ASTR 3830: Astrophysics 2 – Galactic and Extragalactic

http://jilawww.colorado.edu/~pja/astr3830/

TIME & PLACE: MWF 10:00 – 10:50 am, Duane G131

INSTRUCTOR: Phil Armitage

EMAIL: pja@jilau1.colorado.edu

OFFICE: JILA tower A909, phone 303 - 492 – 7836. My mailbox is on the second floor of the tower, at the JILA reception.

AIMS OF THE COURSE: This course follows on from ASTR 3730 to form a year-long introduction to astrophysics. The aim is to show how mostly elementary physical principles can be applied to work out what's going on in a diverse range of astronomical objects, which this semester will include galaxies, supermassive black holes, and the Universe as a whole. After a couple of classes of overview we will cover:

1. **The Milky Way galaxy** – including the different components of our own galaxy and discussion of how stars interact with each other.
2. **`Normal' galaxies** – the classification and properties of spiral, elliptical and irregular galaxies.
3. **Active galaxies** – the properties of galaxies where the emission from ordinary stars is overwhelmed by emission from gas falling in to a supermassive black hole in the nucleus.
4. **Galaxy clusters**
5. **Cosmology** – structure and evolution of the Universe on the largest scales.

CONTACTING ME: `Official' office hours are 11:00 – 12:00 am Monday, Wednesday and Friday (immediately following class). You are, however, welcome to stop by my office any time I'm there to discuss the class and / or homework. Afternoons are normally best. I normally answer email queries promptly.

PREPARATION: No prior knowledge of extragalactic astronomy or cosmology is necessary for this course. ASTR3730 (or equivalent at a different university) is a prerequisite for this class, and you should also have taken or be taking Calculus 3. Knowledge of some of the material covered in ASTR3730 - in particular the properties of black body, bremsstrahlung and synchrotron radiation, and the basic evolution of stars of different masses – will be assumed or only *briefly* reviewed. Mathematically, we will make extensive use of algebra and basic calculus throughout the course, but we will not introduce any concepts from vector calculus.

EXAMS: The Final exam for this course will be on Saturday, May 3rd, at 4:30pm.

HOMEWORK: There will be regular written problem sets, which will be graded and count toward the course grade. Together with the midterms and final exam, these will be the main test of how well you've understood the different parts of the course material. You are encouraged to work collaboratively on the problem sets, on the understanding that the answers you submit must be `your own work' (i.e. if asked `why did you do that?' at some point in a problem, you could answer!). I reserve the right to deduct points for late solutions to homework.

GRADING: The course grade will be determined based upon the homework (40%, your worst homework grade will be discarded and not count), 2 midterms (30% in total) plus the Final (30%). Conversion from numeric to letter grades will be based on a curve. I will provide some guidance on this conversion once we've done a few problem sets, so that you have an idea of how things are going.

BOOKS: The course textbook is `An Introduction to Modern Astrophysics' by Bradley Carroll and Dale Ostlie. This book covers many of the topics in both Astrophysics 1 and Astrophysics 2, in some places with greater astronomical detail than that which we will employ. I will not be lecturing from this book very often, but if you read the corresponding sections as we go it will give a very valuable prespective.

WEB SITE: Problem sets will be posed on the class website.

STUDENTS WITH DISABILITIES: If you qualify for accommodations because of a disability please submit to me a letter from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities (303-492-8671, Willard 322, www.colorado.edu/disabilityservices).