

Physics 321, Unique # 56250
TT 2-3:30
PAI 4.42
Fall 2016
Introduction to Modern Physics
Plan II

- Instructor:** Austin Gleeson
- Office/Phone:** RLM 9.212A/512 471-4450
Home phone in an emergency 512 345-2144.
- E-mail:** gleeson@physics.utexas.edu
- Home Page** <http://www.ph.utexas.edu/~gleeson/home.html>
- Office Hours:** Monday at 1:00 pm and Wednesday at 10:30 am in RLM 9.212A. Required: See **Participation**
- Assistants:** Jacqueline Geler Kremer, jgelerkremer@utexas.edu
Discussion Leader: Tuesday 6:00 pm in CMA 3.114
Elliot Persico elliott.persico@gmail.com
Discussion Leader: Tuesday 6:00 pm in CMA 3.114
- Graders
Jacqueline Geler Kremer, jgelerkremer@utexas.edu
Elliot Persico elliott.persico@gmail.com
- Tutoring:** Kendle Windham, kwindham@utexas.edu
Margaret Johnson, maggiej726@utexas.edu
Hours: Monday at 7:00 pm
Location: Waggener 201
- Text:** "A Traveler's Guide to Spacetime" by Thomas A. Moore
"Quantum Physics: Illusion or Reality?" by Alastair Rae
"QED" by Richard P. Feynman
"Innumeracy" by John Alan Paulos
My class notes
- Homework:** Assigned on every Thursday and due the following Thursday.
Late homework does not exist.
- Quizzes:** Two. They will be questions like the homework. Scheduled on Thursday, October 6, and Thursday, November 17.

- Final:** Wednesday, December 14, 9:00-Noon. The final will be comprehensive and similar to the quizzes in style and difficulty.
- Participation:** Approximately five percent of the grade will be for participation. Part of which can be earned by attending at least one office hour and communicating with me by e-mail. The other part comes from the participation in the discussion sections and lecture.
- Study Groups:** Because the homework sets are rather large and complex, the solutions should be developed within study groups. All students are encouraged to work with other students as a team on these homework sets. This course is supported by **Peer-Led Undergraduate Studying. PLUS** study groups provide an opportunity to collaboratively practice skills and knowledge you need for success in this course. Attending study groups regularly is a great way to ensure that you are keeping up with the material so you don't fall behind. Feel free to attend any study group at any point in the semester; more information on times and locations will be available through Canvas and announced in class. More on PLUS may be found at wikis.utexas.edu/display/PLUS. **All** work on the submitted homework must be your own. Direct copying of any part of a homework set will result in a grade of zero for that homework submission.
- Article Response:** One article response and one book response together are worth ten percent of the grade.

Grade:

$$Grade = (0.85)\left(\frac{hw + q_1 + q_2 + 2f}{5}\right) + (0.1)(ar) + (0.05)(p)$$

General Course Syllabus:

The discoveries and the methods of analysis that are the basis of Twentieth Century Physics have dominated our lives and in many cases set the tone of our intellectual debate. Discoveries from quantum mechanics are the basis for all the current work in the development of modern materials and in modern electronics devices such as transistors. The modern view of space-time is a rich structure that allows for marvelous objects such as black holes and even allows a solid basis for our understanding of the origin of the universe. Unfortunately, in most undergraduate University curricula, this material is not covered. This omission is usually due to the need to prepare the students in both the requisite classical physics and mathematics as a background for other course work. This course covers the modern subjects without the use of sophisticated mathematics but in a coherent and correct presentation of the modern physics. The emphasis in the course will be on the conceptual development of the ideas. The course

begins with a general review of several of the basic ideas that are relevant to all of physics but quickly relates them to discoveries made in the twentieth century. We start the discussion of the current approach to microscopic matter. Beginning with Planck's work on black body radiation and Einstein's photoelectric effect, we will develop the modern theory of light and matter. From this we will study the modern theory of space and time. This is covered using the geometrical concepts to outline the basic ideas of special and general relativity. This is followed by a descriptive analysis of some of the more spectacular of the objects predicted by these theories. If time allows, this will be followed by connecting the two threads of space time and quantum mechanics will. Again the emphasis in all our discussion is on conceptual foundations. In addition, the content of the course allows for discussions of important philosophical issues such as "What is energy and matter?" and significantly the role of mathematics.

This course may be used to fulfill three hours of the natural science and technology (Part I or Part II) component of the university core curriculum and addresses the following four core objectives established by the Texas Higher Education Coordinating Board: communication skills, critical think skills, teamwork and empirical and quantitative skills.

If you are compelled by your religious beliefs to miss class on any class day, you are free to do so. You should notify me 14 days in advance of the holiday period.

My office, RLM 9.212A, is to be gun free. Even if you have a concealed carry permit, you must not bring a gun with you into my office.