

ASTR 301: Introduction to Stellar Astrophysics

Fall 2021 – Syllabus_v3, Sept 23

Instructor: Professor Joshua Pepper

Fall 2021 Teaching Statement:

The fall 2021 semester will be a return to in-class teaching after a year of ad-hoc, experimental, and unusual remote teaching. As an upper-level course with a small class size, we will work together to help everyone understand the material, have a fair opportunity to demonstrate their understanding, to ask questions, and to seek and receive individual help. Of all the course requirements listed below, the most important one by far is the last, to contact me if you are having problems.

The overall plan is to teach the course in person. With all students, faculty, and staff required to be vaccinated or tested, the hope is that the risk of COVID-19 transmission and susceptibility is low. However, depending on local case rates, we might need to require masks at certain times.

The class will be structured as a partially “flipped classroom”, in that there will be regular reading assignments with accompanying videos and slides. There will also be regular short online quizzes before each class. The classes themselves will include reviews of the reading assignments, quiz results, and homework solutions, along with opportunities for deeper discussions and in-class exercises.

I am scheduling weekly office hours on Thursdays as specified below. However, since everyone has different schedules, I have frequently found it simpler to just schedule meetings as needed at any time slots that work. If the official office hours turn out to not be used, I might cancel them partway through the semester.

Text: *An Introduction to Modern Astrophysics, 2nd Edition*, by Bradley W. Carroll and Dale A. Ostlie, 2007, Cambridge University Press, published by Pearson Addison-Wesley

Class Location: 512 Lewis Lab

Class Times: Tuesdays and Thursdays, 1:35pm to 2:50pm ET

Office: 413 Lewis Lab, 8-3649 (direct), 8-3931 (main physics office), joshua.pepper@lehigh.edu

Office Hours: Thursdays, 3:00-4:00pm ET

Course Requirements: General requirements include:

- (i) Read or watch assigned materials prior to class
- (ii) Attend all classes
- (iii) Complete all assignments on time
- (iv) See the instructor if you are having trouble.

Grading: Your numerical grade will be determined *approximately* as follows:

Online Quizzes	20%
Homework Problems	25%
Final Exam (cumulative)	25%
Attendance and Participation	30%

For the quiz portion of your final grade, I will be dropping the lowest quiz grade, and possibly the second lowest, depending on how the semester develops.

Attending and participating in classes fulfills the Attendance and Participation part of the course grade. Unexcused absences will lower that grade. Students can take up to three excused absences over the semester, meaning times that you don't attend class but where you let me know ahead of time. If you believe that you might need more than three excused absences, contact me and we can talk about the situation, and find a resolution. Even if your absence is excused, it is your responsibility to contact me to meet out of class to review the missed material.

Coursework Policies

You may work with other students in the class on homework. However, you must submit your own version of the homework. Other policies regarding homework are posted on the Course Site.

Primary Topics:

- Observing the sky
- Physical properties of stars
- Stellar spectra
- Stellar atmospheres
- Stellar interiors
- Stellar evolution
- Massive stars and stellar remnants

Upon starting the class, I expect that everyone has mastered the following Initial Competencies:

- Algebra, trigonometry, vector arithmetic, calculus
- Introductory physics, including mechanics and electromagnetism, and basic principles of blackbody radiation and spectroscopy

My goal is that at the end of the class, among other objectives, you will have also mastered the following Final Competencies:

- ✓ Understand the life-cycle of a star.
- ✓ Connect the observed properties of a star to its underlying physical properties.
- ✓ Apply mathematical and physical models to describe the atmosphere and internal structure of a star.
- ✓ Explain how stars produce energy.
- ✓ Describe the variety of stars and stellar remnants found in the galaxy.

Accommodations for Students with Disabilities:

Lehigh University is committed to maintaining an equitable and inclusive community and welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact Disability Support Services (DSS), provide documentation, and participate in an interactive review process. If the documentation supports a request for reasonable accommodations, DSS will provide students with a Letter of Accommodations. Students who are approved for accommodations at Lehigh should share this letter and discuss their accommodations and learning needs with instructors as early in the semester as possible.

For more information or to request services, please contact Disability Support Services in person in Williams Hall, Suite 301, via phone at 610-758-4152, via email at indss@lehigh.edu, or online at <https://studentaffairs.lehigh.edu/disabilities>.

The Principles of Our Equitable Community:

Lehigh University endorses The Principles of Our Equitable Community (<http://www4.lehigh.edu/diversity/principles>). We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.