

## Galaxies I.

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|-----------|---|
|           | Introduction: Review of parameters of our galaxy.     |
|           | Disk: the large-scale distribution of gas and stars   |
| September | Halo and bulge. Profiles of elliptical galaxies       |
|           | Tully-Fisher relation, rotation curves of spirals     |
|           | Luminosity function, correlation function of galaxies |
|           | Ages of 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                  |
| October   | Galactic rotation. Oort constants.                    |
|           | Galactic rotation. Results. 21cm.                     |
|           | Dynamics. Review. Trajectories.                       |
|           | Dynamics. Isolating integrals. Velocity ellipsoid.    |
|           | Stellar kinematics. Density.                          |
|           | Stellar kinematics: Age-velocity relation ...         |
| November  | Presentation of projects                              |
|           | Spiral Structure I, II                                |
|           | Large-scale structure, groups, clusters               |
|           | Formation and evolution of galaxies.                  |
| December  | Review  |

**Textbooks:** Binney & Merrifield

Mihalas & Binney "Galactic Astronomy"

Binney & Tremaine "Galactic Dynamics"

**Homework:** There will be homework assignments (every other week or so).

**Project:** A presentation (20min+5min) in class and a written report (5-6 pages)

(plus plots and bibliography) on a large topic

By September 16th you must choose a topic

Presentations (and written texts) are due by **29 October**

**One Midterm Exam: 12 October**

**Final : xx December**

Midterm is written exams: few short questions and two topics for essays

Final is a oral exam : few short questions and one long question

**Grades:**

20% for homeworks,  
20% for the talk + written essay,  
A: 90–100%   B: 80–90%   C: less than 80%

30% for midterm  
30% for final exam

**Suggested Topics for long presentations:**

Galactic Center  
Black Holes in galaxies  
Interacting galaxies  
Clusters of galaxies  
Globular clusters: other galaxies  
the Local Group  
Can an elliptical be formed by merging of spirals?  
Star clusters and associations in our galaxy  
Chemical abundances in our galaxy  
Low surface brightness galaxies  
Dwarf spheroidal and dwarf elliptical galaxies  
Barred galaxies  
Satellites of normal galaxies  
Origin and destiny of Magellanic Clouds  
Voids  
Dark matter in normal galaxies