOR USC STUDENTS

7.1 Registration and administration

Your registration for this course consists of three separate parts: the lectures, a “quiz section,” and the laboratory. You must register for each of them. The “quiz section” **will not be used** for this course, and the labs will be conducted via Microsoft Teams.

The Undergraduate Physics Office in ACB 439 deals with all administrative aspects of this class. Additional help regarding administrative issues is available in that office in person, by phone at (213) 740-1140 or (310) 740-0848, and by email at physics@dornsife.usc.edu.

7.2 Disabilities

Students who need to request accommodation based on disability are required to register each semester with the Office of Student Accessibility Services (OSAS). This office can be found at STU 301 with phone number 213-740-0776. A letter of verification to the instructor from OSAS is needed for the semester you are enrolled in. If you have any further questions please contact the OSAS office or the instructor. **Please note that you need to send the instructor a copy of your accommodation letter as the instructor doesn't automatically receive this information.**

7.3 Faculty Liaison

All courses in the Department of Physics & Astronomy have an assigned Faculty Liaison 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 Faculty Liaison for this course is Prof. Jack Feinberg, feinberg@usc.edu, 213-740-1134, SSC 327.

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 (USC CAMPUS)

January 8	Spring semester classes begin
January 15	Martin Luther King, Jr. Day (University Holiday)
January 26	Last day to drop class without a mark of “W,” and last day to change enrolment option
February 19	Presidents’ Day (University Holiday)
March 11 – 15	Spring Recess
April 5	Last day to drop class with mark of “W”
April 26	Spring semester classes end

9. COURSE SCHEDULE

You should read through the relevant Topics prior to coming to the lectures each week, and review them again after each lecture before attempting the homework problems.

Week	Start date	Required reading
1	8 January	Topic 1: Our Place in the Universe Topic 2: Earth’s View of the Universe

2	15 January	Topic 3: Our View of the Moon Topic 4: A (brief) History of Astronomy in Ancient Times
3	22 January	Topic 5: The Copernican Revolution Topic 6: Gravity (and a bit more...)
4	29 January	Topic 7: Light and Telescopes Topic 8: Atoms and Spectra
5	5 February	Topic 9: A tour of the Solar System Topic 10: Formation of the Solar System Topic 11: Age of the Solar System
6	12 February	Topic 12: Earth: the Active Planet Topic 13: Climate Change Topic 14: The Moon, Mercury, and Venus
7	19 February	Topic 15: Mars Topic 16: The Jovian Planets
8	26 February	Topic 17: Asteroids, Comets, and Dwarf Planets Topic 18: The Sun and Space Weather
9	4 March	Topic 19: Surveying the Stars
10	18 March	Topic 20: The Life Cycle of Stars
11	25 March	Topic 21: The Spectacular Deaths of Stars
12	1 April	Topic 22: The Milky Way Galaxy Topic 23: Galaxies
13	8 April	Topic 24: The Birth of the Universe
14	15 April	Topic 25: Life in the Universe
15	22 April	<i>Review</i>