

PY896, Cosmological Physics, Spring 2017

Course description

PY896, Cosmological Physics, covers the basic theory underlying modern Cosmology. We will cover the geometry and dynamics of the universe, inflation, the thermal history of the universe, cosmological perturbation theory, structure formation, and the origin of initial perturbations from quantum fluctuations. The course will be based on the “Cosmology” notes by Daniel Baumann.

Instructor

Instructor: Prof. Martin Schmaltz
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Office: PRB 561 (3 Cummington Mall)
Office hours: anytime

Meeting Times

Tu/Th 09:30 - 10:45, PRB 365
Fr 10-10:50, PRB 561 (Discussion)

Grading Policies

Homework: 90%, Class participation: 10%.
Late homework assignments receive no credit except with prior arrangement. This class will not have a final exam.

Academic conduct

You should read and follow the BU Academic Conduct Code (posted at <http://www.bu.edu/academics/>). In particular, cheating on problem sets will not be tolerated, and suspected cases will be treated in accordance with BU Academic Conduct procedures.

Syllabus

The course syllabus mirrors the chapters in Baumann’s notes. The course material can be divided in two: I. The homogeneous universe and II. Perturbations. Each part is further divided in three chapters.

- I.1 Geometry and Dynamics
- I.2 Inflation
- I.3 Thermal History
- II.4 Cosmological Perturbation Theory
- II.5 Structure Formation
- II.6 Quantum Initial Conditions

Suggested Readings

The course is self-contained and follows Baumann's notes. You are not required to purchase any books, but you may need to consult appropriate texts depending on your knowledge of the subjects or special interests.

Some other books:

- Scott Dodelson "Modern Cosmology" readable book at the level of the Baumann notes.
- Kolb and Turner "The Early Universe" classic that is also quite readable, not quite up to date.
- Steven Weinberg "Cosmology" rigorous and somewhat harder to penetrate.
- Peter Schneider "Extragalactic Astronomy & Cosmology" book that Tereasa Brainerd in Astronomy uses for her course on the same subjects, more elementary.