

Astronomy 1120: Stars, Stellar Structure and Stellar Evolution

Course Summary, Requirements, and References

August, 2007

1 Course Summary

1. Introductory lecture: Scales in Astrophysics.
2. Celestial Geometry (Carroll, Ch. 1).
3. Celestial Mechanics: the role of gravity (Carroll, Ch. 2).
4. Continuous Spectrum of Light: magnitudes, electromagnetic waves, blackbody radiation (Carroll, Ch. 3).
5. Special Relativity (Carroll, Ch. 4).
6. Interaction of Light and Matter (Carroll, Ch. 5).
7. Binary Systems (Carroll, Ch. 7).
8. Classification of Spectra (Carroll, Ch. 8).
9. Stellar Atmospheres (Carroll, Ch. 9).
10. Stellar Interiors (Carroll, Ch. 10).
11. The Interstellar medium and star formation (Carroll, Ch. 12).
12. Main Sequence and post Main Sequence Evolution (Carroll, Ch. 13).
13. Supernovae (Carroll, Ch. 15).

2 Course Requirements

The course text will be “An Introduction to Modern Astrophysics”, by Carroll and Ostlie (second edition!). You should also have a copy of the introductory physics text by Young and Freedman handy: see below. Carroll and Ostlie will also be the text for the followup course Astronomy 1121 (Galaxies and Cosmology) in the spring.

The grade will be based on problem sets (25%), a midterm exam (25%) and a final exam (50%).

3 Physics Prerequisites

The introductory calculus-based physics sequence is a prerequisite for this course. Particularly important material can be found in Young and Freedman Chapters 12 (Gravitation), 15 (Waves), 18,19,20 (Thermal Properties of Matter, 1st and 2nd Laws of Thermodynamics), 32 (Electromagnetic Waves), 37 (Relativity) and 38 (Photons, Electrons and Atoms).

4 Contact information

Office hours (220 Allen Hall) will be Tuesday, Thursday 10-12 AM, or by appointment. I can be reached at email address tony@dectony.phyast.pitt.edu

5 References

The following texts may be consulted for supplementary material, and are on reserve in the Engineering Library, Benedum Hall:

1. A. C. Philips, “The Physics of Stars”.
2. D. Clayton, “Principles of Stellar Evolution and Nucleosynthesis”.
3. R. Resnick and D. Halliday, “Basic Concepts in Relativity and Early Quantum Theory”.

4. S. Shore, "The Tapestry of Modern Astrophysics".
5. C. J. Hansen and S. D. Kawaler, "Stellar Interiors: physical principles, structure and evolution".
6. R. Bowers and T. Deeming, "Astrophysics I: Stars".
7. E. Bohm-Vitense, "Introduction to Stellar Astrophysics".
8. R. Kippenhahn and A. Weigert, "Stellar Structure and Evolution".