ASTR 300B Astronomy & Astrophysics
Spring 2015

Details

Lecture times/location:
Monday, Wednesday, Friday 3:00-3:50pm, SO 204.
Occasional lectures as make up (TBD).

Homepage:
https://lavinia.as.arizona.edu/~dstark/astr300B

Professor: Daniel Stark
Office: 322
email: dpstark@email.arizona.edu
Office hours: Tuesday 1:30-2:30 pm or by appointment

Textbooks

Astrophysics - Decoding the Cosmos (2008), by Judith A. Irwin
Radiative Processes in Astrophysics (2004), by George Rybicki & Alan Lightman

Grading

Homework: 25%
Class Participation: 10%
Presentation: 15%
Midterms: 25%
Final Exam: 25%

Homework

There will be 6 assignments throughout the semester. Students should first attempt to solve problems on their own. Books and published papers may be consulted, but students should not look at old homework solutions. Discussion of the problems with other students is permitted after students have tried the problems on their own. The submitted homework should represent each student's individual work Homework will be submitted in class on the due date. Anything turned in after the due date will be considered late. Work turned in before the next class period will receive 75% credit. Work turned in two class periods following the due date will receive 50% credit. Work turned in more than two class periods late will not receive credit. Exceptions can be made for some extraordinary circumstances.

Satellite/Observatory Project

The satellite/observatory project provides an opportunity to delve deeper into the applications of topics covered in ASTR300B and gives students a chance to work on presentation skills. The assignment is to take on the role as project manager for a recently commissioned or future satellite/observatory (e.g., ALMA, JWST) and convince your classmates that the project deserves continued funding. The presentation will be short (~15mins) and should describe the satellite/observatory, its primary goals, and why it deserves to be funded. Presentations will occur in class (dates to be determined later). More information (including possible satellites/observatories) will be circulated in class and posted on the course website. A 1 page write-up should accompany the presentation. Students will be expected to report on two satellite/observatories throughout the semester.

Class Participation

This will be assessed through attendance and discussion/participation in class.

Midterm and Final Exam

There will be two midterm examinations. Each will cover roughly 5 weeks of material and will be closed book. The final will also be closed book (some relevant equations and physical constants will be provided) and will take place on Tuesday May 12 from 3:30 pm to 5:30 pm.

Course Content (subject to change)

Introduction: Radiative flux, Specific Intensity and its Moments, Polarization
Measuring the Signal from Astronomical Sources
Matter and Radiation Essentials
Interaction of Light with Matter
Radiative Transfer
Basic Theory of Radiation Fields
Radiation from Moving Charges
Basics of Relativity
Emission from Relativistic Particles
Bremsstrahlung Emission
Synchrotron Emission
Inverse Compton Radiation
Line Emission
Applications, current topics in astrophysics