

ASTRONOMY 400A: THEORETICAL (STELLAR) ASTROPHYSICS

SPRING 2022

Time: Tu Th 12:30-1:45 PM

Place: Steward 450 or <https://arizona.zoom.us/j/82490107908> (as needed)

Course Website: on <https://d21.arizona.edu> (for updates to this syllabus!)

Course Email: astr400a@list.arizona.edu (please use!)

Lead Instructor: Prof. Andrew Youdin

Office: SO N418 (don't forget the N)

Office Hours: By request at <https://arizona.zoom.us/j/82490107908>.

Note: Additional ATOMM tutoring hours also available

Course Description

In this course we will study the most important objects in astronomy, stars. Most of our observational knowledge of stars comes from light from their surface. It is one of the greatest achievements of science that when the laws of physics are applied to these observations, astrophysicists have gained a detailed understanding of the inner workings and evolution of stars. This course will develop that understanding at a level appropriate for undergraduate astrophysics majors.

Textbook: The main textbook is “An Introduction to Modern Astrophysics,” by Carrol & Ostlie (2nd Edition). Supplementary readings will be assigned as needed.

Topics to be covered

Stellar Atmospheres	Stellar Structure Equations
Main Sequence Evolution	Post Main Sequence Evolution
Compact Stellar Remnants	Star (and some planet) Formation
Binary Stars	

Grading: Your course grade will be based on:

- In Class Activities & Homework: 60% (drop lowest scores)
- Midterms: 25%
- Final Exam: 15%

The class will not be curved. The correspondence between final percentages and letter grades will be: **A:** 87% – 100%; **B:** 72% – 87%; **C:** 50% – 72%; **D:** 30% – 50%; **E:** 0% – 30%.

Midterm Tests: There will be two in class tests during the semester (pending COVID restrictions). Dates will be confirmed at least 2 weeks in advance, but are tentatively set for Tuesday March 1 and Thursday April 7.

Final Exam: The final exam will be comprehensive, but with more emphasis on material since the last midterm.

Learning Goals

- Demonstrate the ability to meaningfully analyze, apply and integrate the principle findings, common applications, current problems, fundamental techniques, and underlying theory of the astronomy discipline.

- Employ discipline skills related to the observational techniques, instrumentation, computational methods, and software applications used to investigate modern astrophysical phenomena and problems.
- Develop proficiency with communicating, translating and interpreting fundamental astronomical concepts and research results in oral and/or written formats.

Class Attendance: Regular class attendance is expected and the instructors should be notified of any planned absences. In the event of mild illness, Covid exposure, etc. we will move the class to Zoom due to the low enrollment. Approved absences for religious practices (<http://policy.arizona.edu/human-resources/religious-accommodation-policy>) or with Dean's approval (<https://deanofstudents.arizona.edu/absences>) will be respected.

Course Participation and Conduct: Please come to class ready to learn and engage with your peers. Participation and in-class activities make up a substantial portion of your final grade. Much of the traditional lecture material will be assigned as homework, so it is absolutely crucial to prepare outside of class time. We will be doing a lot of in class problem solving. In order to ensure a productive learning environment for all students, please note the following class rules:

- NO cellphones in class. They must be kept in a bag or pocket and on silent.
- Laptops / tablets ONLY for work.
- For remote meetings, please keep your camera on, and microphone muted when not speaking
- Obey the University of Arizona Code of Academic Integrity: [available here](#)
- Follow the University of Arizona Non-threatening behavior policy: [available here](#)
- Adhere to the University of Arizona nondiscrimination and anti-harassment policy: [available here](#)

Course Updates: It is your responsibility to check D2L regularly for course notifications, updates, and assignments. The information contained in the course syllabus and schedule, other than the grade and absence policies, may be subject to change with reasonable advance notice.

Students with Disabilities or Pregnancies: At the University of Arizona, we strive to make learning experiences accessible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu/>) to establish reasonable accommodations.