

Astronomy 220A
Stellar Structure and Evolution
Fall 2008 Quarter, MWF 9:30-10:40 am

Instructor:

Jonathan Fortney, Assistant Professor
Room 275 ISB, 831-502-7285, jfortney@ucolick.org
Office hours: Whenever you like on MWF mornings after class

Class Web Site:

www.ucolick.org/~jfortney/220A.htm

Required Text:

Stellar Structure and Evolution, by R. Kippenhahn and A. Weigert, 1990.

Additional texts that will be helpful:

Stellar Interiors: Physical Principles, Structure, and Evolution, by C. J. Hansen, S. D. Kawaler, and V. Trimble, 2004.

Principles of Stellar Evolution and Nucleosynthesis, by D. D. Clayton, 1983

Structure of the course:

There will be 30 lectures, predominantly over material in the required text, in this order:

- Review of Observational Data
- Fundamental Physics and Equations
- Energy Transport in Stellar Interiors
- Properties of Stellar Matter
- Energy Generation
- Building Models: Equations, Boundary Conditions, Numerical Methods
- Polytropes
- Early Stellar Evolution
- Chemical Evolution on the Main Sequence
- Late Stellar Evolution and Nucleosynthesis
- Brown Dwarfs and Giant Planets
- Compact Objects
- Pulsations and Helioseismology

Grading:

There will be problem assignments every other week (*20% of grade*)

You will need to construct a stellar structure model and write up the results by the end of the quarter (*25%*). Details will be given in a separate handout.

A brief review (3 pages) of a recent article (within the past 5 years) from the literature, along with a 10-minute in class presentation on the paper (*15%*)

Exams: We will have one in-class midterm (*15%*) and a final (*25%*)