Syllabus

Physics 313: Cosmology part

Spring 2011

Instructor: Prof. M. Amaryan

Topics to be covered:

1. The expansion of the Universe
   - Spacetime geometry
   - The cosmological redshift
   - The Hubble constant
   - Dynamics of the expansion
   - Einstein and Friedmann equations
2. The Cosmic Microwave Background
   - Discovery of microwave background
   - The equilibrium era
3. The Early Universe
   - Thermal history of universe
   - Cosmological nucleosynthesis
   - Baryosynthesis and Leptosynthesis
   - Cold dark matter
4. Inflation
   - Flatness, Horizons and Monopoles
   - Slow-roll inflation
   - Chaotic inflation, ethernal inflation

Textbok

As a main book for this part I decided to use "Cosmology", by S.Weinberg, Oxford University Press, 2008.

Significantly reduced version of the first four chapters of this book will be covered. Although in general the book is intended to higher level, I find the logic and concise presentation of Winberg's text to be the most important. The time allocated for cosmology part is even less than one semester, nevertheless we will try to have the main ideas of the cosmology discussed.

Other useful texts are:

- "Introduction to Cosmology", 3d edition, by Matt Ross, Wiley and Sons, Ltd.
- "An introduction to Galaxies and Cosmology", by Mark Jones and Robert Lambourne, Cambridge University Press, 2004.
- "Physical Foundations of Cosmology", by V.Mukhanov, Cambridge University Press, 2005.

Homework.
There will be three homework assignments.

Meetings.
My office hours for this course will be on Monday and Tuesdays at 11am in my office in OCNPS, room 2100 E.

Here is a tentative list of **Projects** from this part of the course:

1. Expanding Universe
2. The Cosmic Microwave Background
3. Big Bang and the Early Universe
4. Inflation