(AST 461) Physics of Astrophysics 1: Radiative Processes

Professor: Eric Blackman, B&L 417A, 5-0537

Required Text: Rybicki and Lightman, Radiative Processes in Astrophysics (on reserve).

Other Text: Shu, Physics of Astrophysics, Volume 1 (on reserve).

Course work:

1. Study text/notes.
2. approximately 4 problem sets
3. Oral exam/interview

Rough Syllabus of Physics Topics:

Applications and class discussion will supplement these topics and the reading.

(Reading in Rybicki & Lightman. Complementary material can be found in Shu)

(Read Chapter 1):

1. Introduction, basics of radiative transfer, and some relevant statistical and fluid mechanics.

(Read Chapter 2):

2. Classical theory of radiation fields

(Read Chapter 3):

3. Radiation from moving charges

(Read Chapter 4):

4. Special relativistic covariance and kinematics

(Read Chapter 5):

5. Bremsstrahlung radiation

(Read Chapter 6):

6. Synchrotron radiation

(Read Chapter 7): (note no class on Oct 23)

7. Compton scattering

(Read Chapter 8):

8. Plasma effects

(Read Chapter 9):

9. Quantum theory of radiation, atoms

(Read Chapter 10):

10. Radiative transitions

(Read Chapter 10-11):

11. Line shapes, bulk and thermal motions, molecular spectra.