

ASTR 3730: Astrophysics 1 – Stellar and Interstellar

<http://jilawww.colorado.edu/~pja/astr3730/>

TIME & PLACE: MWF 2:00 – 2:50, Duane G131

INSTRUCTOR: Phil Armitage

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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 is the first part of yearlong introduction to astrophysics. The goal is to show you how we can apply basic physical principles (gravity, fluid dynamics, quantum mechanics etc) to understand the properties of astronomical objects. The focus during this semester will be on stars and objects within our own Galaxy, this will lead on to ASTR 3830 in the Spring which will concentrate on extragalactic astrophysics. Ideally, by the end of the class you should be able, when presented with a new and unfamiliar astronomical situation, to start analyzing it quantitatively. For example, if told tomorrow that ‘astronomers claim to have found the first planet in orbit around a black hole’, you ought to be able to work out if this is physically reasonable; think about simple estimates you could do to assess the scenario; and have an idea how to formulate more detailed versions of any problems this brings up.

CONTACTING ME: ‘Official’ office hours are 3:00 – 4:00 pm 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, with or without an appointment. Afternoons are normally best. I generally answer email queries promptly.

PREPARATION: You should either have completed:

- 1) Calculus 3
- 2) Physics 3

...or be taking those classes this semester. This is very much in your interests, so unless there are exceptional circumstances I will not waive these requirements. Prior knowledge of astronomy is less important – speak up if I use jargon with which you’re not familiar.

EXAMS: There will be two in-class exams, plus a final exam that will be comprehensive in nature. The final will be on Tuesday December 18th, 1:30pm – 4:00pm.

HOMEWORK: There will be regular written problem sets, which will be graded and count toward the course grade. Doing these problems is the core of the course, and should also be very helpful preparation for the exams.

GRADING: The course grade will be determined based upon the homework (40%, your worst homework grade will be discarded and not count), the in-class exams (30%), and the final (30%). I will give some guidance as to how your marks (up to that point) translate into letter grades following the first in-class exam, so that you have a rough idea of how you're doing.

BOOKS: Textbook choice at this level is largely a matter of personal taste. No textbook is 'required', in the sense that I will not be assigning problems or readings out of any book. However, I strongly recommend that you find a book that you're comfortable with and study that in parallel with the lectures. Of the books I'm aware of, the following are worth considering:

- 1) 'Advanced Astrophysics' (Neb Duric, Cambridge). This is nominally the class textbook, so the bookstore will have this one in stock. This is a good text, which focuses on the basic physics of astrophysics. The level is generally higher than that of the class. I particularly recommend this text if you plan to apply for graduate school and would like to understand more deeply topics we discuss in class.
- 2) 'Astrophysics in a Nutshell' (Dan Maoz, Princeton). This is a concise text at approximately the level of ASTR 3730. I recommend this one if you find the course material pretty challenging and need a second presentation to really understand things.
- 3) 'An Introduction to Modern Astrophysics' (Bradley Carroll and Dale Ostlie, Addison Wesley). Unlike the other books, this is a comprehensive text that goes into much more astronomical detail. It's a fine book, if a bit daunting. I recommend this if you need more detailed explanations of the course topics. Be sure to get the latest (second) edition: the first edition would be OK for this semester but some of the extragalactic section (useful for 3830 next semester) is seriously out of date.

WEB SITE: I will post problem sets and any useful links that I can find on the class web site. A full set of lecture notes (in pdf format) from a previous version of this course are also available on the web, these may be useful though I will not follow them exactly this semester.

ACADEMIC INTEGRITY: All students are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, and threatening behavior. Incidents of academic misconduct will be reported to the Honor Code Council. Note that in this class I allow (in fact, I strongly encourage) you to discuss homework problems with your fellow students, however work that is handed in must be your own. What that means is not that your solution must be different from everyone else's, but rather that if I were to question you about the work you could individually explain what you had done and why.

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).

OTHER POLICIES: I will make every effort to deal reasonably and fairly with scheduling difficulties resulting from religious obligations. Please let me know of any difficulties as soon as possible. Students should be aware of the university's policies on Classroom Behavior and Discrimination and Harassment. If you believe that you have been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, or veteran status you should contact the Office of Discrimination and Harassment at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550.