

Cosmology 2, Spring Semester 2016/17

Topics:

Mainly galaxy formation, also galactic structure.

Lecturer:

Prof. Rennan Barkana, barkana@tau.ac.il, (03)640-5993, Kaplun 111
[Office hour: Kaplun 111, Wedn. 13:10-14:00, please email].

Course Schedule:

3 weekly lecture hours, Shankar 118, Tues. 9:15-12:00.

Grade:

25%: Homework exercises (3 or 4 times)

75%: Final written exam

Exercises will be handed out and also posted (along with lecture notes and slides) on the course website:

<http://wise-obs.tau.ac.il/~barkana/cosmology2.html>

References:

Modern Cosmology, Scott Dodelson (A.P. 2003)

Theoretical Astrophysics: Vol. III, T. Padmanabhan (C.U.P. 2002)

Galaxy Formation, Malcolm S. Longair (Springer-Verlag 1998)

Principles of Physical Cosmology, P.J.E. Peebles (Princeton U.P. 1993)

Structure Formation in the Universe, T. Padmanabhan (C.U.P. 1993)

Galactic Dynamics, J. Binney and S. Tremaine (Princeton U.P. 1987; 2nd ed: 2008)

Course Plan:

1. Cosmological and Statistical Background
 - a. Review of basic cosmology
 - b. Statistics: Correlation functions and power spectra
 - c. Time evolution of linear density perturbations
 - d. The power spectrum of cold dark matter
2. Galaxy Formation within Dark Matter Halos
 - a. Non-linear collapse of density perturbations
 - b. The abundance of dark matter halos in the Press-Schechter model
3. Dynamics of Collisionless Systems (stars or dark matter particles)
 - a. Stellar orbits under gravity
 - b. Virial equilibrium
4. Galactic Structure
 - a. Dynamics of disks
 - b. Waves and spiral arms
5. Bonus: Gravitational lensing