Physics 441/541 Introductory Astrophysics

Spring 2011

Dr. Tad Pryor 302W Serin Physics Lab 445-5500 x5462 pryor@physics.rutgers.edu

Overview: This is a combined undergraduate/graduate course on the structure and evolution of stars. The development of our understanding ofars was one of the greatest successes of astrophysics in the 20^{th} century and this understanding underlies most of our knowledge of the universe. However, some uncertainties remain. Examples are the synthesis of the elements, the structure of rapidly rotating stars, the evolution of interacting binary stars, and the formation of the first stars in the universe. This course begins with the properties of stars and how these are determined. It will then cover topics in stellar structure and evolution. An approximate calendar giving the subjects to be discussed is on the back of this page. Junior-level courses in atomic physics and electromagnetism are prerequisites for this course.

Home page: http://www.physics.rutgers.edu/ugrad/441/441home.html

Text: "The Physics of Stars" by A. C. Phillips (J. Wiley & Sons)

Other useful texts (the first three on reserve in the Physics library) are:
"Stellar Interiors: Physical Principles, Structure, and Evolution" by Hansen and Kawaler
"Stellar Structure and Evolution", by Kippenhahn and Weigert
"Principles of Stellar Evolution and Nucleosynthesis" by Clayton
"Structure and Evolution of the Stars" by M. Schwarzschild
"Introduction to Stellar Astrophysics, Vol. 1, Basic Stellar Observations and Data; Vol. 2, Stellar Atmospheres; Vol. 3, Stellar Structure and Evolution" by E. Bohm-Vitense
"The Observation and Analysis of Stellar Photospheres" by Gray
"Galactic Astronomy" by Binney & Merrifield
"Radiative Processes in Astrophysics" by Rybicki & Lightman

Office hours: Th 3:00–4:00 PM. Alternatively, call or email for an appointment.

Homework: There will be approximately weekly homework assignments posted on the class web-site consisting of 2–3 problems each. Homework handed in after the due date can only receive 90% of the maximum score. Homework handed in after the answers are discussed (typcially the class after the due date) will only recieve 50% of the maximum. You may discuss the homework problems with your classmates, but your solutions should be in your own words. If you are having difficulty with a question, you are encouraged to talk to me about it.

In addition to the weekly homework, there will be two longer numerical assignments that will involve generating stellar models and, perhaps, programming. The computer programs that create the stellar models will be available on astrolab.rutgers.edu. I will create accounts on that computer that will be accessible by ssh or VNC. More details will be given later.

Grades:

Homework	50%
Midterm	25%
Final (not cumulative)	25%