**Relativity (PHY 408)**

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[Announcements](http://chi.physics.sunysb.edu/lectures/fall-2025/announce.shtml)

[Homework Assignements](http://chi.physics.sunysb.edu/lectures/fall-2025/homework/homework.shtml)

[Lecture Notes](http://chi.physics.sunysb.edu/lectures/fall-2025/notes/notes.shtml)

[Mathematica Notebooks](http://chi.physics.sunysb.edu/lectures/fall-2025/notebooks/notebooks.shtml)

This course covers special and general relativity. After a short review of special relativity and relativistic covariance, we cover the basics of geometry and tensor analysis to arrive at the Einstein equations. We will discus the non-relativistic limit of these equations, the black hole solutions and the gravitational wave solutions. The course is loosely based on the textbook by Sean Carrol, Spacetime and Geometry: An Introduction to General Relativity. Also useful are [lecture notes by Gerard 't Hooft](http://chi.physics.sunysb.edu/lectures/fall-2025/thooft.pdf) and the textbook, A first Course In General Relatibvity, by Bernard Schutz.

A tentative course plan is [available](http://chi.physics.sunysb.edu/lectures/spring-2025/plan.pdf).

Class attendance is essential, and your feedback is very important. Everyone should be able to follow the lecture at all times. Questions during class on the material and my explanations are strongly encouraged. I may give quizzes to find out if I have been sufficiently clear.

This class meets Tue-Th 9.30-10.50 in Physics C133 (next to the Library). The first class meeting is Tuesday August 26.

**Prerequisites**

Two semesters of a Griffiths level course in electrodynamics is essential as well as a strong background in Mathematics. Basic knowledge of Mathematica is required -- some of the homework problems rely on this framework.

**TextBook and Lecture Notes**

As I said above, the required text book is Sean Carrol, Spacetime and Geometry: An Introduction to General Relativity.

**Grade Calculation**

The course grade will be based on homework, a midterm exam, a final exam and class participation, according to the formula 15 percent homework, 5 percent for class participation (including possible quizzes), 30 percent for the midterm and 50 percent for the final. Students who get less than 25 percent correct of the final can expect an F grade for this course. Note that the weight of the homework is actually much higher because without spending of lot of time on the homework you will not be able to solve the exam problems in a satisfactory way.

**Final Exam:** Friday December 12, 2025, 11.15 am - 1.45 pm. Frivolous excuses such as I have booked a flight back home or I have two exams on the same day will not be accepted.

**Class Times and Venue:**Tue-Th 9.30 -- 11.50, in Physics C133.

**Office Hours**

Wednesday 12.00 -- 2.00, may change if there are conflicts.

**Homework**

Homework will be assigned weekly, and must be submitted on paper. It will be assigned on Monday or Tuesday evening and is due next Monday at the beginning of the class. No extensions of the homework deadline will be given. If the handwriting or scan is not sufficiently clear, it is my prerogative not to grade the homework. Copying homework solutions from the internet is not allowed, but collaboration with fellow students is encouraged. I will check if homework solutions have been copied from the web or other sources. The home work will be graded on effort, but I will supply solutions of all problems.

**Course Website:** [PHY 408 Website](http://chi.physics.sunysb.edu/lectures/fall-2025/index.shtml)

**University Policies**

We will comply with University Policies with regards to religious holidays, accessibility, disabilities, academic integrety, etc.. See, [the Provost Webpage](https://www.stonybrook.edu/commcms/provost/faculty/handbook/academic_policies/policies_and_procedures_for_instructors.shtml) and [University Syllabus statement](https://www.stonybrook.edu/commcms/faculty-pathways/pages/policies_and_procedures_for_instructors.php) for details.

Send corrections and comments about this WEB page to jacobus.verbaarschot@stonybrook.edu. Last updated 08/20/2025.