## Syllabus & General Information

**Prerequisites**

Knowledge of classical mechanics and E&M at the level of Ph106. (If you haven't worked with Euler-Lagrange equations, for example, you're taking this course too soon.) You should also have seen a simple treatment of special relativity before, but you don't have to know about 4-vectors or tensors.

**Meeting Times**

T Th 1:00 – 2:25pm

**Lecturer**

Saul Teukolsky

saul@caltech.edu

Office: 326 Cahill

Office Hours: Mon 2:00 – 3:00pm (tentative) and by email arrangement

**TA**

Kyle Nelli

knelli@caltech.edu

Office Hours TBA

**Text**

*Modern Classical Physics* by Thorne & Blandford

We'll use Chapters 1 – 2, 24 – 28

This material is available separately as

*Relativity and Cosmology*

if you don't want to get the whole book. (But this is one of the great physics textbooks of all time!)

Other books that you may find useful:

- Hartle *Gravity: An Introduction to Einstein's General Relativity*

- Schutz *A First Course in General Relativity*

Somewhat more advanced:

- Misner, Thorne, and Wheeler (MTW) *Gravitation*

- Carroll, *Spacetime and Geometry: an Introduction to General Relativity*

**Topics**

This course is a one-term introduction to general relativity. Topics covered include

- Special Relativity: Geometric Viewpoint

- Differential Geometry and Curved Spacetime

- Formulation of General Relativity

- Relativistic Stars and Black Holes

- Gravitational Waves

- Cosmology

**Homework**

Assignments will be posted on Canvas every Thursday, and will be due the following Thursday. I'll post solutions after the homework is graded. One homework assignment (probably #5) will be designated as serving as the mid-term exam.

**Late Homework Policy**

Homework extensions of up to 24 hours can be granted by the instructor or the TA. Longer extensions can only be approved by the instructor. No late homework will be graded unless one of these prior arrangements has been made.

**Collaboration Policy**

Note: This policy does not apply to the midterm assignment or the final paper, which will have their own policies.

In doing the homework, you may consult the lecture notes, your own class notes, and Thorne and Blandford. You may also consult any textbooks or other reference books you find helpful. In this case, you should cite the book you used.

The purpose of the homework is to help you learn the material in the course. So you may not look at solutions to the problems you might find anywhere. This includes online, on a friend's computer, or in hardcopy form (e.g., another student's actual writeup of a solution). In particular, you may not consult books that consist solely of problems with solutions.

A good way to learn is by discussion. Thus you are encouraged to discuss the homework problems fully with other students in the class and with the TA, but your solutions should be your own work, in your own handwriting or typing. Copying someone else's solution or trading answers is not acceptable. If you do get help on a problem set from anyone other than the instructor or TA, you must list their names on the submitted work. Note that acknowledging help or giving a citation counts for you in this course, not against you, just as it will do in your career as a professional.

**Final Paper**

Toward the end of the course, you'll start working on a 5-page paper on a topic of your choice related to the course. It can either be a subject we didn't deal with in class, or it can be an in-depth look at something we covered superficially. More details later.

**Grading**

There will be 8 homeworks during the term. You must turn in all the homeworks to pass the course, whether or not they were submitted in time to be graded. There will be no midterm exam, but instead a more extended homework set that you will do on your own. Your grade will be based roughly equally on the homework designated as the midterm exam, the other 7 homeworks, and the final paper.

**Academic Integrity**

Each student in the course is expected to abide by the Caltech Honor Code. Note that you are not permitted to buy or sell any course materials from this course nor to post any materials online nor to distribute them to anyone not enrolled in the course.