ASTRONOMY 570 - THE GALAXY AND THE INTERSTELLAR MEDIUM
Spring 2009

Instructor: Prof. R. Buta
Office: 302 Gallalee
Phone: 348-3792 or 348-5050
Class times: 10:00-10:50am MWF
Class location: 338 Gallalee Hall
Office Hours: By appointment

Textbook: "The Milky Way as a Galaxy" by Gilmore, King, and van der Kruit (should be at the Supe Store)

Auxiliary books: Galactic Astronomy, by J. Binney and M. Merrifield, 1998
Galactic Astronomy, by D. Mihalas and J. Binney, 1981
(both of these are in the reading room, across from Room 302 Gallalee)

Grading: Your grade in this course will be based various homework assignments, two one-period in-class exams, a final exam, and a research-term paper. The latter will be on more specialized topics (see below) which we will have little time to cover in class. The term paper will be due on the LAST class day, May 1, and will be counted among the homework assignments.

Tentative dates of in-class exams: February 9, March 13

Grade distribution: 45% homework and term paper, 15% test 1, 15% test 2, 25% final exam

Date of Final Exam: Friday, May 8, 11:30am-02:00pm, Rm 338 Gallalee Hall

Topics to be covered (not necessarily in the following order):

1. Components of the Galaxy:
   - Disk - thick, thin
   - Bulge
   - Halo
   - Spiral structure

2. Subcomponents of each:
   - Gas
   - Dust
   - Stars
   - Dark matter

3. Tracers of Components
   - Baade's populations
   - Star clusters - open, globular
   - Variable stars - RR Lyrae's

4. Rotation Curve and Dynamics
   - Determination of Ro
   - Kinematics of subsystems
   - Collisionless Boltzmann equation

5. Galactic nucleus
   - Baade's window
   - 3 kpc arm

6. Density in the solar neighborhood

7. Formation of the Galaxy
   Collapse of the Disk
   Collapse of the Halo
   Age-metallicity relationships

Suggested Term-Paper Topics:

1. Galactic RR Lyrae Variables, the Baade-Wesselink method, and the Barnes-Evans Relation

2. Population studies in Baade's Window

3. Thick disks and evidence for one in the Milky Way

4. Search for "Population III" stars in the Milky Way

5. New views of the spiral and barred structure of the Milky Way

6. Dynamics of the Globular Cluster System using tidal radii to determine peri-galactic distances

7. Current thinking on the Eggen, Lynden-Bell, and Sandage relation between ellipticity and metallicity for Pop. II stars

8. Searching for a warp in the Galactic Disk.

9. What is the Magellanic Stream?

10. IRAS revelations on Galactic structure.

11. New findings concerning star formation processes in the Milky Way.

12. Comparison of the Milky Way with other galaxies.

13. The Galactic CO and HI distributions.

14. Carbon stars as tracers of galactic structure.