ASTRONOMY 300B: Astronomy and Astrophysics -- Part II

Professor: Dr. Jill Bechtold
Office: Room 328, 621-6533, jbechtold@as.arizona.edu
Lectures: MWF 2-2:50 pm, Steward Observatory Room 204

Office Hours: Immediately after class. Feel free to drop in any time, but I'm not always in my office, so it's a good idea to make an appointment. I often can read email when I am out of town, so email is a good way to make an appointment.

CLASS WEB PAGE: http://boojum.as.arizona.edu/~jill/A300b.html or see link from Steward Observatory web page http://www.as.arizona.edu/

DESCRIPTION:
Continuation of Astro 300A, an introduction to astronomy and astrophysics for astronomy majors. After a review of radiative transfer, special relativity, and classical electrodynamics, we will discuss radiative processes important in astronomy: synchrotron, inverse Compton and Bremsstrahlung emission, and atomic and molecular line formation. Illustrative examples and observations will be discussed, primarily from the study of active galaxies, cosmology, and the interstellar medium.

PREREQUISITES:
The course is taught at the level of the 300-level courses in the Physics Department (Physics 321, 325, 331, 371).

The official prerequisites for this course are Astro 300a, Math 125ab and Math 223/254, Physics 241 and 242, or Physics 251 and 253, or Physics 261H and 262H, Physics 321 (Theoretical Mechanics I) and 331 (Electricity and Magnetism I).

IF YOU HAVE NOT COMPLETED THESE COURSES SATISFACTORILY you will probably be in over your head in this class -- please see me immediately to discuss your continued enrollment.

The homework will include problems which require short (10-20 line) computer programs for solution. It is assumed that you have a working knowledge of Fortran, C, IDL, Python, Mathlab or another scientific programing language, at approximately the level required for completion of Phys 105 or Astro 302. If you do not, please see me immediately to discuss your continued enrollment.
REQUIRED TEXT:

"Radiative Processes in Astrophysics" by George Rybicki and Alan Lightman. This is the main text we will be following. Paperback.

Other books which will be useful for the course material:

   "Astrophysics Processes" by Hale Bradt  
   "High-Energy Astrophysics" by Fulvio Melia  
   "Astrophysics in a Nutshell" by Dan Maoz  
   "Feynman Lectures in Physics" by Richard Feynman

These will be placed on the reserve shelf in the Parker Room.

ALTERNATIVE LECTURE TIME: From time to time, we will need to schedule make-up lectures because of Prof. Bechtold's observing schedule. Please fill out the doodle poll on the class web site by TUESDAY, JANUARY 18 at noon, so we can schedule an alternate lecture time.

GRADES AND COURSE REQUIREMENTS:

There will be 3 Midterm Exams. The lowest grade will be dropped. There will therefore be NO MAKEUP exams. If you miss more than one midterm exam, you will receive a zero for the second exam missed.

Communication with the instructor is encouraged -- let me know if you are missing class or falling behind for a valid reason, and I will try to help.

Grading will be as follows:

   50% : Homework and Class Presentation.

   Homework is due AT THE BEGINNING OF CLASS on the date it is due. LATE HOMEWORK WILL NOT BE ACCEPTED. You are free to discuss the homework with your classmates, but the work you turn in must be your own. Again, please keep in touch with the professor, so we can work together to complete the work in this course.

   25% : Midterms

   5% : Attendance (taken at beginning of class).

   20% : Final (Friday, May 6, 2011 1-3 pm)

Extra Credit: Attendance at "Colloquium Briefing" and Joint Steward Observatory/NOAO Colloquium on Thursdays, 3:30-5pm, will provide up to 5%, as extra credit points to your final grade.
Experience shows that the A students are those who attend all classes ready to listen and participate. Although we will be following the textbook and handing out notes, don't think that reading the textbook and notes alone will be sufficient for learning the material. The lectures will enable you to synthesize and LEARN the material. Technical information can often be terse, and therefore is deceptively simple: we may be able to state in a single sentence the topic of a particular lecture, but most students will need the 45 minute explanation to understand that sentence. In addition, the most important component of the course is problem solving. We will spend about 1/3 of the class time going over homework and exam problems and other illustrative problems which will be crucial for your understanding of the source material.

ACADEMIC INTEGRITY: We believe very strongly in upholding the Code of Academic Integrity as established by the Dean of Students of this University. Copies of this code are available from the Dean of Students Office. It states that "The guiding principle of academic integrity is that a student's submitted work must be the student's own... Conduct prohibited by the Code consists of all forms of academic dishonesty, including, but not limited to: cheating, fabrication, facilitating academic dishonesty, and plagiarism... modifying any academic work for the purpose of obtaining additional credit after such work has been submitted... and attempting to commit an act prohibited by this Code."

Any violation of the code will be dealt with harshly, since all violations diminish the integrity of this class as a whole and the University. If you violate the code in any part of this class, you will receive an E for the course, and your name will be submitted to the Dean of Students so that a notation will be attached to your permanent record that you cheated in this course.