

ASTR 5120: Radiative and Dynamical Processes

HOME PAGE: <http://jilawww.colorado.edu/~pja/ast5120/>

TIME & PLACE: lecture sessions are Monday / Wednesday / Friday 2:00-2:50pm, Duane E126. There is also a weekly discussion session on Wednesday mornings 10:00-10:50am, Duane E126.

INSTRUCTOR: Phil Armitage (pja@jilau1.colorado.edu, office JILA A909, phone 303-492-7836). There are no official office hours for this class, rather you're very welcome to stop by my office at any time to discuss the class. You will usually find me in during the afternoons between 2-6pm (and often in the morning too except when I have meetings) – call or drop me an email if you want to be sure I'm in before coming by.

AIMS: This class is a new addition to the graduate core curriculum whose primary goal is to give you some exposure to three areas of physics that are commonly encountered in astrophysics and planetary science: the macroscopic theory of radiation transport, magnetohydrodynamics, and gravitational dynamics. Each of these topics could easily occupy a whole semester, so my goal is not to provide a comprehensive treatment but rather to give you a background so that when you encounter problems in these areas in your research (as you surely will) you will at least know where to look for a solution. Apart from such practical considerations MHD and celestial mechanics in particular involve some of the richest classical physics that you will encounter in astronomy and planetary science, and I hope that you will find their study rewarding in its own right.

DISCUSSION SESSIONS: What we do during the weekly discussion sessions is largely *up to you!* My default plan is to alternate problem solving sessions with discussions of papers. In the problem solving sessions we will attack an “order of magnitude” problem cold, in the same way as you will need to in the short term for COMPS 2 and in the long term when confronted by an unexpected question during a research talk. In the discussions of papers we will look either at classic papers or at new preprints of interest. In addition, we could devote some of this time to covering additional topics (if so, this would be non-examinable) or to discussion of some aspect of the lectures in more depth than is possible otherwise. Just let me know what you prefer...

As we all know, discussion sessions only work well if everyone speaks up freely (this being a graduate class I'm reluctant to impose a format such as a “shotgun” seminar that *forces* everyone to speak). No aspect of the discussion sessions will be graded, so please feel free to make comments and ask questions even if they seem stupid.

EVALUATION: Since this class is part of the core it is probably useful to have some practice at answering questions in an exam setting. Accordingly the grade will be decided based on:

- Problem sets (50%)
- Mid-semester numerical project (20%)
- Open book final Tuesday May 5th 1pm (30%)

TEXTBOOKS: No single textbook covers all the topics in the class. I've provided some suggestions for useful books and online resources on the web page in case you find yourself needing a textbook.

QUERIES: This is a new class, and as such it's inevitably a bit experimental! Please feel free to ask questions during class, and to give me feedback on how it's going as we progress.

STUDENTS WITH DISABILITIES: If you qualify for accommodations because of a disability please submit to me a letter from Disability Services so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities.