Fall 2014 Course Outline

Topic	Reading
1. Introduction to Tensors	Chapter 10 of Boas
2. Covariance of Physical Laws	Chapter 2.1
3. Special Relativity	Chapters 1 and 2
4. The Equivalence Principle	Chapter 4.1.1
5. Space and Spacetime Curvature	Chapter 3
6. Tensors in Curved Spacetime	Chapter 4.1.2
7. The Geodesic equation	Chapter 3.3
8. Einstein's Field Equations	Chapters 4.1.3, 4.2 and 4.3
9. Schwarzschild Spacetime	Chapter 5
10. Black Holes	Chapter 6
11. Testing General Relativity	Chapters 7.1–7.3
12. Gravitational Radiation	Chapter 7.4
13. Relativistic Cosmology	Chapter 8

The readings above refer to the textbook by Lambourne unless otherwise noted. For an introduction to tensors, please review Chapter 10 of Mary L. Boas, *Mathematical Methods in the Physical Sciences*, 3rd Edition (John Wiley & Sons, Inc., Hoboken, NJ, 2006).

Course Requirements

The basic course requirements consist of regular problem sets (40%), a take-home midterm exam (25%) and an in-class (open book/open notes) final exam (35%) [percentage of the course grade indicated in parentheses]. Prerequisites for the course are: Physics 116A and B, 105 and 110A and B or equivalent. No prior knowledge of differential geometry is required.