

PHYS 514

Winter 2018

R. Brandenberger

GENERAL RELATIVITY AND COSMOLOGY

Textbook: S. Carroll, *Spacetime and Geometry* (Addison Wesley, San Francisco, 2004).

Note: Textbook available at Paragraphe Bookstore.

Other Recommended Texts:

1. S. Weinberg, *Gravitation and Cosmology* (Wiley, New York, 1972).
2. R. d'Inverno *Introducing Einstein's Relativity* (Oxford Univ. Press, Oxford, 1992).

COURSE OUTLINE:

1. Introduction: Einstein's Equivalence Principle
2. Methods of Differential Geometry
3. Motion of Test Particles in General Relativity
4. Curvature
5. Einstein's Field Equations
6. Schwarzschild Solution & Tests of General Relativity
7. Black Holes
8. Gravitational Waves
9. Cosmological Solutions of Einstein's Equations
10. The Inflationary Universe
11. Cosmological Fluctuations
12. Hawking Radiation

Class Time: Tu, Thu: 11:35 - 12:55, RPHYS 115

Extra Class Time: Wednesday: 18:45 - 19:45, Board Room

Class begins Jan. 9 2018

GRADING SCHEME (suggested)

1. Homework 50%
2. Midterm Exam 15%
3. Final Exam 25%
4. Final Project 10%

Midterm Date: Feb. 27, in class

Instructor: Robert Brandenberger, RPHYS 332, rhb@physics.mcgill.ca

Office Hours: Mo: 13:30 - 14:30 (RB, Room 332), Wed. 16:00 - 17:00 (TBA)

Teaching assistants: Bryce Cyr (RPHYS 349), Sigtryggur Hauksson (RPHYS 345)

The following information must be included on course description due to University rules:

1. Language Policy Statement

In accord with McGill University's Charter of Students Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

2. Academic Integrity Statement

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest/ [www.mcgill.ca] for more information).