

PHY375R: Introduction to Relativity - Fall 2014

Unique Number: 58240

Classroom / Time: RLM 5.116 M W F 12:00-1:00

Instructor: Prof. Can Kilic (kilic@physics.utexas.edu)

Office Hours: M & Th, 5-6pm or by appointment, RLM 9.220a

Teaching Assistants: Ali Hamze (aliamze@utexas.edu)

Office Hours: M 11-12, Tu 3:30-4:30, RLM 9.218

Prerequisites/Co-requisites: Physics 352K with a grade of at least C-. Exceptions can be made, but you must clear it with me before registering.

Textbook and What Will Be Covered: The textbook for the course is “A First Course in General Relativity” by Bernard Schutz (2nd edition). We will start with a review of special relativity (chapters 1-2), and introduce tensors which will allow us to generalize physics to curved spaces (chapters 3-4). Then we will lay down the mathematical foundations for describing geometry in a curved space-time (chapters 5-7). Putting together these ingredients, we will write down Einstein’s equations (chapter 8) that identifies matter and energy as the source of curvature. We will then start exploring the physical consequences of these equations such as modification of Newtonian orbits, the bending of light and black holes (chapter 11), as well as the cosmological model for the universe (chapter 12).

<u>Grading:</u>	Homeworks	(drop 2)	30%
	Midterm Exams	(drop 1)	40%
	Final Exam		30%

There will be no makeup exams. Missing the final exam will result in a failing grade. The final letter grades will be assigned using a curve distribution, however if the class average is high, you will not be penalized as a result. A cumulative score between 95 and 100% will guarantee an A, between 90 and 95% an A-, and so forth until 60-65% for a C-. Anything below that will be decided on a case-by-case basis.

Homework Assignments: Homework will be assigned and collected weekly. The solutions will also be made available at the same time, so late assignments cannot be given credit. The lowest two homework grades will be dropped and will not affect your final grade. You are encouraged to discuss problems with your classmates. However, each student must do his or her own work when turning in the assignments. Your grades on the homework assignments will depend not only on whether you arrived at the correct answer, but also on your presentation of the solutions. You should develop the habit of solving a problem on scratch paper first, and **then** write up your solutions **cleanly**, in such a way that the grader can follow each step of what you did **and why** (do use words in between equations so that we don't have to guess what you were thinking).

Exams: There will be three midterm exams during class hours. The exam dates are 9/29, 10/27 and 11/24. The lowest of your three midterm exam scores will be dropped and will not affect your final grade. The final exam for the course is scheduled for 12/15 (2-5 pm). There will be no makeup exams for either the midterms or the final. As in the case of homework assignments, your score on exams will also factor in your solution writing style. You can lose points for sloppily written solutions even if you obtained the correct answer.

Class Tools: Homework assignments and other relevant material will be posted on Canvas. Class announcements will also be posted there.

General Advice:

- Physics is learned actively (by doing), not passively (by listening only). Study the material assigned before each class, and review it again after each lecture. Start working on your homework assignment early, not on the last day. You may get a decent grade from a homework that is worked out at the last minute, but you will be less likely to retain what you have learned. A little bit of discipline and a reasonable amount of study time you invest each day can make a huge difference in terms of how well you internalize the material. If you study regularly, you can basically eliminate the need to study extra for the exams, and a lot of anxiety along with it.
- In the internet age, the solutions to many homework problems can be found online. I strongly urge you to resist the temptation to do this. You may finish your homework assignments in less time as a result, but by not having solved the problem yourself, you will miss out on the actual purpose of the assignment, and in the long run you will hurt yourself by doing worse on exams because you never internalized crucial parts of the material.
- Physics is about understanding, not memorization. You will do much better in exams if you study not by memorizing formulas but focus on how each formula was derived, when it does or does not apply etc.
- I and the TA for the class are here to help you learn. If you feel that you do not understand the material, come to our office hours and talk to us, and do so sooner rather than later.

Students with disabilities: Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, <http://www.utexas.edu/diversity/ddce/ssd>. Students who need special accommodation must notify the instructor no later than the 12th day of class.

Accommodations for religious holidays: If you will miss class because of a religious holiday, you must notify the instructor of your pending absence at least fourteen days prior to the date of observance of a religious holiday and no later than the 12th day of class. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holiday, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Quantitative Reasoning Flag: This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.