

ASTR 301: Modern Astrophysics I

Fall 2020 – Syllabus_v4, Aug 13

Instructor: Professor Joshua Pepper

Fall 2020 Teaching Statement:

The fall 2020 semester will be an unprecedented situation for teaching throughout our university and the country. Since this upper-level course will have a small class size, we will consider many ways to teach the material the best way possible, and will strive to accommodate every student's needs. Every student has the right to contact me to request changes to any aspect of the teaching model. 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 remotely, with both synchronous and asynchronous elements. Our main online tools will be Zoom for group and individual meetings and CourseSite for distributing materials, taking quizzes, and turning in assignments. The asynchronous elements will involve online lecture videos, short quizzes, reading assignments, and a class forum to raise questions and get clarifications. The synchronous elements will take place during the scheduled class time, where we will recap the readings and videos, discuss questions from the forum, and carry out exercises individually or as a group.

At the beginning of the semester, I will hold one-on-one meetings with all students online. This will be an opportunity for us to get to know each other, and also for any student to raise questions about the class, express concerns about the teaching plan, or discuss preferences for the class interaction style, and any other issues.

In-person interactions: So long as the COVID-19 pandemic is still in effect (i.e. as long as there is still community transmission in the area and there is not yet a widely available vaccine), the priority for all of us is to stay safe. That is the reason the class will be primarily online. I realize that some students are less comfortable with online interactions and might like to meet in person on occasion. If any student would like to meet in-person on Lehigh campus to discuss the class, we will see if that can be arranged. Any such interactions will be contingent upon both the student and the instructor being cleared to enter campus using the HawkWatch app. We will preferentially meet outside somewhere on the Asa Packer Campus where we can sit and talk while being more than 6 feet apart. In the case of inclement weather, we will identify an indoor location where we can maintain distancing. In ALL in-person interactions, masks are required, inside or outside. If you would like to meet in person, please email me more than 2 days ahead of time.

Office: 413 Lewis Lab, 83649 (direct), 83931 (main physics office), joshua.pepper@lehigh.edu

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

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

Office Hours: By appointment

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	15%
Midterm	15%
Final Exam (cumulative)	20%
Attendance and Participation	30%

Primary Topics:

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

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. Upon starting the class, I expect that everyone has mastered the following skills:

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 skills:

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 stars.
- ✓ 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.