

## ASTR 5120 Radiative & Dynamical Processes

**HOME PAGE:** <http://jilawww.colorado.edu/~pja/astr5120/index.html>

**CONTACTING ME:** Phil Armitage, JILA A909. Phone: 303 492 7836, email [pja@jilau1.colorado.edu](mailto:pja@jilau1.colorado.edu). There are no official office hours for this class, feel free to stop by whenever you want to discuss problems. Call or drop me an email if you want to be sure I'm in before coming by. Coffee is available...

**AIMS:** RDP is intended to provide an introduction to three topics that are central to much of astrophysical and planetary sciences, but which are rarely encountered at undergraduate level. We will start with an introduction to the description of radiation fields, and work that through to an understanding of how planetary and stellar atmospheres can be modeled (though we won't go too far into these interesting topics). We will then introduce the magnetohydrodynamic (MHD) description for magnetized fluids, discuss how MHD relates to other descriptions of fluids and plasmas, and apply MHD to some topical problems. Finally we will cover gravitational dynamics, giving about 50/50 weight to consideration of planetary dynamics and to the dynamics of stars in star clusters and galaxies.

**TEXTBOOKS:** There is no single book for the whole class, and so nothing is specified as required. I'll be making use of:

"Radiative Processes in Astrophysics" (Rybicki & Lightman) for the introduction to radiative transport

A variety of sources for magnetohydrodynamics, including the very useful "Essential MHD for Astrophysics" (Spruit) <http://arxiv.org/abs/1301.5572>

"Galactic Dynamics" (Binney & Tremaine) for the dynamics, supplemented by additional references for the planetary part.

Both Rybicki & Lightman and Binney & Tremaine are classic texts that are well worth having, but they're not essential for the class.

**ASSESSMENT:** Since this is one of the core classes, we will try to get some practice in solving "COMPS-like" questions under exam conditions. 50% of the grade will be for three in class midterms, one for each of the three main topics of the class. The other 50% will be for homework. My intention is to set short, frequent homeworks with a short turnaround, so that we get to review the material in near real time.

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