Astronomy 688: Stellar Structure and Evolution

Instructor:

Professor: Cole Miller
CSS 1239
(301) 405-1037
miller@astro.umd.edu
Office hours: Tuesday and Thursday, 3:30 to 5:00 PM.

Schedule:

Lectures on Tuesday and Thursday from 2:00 to 3:15, CSS 0201.

Textbooks:

Required: *Stellar Interiors* by Hansen and Kawaler.
Recommended: *Stellar Structure and Evolution* by Kippenhahn and Wiegert, and *Principles of Stellar Evolution and Nucleosynthesis* by Clayton

Course Grading

Homework	25%
Midterm Exam	25%
Final Exam	35%
Individual Project	10%
Class Participation	5%

Feel free to discuss homework with other students, but you must work out and write up the solutions yourself. I will grade each problem (in the homework and in the exams) on a four-point scale. One point is awarded if you demonstrate understanding of the physical issues associated with the problem. One point is awarded if you use the correct equations. Two points are awarded for correct solution of the equations. If you come up with an answer that is obviously incorrect (e.g., a velocity 1000 times the speed of light!), but correctly say why it is incorrect and approximately what the right answer is, you will get one of those possible two points. The midterm and final will both be in-class, and we can negotiate whether they are open-book or closed-book.

Homework will be assigned approximately every two weeks (or less, for short assignments), on Thursdays. The homework will be due at the beginning of class one or two Thursdays later, and I will return the graded homework to you on the following Tuesday. For the individual project I will expect you to read literature and report on one current paper in stellar astrophysics. I'll want you to have selected the paper you'll review by the week after the midterm, so that we can talk about it and make sure it's a good project. The report will be both a written report (4-5 pages in LaTeX aasms4 format) and an oral report, which will be given in front of the class at the end of the semester. For this project you will be graded on both content and presentation in the oral and written reports. Class participation will be determined by attendance and by participation during classes; I will ask many questions during class, and while I don't expect you to get the "right" answer every time I do want you to try.

Letter Grades

I will guarantee that you will receive no worse than the following letter grades for a given percentage:

80%–100%	A
65%–80%	B
50%–65%	C
40%–50%	D

I may grade on a curve if the class average is significantly lower than suggested by the table.

Late Policy and Make-Up Policy

Partial credit for late homework assignments may be given if you give me a valid reason by the Tuesday before the assignment is due. No credit will be given for homework turned in more than a week after the due date (i.e., after the end of class the following Thursday). If you cannot make the midterm or the final exam, then we can arrange a different time if you tell me at least a week before the exam (to be fair to other students, the alternate time should be before the scheduled time).

Tentative Course Outline

February 1–10: Overview, equilibrium conditions, simple models.
February 15–24: Energy generation and nuclear processes.
Feb 29 – March 9: Equations of state.
March 14–30: Energy transfer.
April 4: Midterm.
April 6–18: Stellar formation and evolution. Binaries.
April 20–25: Neutron stars and black holes.
April 27–May 4: Detailed modeling; Ol' Sol, white dwarfs.
May 9–11: Presentation of projects.
May 16: Recap, emphasis of points brought up during semester.
May 19: Final exam.