

1. Required Reading — Textbook
Chapters 1, 4, 5, 6, 8 (skip Chaps. 2, 3, 7)
2. Important Lecture Material

History of Astronomy

- Remember the development of the subject and general concepts but not facts like dates, specific quotes, etc.

Electromagnetic Radiation

- Wavelength, frequency, and speed of light
- The electromagnetic spectrum
- Color and why something looks red

Optics

- Reflection and refraction
- Dispersion (the dependence of refraction on the light's wavelength)
- The notion of an image
- Lenses and how a camera works
- Reflective and refracting telescopes and why reflectors are now preferred
- Diffraction and "seeing"
- The spectrograph
- Atmospheric windows

Perfect Radiators

- Distribution functions and radiation from a perfect radiator
- Wein's Law
- Stefan-Boltzmann Law
- Logical connections
 - color (Wein's Law) \rightarrow temperature
 - temperature \rightarrow total luminosity per unit area (Stefan-Boltzmann Law)
 - brightness + distance \rightarrow luminosity (Inverse Square Law)
 - luminosity + luminosity per unit area \rightarrow area of star

Quanta-Photons

- Planck's Law

Spectra

- Continuous spectra, bright line spectra, dark line spectra
- The hydrogen spectrum

Atoms

- The guts of an atom (protons, electrons, neutrons)
- Isotopes and ions
- Electron jumps and the emission and absorption of photons
- The spectral lines in hydrogen
- Ionization

The Doppler Effect

Interpretation of Stellar Spectra

- Effects of temperature
- Effect of composition
- Effect of motions in the atmosphere
- Effect of rotation

The Spectral Sequence

- O, B, A, F, G, K, M

Where are the Stars?

- Parallax and the parsec
- Inverse Square Law
- Space motions of stars
- Frames of reference
- Stellar magnitudes

Luminosity Function

Stellar Masses and Densities

Mass-Luminosity Relation

- Stellar lifetimes

Hertzsprung-Russell Diagram

- Giants, main-sequence, white dwarfs
- Importance of a relationship
- Using perfect-radiator notions to deduce stellar sizes on H-R diagram
- Cluster fitting
- Importance of star clusters

Mechanics

- Definitions: velocity, speed, acceleration, force, mass
- Newton's Laws of Motion
- Gravity
- Weight
- Motion of a tossed object
- Newton's form of Kepler's 3rd Law

Orbits of Stars Around Each Other

- Center of mass of the system at both stars' orbital focus

Binary Stars

- Optical binaries
- Visual binaries
 - Getting sum of masses
 - Getting ratio of masses
- Astrometric binaries
- Spectroscopic binaries
- Eclipsing binaries