

PHYS 1311: Elements of Astronomy

Syllabus and Course Information

Instructor: Professor Krista Lynne Smith
Lecture times: 3-3:50 PM Wed/Fri
Laboratory times: Monday 1:00 - 2:50 PM (N10)
Monday 3:00 - 4:50 PM (N11)
Class location: Virtual
Lab location: Virtual
Office: 41 Fondren Science
Office hours: Wednesday 4:00 – 5:00 PM
Friday 9:00 – 10:00 AM
(in Zoom room, TBA)

Contact information:

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Course Objectives: In this class, you will learn both the basic physical phenomena of astronomy, from the planets and bodies in our solar system to quasars at the edge of the observable universe, as well as the methods used in modern observational astrophysics to study these objects. You should also get a sense of how the field of professional astronomy works, and what kind of instruments are used in astronomical experiments.

Method of Instruction: This course will include both traditional lectures and class periods where you are expected to read material ahead of time, with class time reserved for interactive work with each other and the instructor. Lectures will also be interactive, not passive.

Grading: The majority of grading in the course will come from homework assignments, participation in in-class exercises, and laboratory reports, which will sometimes coincide with homework assignments. There will be one large project and two exams.

- Homework and Lab Reports: 35%
- In-class exercises: 10%
- Class project: 25%
- Mid-term exam: 15%
- Final exam: 15%

Course Outline (subject to change):

Week 1: Scale of the Universe, The Big Questions, Astrology

Week 2: Coordinate systems, Telescopes across the Electromagnetic Spectrum

Week 3: The Solar System, Planets, Orbital Motion, Asteroids, the Moon

Week 4: Exoplanets and How to Find Them, Formation of Planetary Systems

Week 5: Spectroscopy, Doppler Effect, Radiation

Week 6: The Sun as a Star, Stellar Types, Stellar Evolution

Week 7: Deaths of Stars, Black Holes, Neutron Stars, Pulsars

--MIDTERM EXAM--

Week 8: The Milky Way and its Neighborhood, Globular Clusters, Dwarf Galaxies

Week 9: Galaxy Classification, Galaxy Evolution

Week 10: Quasars, Active Galaxies, Supermassive Black Holes, Expansion of Universe

Week 11: Cosmology, Cosmic Microwave Background, the Big Bang

Week 12: Special topics: Dark Matter / Dark Energy (or others submitted by class)

Week 13: Special topics: Extraterrestrial Life / Astrobiology (or others submitted by class)

Week 14: Presentations of final projects, discussions

--FINAL EXAM--