Syllabus
General Relativity I
Physics 6553 / Astro 6509 --- Fall 2024

Professor:
Tom Hartman
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Office: PSB 434
Office hours: Tuesday, 2:40-4pm

Lectures: T-Th 1:25-2:40pm in Rockefeller 112
Website: see canvas.cornell.edu

This course is an introduction to the theory of general relativity. We will cover physical motivation, differential geometry, geodesic motion on curved manifolds, the Einstein equations, and experimental tests of general relativity; and discuss applications to black holes, gravitational waves, and cosmology.

No prior experience with general relativity or differential geometry is assumed. Knowledge of Lagrangian mechanics and electromagnetism is required at the advanced undergraduate or beginning graduate level. Undergraduates should discuss with the instructor before taking this course.

Main textbook
Spacetime and Geometry: An Introduction to General Relativity by Carroll (any edition)

Other useful texts
Introductory/physical: *Gravity: An Introduction to Einstein's General Relativity* by Hartle
Advanced/mathematical: *General Relativity* by Wald

Policies

- Grades will be based on problem sets (around 50%) and a final exam (around 50%)
- Problem sets every 1-2 weeks will be posted on the course website and turned in online.
- You are encouraged to work together on solving the homework problems, but write up the solutions yourself. List your collaborators at the top.
- Use of Mathematica (or similar) is encouraged. However, in this first-semester course, don't use any specially designed General Relativity packages to do things like calculate curvature tensors, etc.; write the code yourself!

- One late homework (up to 7 days late) is OK, no questions asked and no prior permission needed. Beyond that (more than one, or more than one week late), late homeworks receive 50% credit.