

## Astro 218 – Syllabus 2010

- 1) Collisionless fluids: Stars vs. Gas (Lec 1 BT Chapter 1)
- 2) Topics in Scattering:
  - A) Relaxation Time (Lec 2 BT 1.2.1; 7.1)
  - B) Dynamical Friction (Lec 3 BT Chapter 8.1)
  - C) Gravitational Lensing (Lec 4 BM Chapter 2)
- 3) Stars
  - A) Photometry and Luminosity Functions (Lec 5 BM 3)
  - B) IMF and Stellar Distributions (Lec 6 BM 3, 5)
- 4) Stellar Evolution; Nucleosynthesis (Lec 7 BM 5)
- 5) Chemical Evolution; Abundances (Lec 8 BM 5)
  - A) Closed-Box; G-Dwarf Problem
  - B) Accreting Box Model
  - C) Leaky Box Model
- 6) Properties of individual Galaxies (Lec 9 BM 4)
  - A) Surface Brightness Profiles
  - B) Properties of Distributions
  - C) Rotation Curves
  - D) Local Group, LG Dwarfs (Lec 10 other)
- 7) Statistical Properties of Galaxies (Lec 11, 12 BM 4)
  - A) Sloan Sample (+ other material)
  - B) Schechter Function  $z=0$ ; high  $z$
  - C) Tully-Fisher
  - D) Mass-metallicity
  - E) Fundamental Plane
  - F) Black Hole/Bulge Mass relation
  - G) Lyman Alpha Absorbers
  - H) Madau Plot
  - I) Two-Point Correlation Function
- 8) Potential Theory
  - B) Spherical Systems (Lec 13 BT 2)
  - C) Disk Galaxies (Lec 14 BT 2)
  - D) Mass Decomposition
- 9) Clusters; Sunyaev-Zel'dovich Effect (Lec 15 BM 7)
- 10) Gas (Lec 16, 17 BM 8)
  - A) Interstellar Hydrogen in all forms
  - B) Spider Diagrams
  - C) Rotation Curves
- 11) Dark Matter (Lec 17 BT 1, 9)
- 12) Milky Way Kinematics and Dynamics (Lec 18, 19 BM 9)
  - A) Differential Rotation
  - B) The Oort Constants

- C) Asymmetric Drift
- D) Galactic tides
- 13) Boltzmann Equation (Lec 20, 21 BT 4)
- 14) Jeans Equations (Lec 20, 21 BT 4)
  - A) Solving Jeans Equations
  - B) Oort Limit, Thick Disk
  - C) Vertical Structure of the Disk
- 15) Star Formation in the Milky Way and Universe
  - A) Star formation in Molecular Clouds
  - B) The Madau Plot
- 16) Instabilities (BT 5)
  - A) Jeans Instability
  - B) Toomre Disk Instability (BT 6)
  - C) Gravi-thermal Instability; Bonnor-Ebert Spheres
- 17) Galactic Center (other material)
  - A) Milky Way
  - B) Black Holes in Galactic Bulges, E's
- 18) Spiral Structure
- 19) Galaxy Mergers
- 20) Additional topics
  - A) Active Galactic Nuclei
  - B) Starburst Galaxies
  - C) Bars?
  - D) High Velocity Clouds?