

Cosmolgy (A. M. Wolfe)

This is a one-quarter course offering an introduction to cosmology.

- Textbook: **Cosmology** by S. Weinberg

The lectures will generally follow the presentation of the book, but only loosely. Because of time limitations we will cover less than half of the topics in the book.

- Related Cosmology texts put on reserve are

Principles of Physical Cosmology by Peebles (Princeton: University Press)

The Early Universe by Kolb and Turner (Benjamin)

Structure Formation in the Universe by T. Padmanabhan (Benjamin)

- The following Introduction to Astronomy Texts will also be on reserve

Modern Astrophysics by Carrol and Ostlie

An Introduction to Astronomy by F. H. Shu

- Lecture time: Tuesday and Thursday at 9:30– 10:50 A.M. in SERF 329. Lectures next week will be rescheduled since I will not be in San Diego from April 7 to 9.

- Assignment: There will be a number of homework assignments (50 % of the grade)

- Term paper: Oral and written presentation during finals week (50 % of the grade). Written paper will be at least 10 pages in length (excluding figures and references).

Course Outline (*tentative*)

Fundamental Ideas (1 week)

- Fair Sample, Isotropy, homogeneity
- Hubble's Law, Friedmann-Robertson-Walker metric
- Geodesic Equations, Fundamental Observer
- Age, Distance Measurements, brief discussion of Cosmic Microwave Background

Dynamics of Expansion (2 weeks)

- Friedmann Equations: Relativistic and Newtonian
- Ω_M , H_0 , Ω_Λ , Ω_{baryon}
- Distance In cosmology: D_A , D_L , ..l etc.
- Volumes, number counts etc.
- Horizons

Background Radiation (1 week)

- Radiative Transfer in a Friedmann universe
- Cosmic Microwave Background Radiation: Properties
- Cosmic Microwave Background Radiation: Thermal History

Early Universe(2 weeks)

- Evolution
- Big Bang Nucleosynthesis
- Inflation: 3 Puzzles

Origin of Structure (4 weeks)

- Gravitational Instabilty of Friedmann models
- Growth of fluctuations in radiation and matter dominated eras, hierarchical models for the growth of structure
- Power spectrum of inhomogeneities
- Angular Power Spectrum of the CMB
- SW effect, Boltzmann Equation, Acoustic Oscillations.