

Physics 717: General Relativity

Spring, 2009

Instructor: Prof. Daniel Chung (*danielchung@wisc.edu*)

Prereq: Graduate level electrodynamics (e.g. 721)

Website: <http://uw.physics.wisc.edu/%7Edjchung/phys717/phys717.html>

Textbooks:

Gravitation and Cosmology (Weinberg)

General Relativity (Wald)

Lectures: 11:00 AM - 11:50 AM MWF at Chamberlin 2116

Office hours: by appointment (truly welcome): office location 5207 CH (608-265-3133)

Grading:

homework (70 %)

final (30 %)

Recommended supplementary books on reserve at the physics library:

- Gravitation / Misner, Thorne, and Wheeler (QC178 M57): a verbose but authoritative text on pre-1973 GR; a good source of examples and problems; treats both formal and calculationally useful aspects of GR.
- The Classical Theory of Fields / Landau and Lifshitz (QC670 L313 1975): a terse but useful nuts and bolts approach to GR (and E&M).
- General Relativity: An Introduction for Physicists / Hobson, Efstathiou and Lasenby (QC173.6 H63 2006): an exposition of GR with a cosmological emphasis.

Topics (details may change)

1. preliminaries
2. classic special relativity
3. equivalence principle
4. differential geometry
5. fluids
6. Einstein equations
7. Killing vectors
8. Schwarzschild related solutions
9. classic tests of GR
10. more about black holes
11. gravity waves
12. time-dependent solutions and basic cosmology
13. spinors
14. selected advanced topics if time permits (e.g. extra dimensions, supersymmetry, dilaton gravity, etc.)