University of Florida
Astronomy 6215 Fall 2008
"Stellar Structure"
MWF 3:00 – 3:50
Professor Ata Sarajedini
BRT 222 x238
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Syllabus

Textbook: "The Physics of Stars" by A. C. Phillips (required)
"Stellar Interiors" by Hansen, Kawaler, & Trimble (required)

Other Useful Texts: "Stellar Structure and Evolution" by Kippenhahn & Weigert
"Principles of Stellar Evolution and Nucleosynthesis" by Clayton
"An Introduction to Modern Stellar Astrophysics" by Ostlie & Carroll
"Stellar Astrophysics in the Local Group" edited by Aparicio, Herrero, & Sanchez

Purpose: This course is intended to give you a solid foundation in the subject of stellar structure. We will discuss both the theoretical and observational aspects of the topic. In all facets of the course, relevant journal articles from the professional literature will be used to augment and extend the topics discussed in lecture. In the process, I hope to introduce you to the scholarly literature in the field and endeavor to teach critical thinking in the evaluation of scientific results. Since oral and written communication skills are very important for a scientist, you will be required to present an in-class lecture on a topic related to stellar structure. The Annual Reviews of Astronomy & Astrophysics as well as Virginia Trimble's yearly Astrophysics articles in the PASP are good places to look for topics. Your chosen topic must be approved by the professor before midterm. You will also be required to hand-in a 10 to 20 page paper based on the lecture.

General Requirements: Bi-weekly problem sets, lecture+paper , one project, one term exam (Oct 10), one final.

Course Web Page: Can be accessed at http://www.astro.ufl.edu/~ata/

Grading Breakdown: 10% - class attendance and participation
20% - problem sets and project
20% - lecture and paper
20% - mid-term exam
30% - final exam

General Guidelines: The required reading in this class is not overwhelming; therefore, you are expected to do all of the reading as well as to keep up with it as the lectures are given. The lectures will follow the text but the two will not be entirely overlapping. The problem sets will generally be assigned on Tuesday to be due two weeks later. They must be turned in at the

beginning of class. Feel free to work together on the problem sets, and please make sure to show all of your work. The mid-term exam will cover all of the material from the beginning of the semester. The final exam will be cumulative.

Office Hours: If you would like to meet with me, please see me to set up a time.

Proposed Schedule of Lectures: As the semester progresses and depending upon class interest, it may become necessary to deviate from this plan.

Weeks 1 and 2: Basic Concepts and an Overview of Stellar Evolution
Readings: Chapter 1 of Phillips, Chapters 1 and 2 of HK&M

Weeks 3 and 4: Matter and Radiation
Readings: Chapter 2 of Phillips, Chapter 3 of HK&M

Weeks 5 and 6: Heat Transfer
Readings: Chapter 3 of Phillips, Chapters 4 and 5 of HK&M

Weeks 7 and 8: Energy Generation
Readings: Chapter 4 of Phillips, Chapter 6 of HK&M

Weeks 9 and 10: Structure of Stars
Readings: Chapter 5 of Phillips, Chapters 7 and 9 of HK&M

Weeks 11 and 12: Stellar Death
Readings: Chapter 6 of Phillips, Chapters 9 and 10 of HK&M

Weeks 13: Helioseismology
Readings: Chapter 7 of Phillips

Weeks 14 and 15: Student Talks

Possible Topics For Student Lectures

1. The impact of stellar astrophysics on the determination of cosmological distances
2. Blue stragglers in star clusters and the field
3. The Baade-Wesselink method – description and uses
4. The RR Lyrae luminosity controversy
5. Theoretical and observational treatment of the RGB and AGB ‘bumps’
6. Observational tests of theoretical stellar models
7. Subdwarf B stars in clusters
8. The “stellar” luminosity function at low masses