

## Galaxies I.

	Introduction.
September	Elliptical galaxies: properties, types, and populations Spiral galaxies: types, profiles, Tully-Fisher relation, rotation curves Spiral galaxies: barred and LSB Galaxies: Luminosity function, clustering, morphology Clusters of Galaxies: statistics and physics Review of parameters of our galaxy. Disk: the large-scale distribution of gas and stars Galaxy: ISM, molecular clouds, star clusters
October	Ages of galactic populations Star Counts and Galactic Structure I Star Counts and Galactic Structure II Luminosity function of stars, Malmquist bias I Luminosity function of stars, IMF II
November	Galactic rotation. Oort constants. Galactic rotation. Results. 21cm. Stellar kinematics. Stellar kinematics: Age-velocity relation ... Mass models of MW Satellites of MW
December	Review

**Textbooks:** Binney & Merrifield “Galactic Astronomy”  
Binney & Tremaine “Galactic Dynamics”

**Projects:** There will be 3 projects for each student.

We will have discussion sessions where students will presents their project status reports.

Project presentations will be on October 7, November 4, and December 2.

Presentations should provide enough details of the work done. It should include a short introduction with a review of previous results on the subject followed by description of methods used in the project and then by results and conclusions. No written text is required. Figures must be clearly labeled and have figure captions. Description of methods should provide enough details to understand what actually was done. Presentations in the form of either ppt or pdf files should be made available on-line.

**One Midterm Exam: 14 October**

**Final : xx December**

**Grades:**

20% for each project,

20% for each exam.

A: 85–100%    B: 75–85%    C: less than 75%

**Suggested Topics for projects:**

- \* Using SDSS catalog find the luminosity function of galaxies with different color and environment; study color by-modality as a function of the number of neighbors.
- \* Using a sample of isolated galaxies in SDSS catalog study properties of satellite galaxies and their relation with their primaries: color-color correlation, luminosity function, velocity distribution.
- \* For a sample of galaxies with measured surface brightness profiles make the bulge-to-disk decomposition. Study different properties of disks and bulges.
- \* Using rotation curves and surface brightness profiles of a sample of galaxies make mass models of the galaxies.
- \* Using a catalog of dark matter halos, study clustering of halos as a function of environment of the halos and as a function of the circular velocity of the halos.