

## **ASTR 352 Current Developments in Astronomy**

In-depth examination and interpretation of astronomical discoveries occurring at the time the course is taught. Reading includes both background material and current periodicals accessible to General Education students. Likely areas of discussion include spacecraft exploration of the solar system, satellite observations of high-energy radiation from space, exotic astronomical objects (e.g., double quasars, black hole candidates), and new cosmological data.

*(Pre-requisites: None)*

### **Course Learning Outcomes:**

By the end of the course, students will be able to:

1. Identify the structure and evolution of the physical universe
2. Recognize the nature of various objects in our universe such as planets, moons, stars, galaxies, dark matter, and other components
3. Explain in detail the models, techniques, and instruments used in High Energy Physics that help address basic human problems
4. Investigate astronomical topics, such as Kepler's Laws, the Universal Law of Gravitation, the Spectrum, the Doppler Effect, Search of Exoplanets, Formation of Black Holes, and the Theory of the Big Bang
5. Present to an audience research on astronomical topics, such as Kepler's Laws, the Universal Law of Gravitation, the Spectrum, the Doppler Effect, Search of Exoplanets, Formation of Black Holes, and the Theory of the Big Bang
6. Produce a written research paper related to astronomical topics, such as Kepler's Laws, the Universal Law of Gravitation, the Spectrum, the Doppler Effect, Search of Exoplanets, Formation of Black Holes, and the Theory of the Big Bang

### **Textbook & Course Materials:**

- ["The Cosmos, Astronomy in the New Millennium", by Pasachoff and Filippenko, 5th Edition, Cambridge University Press, 2019, ISBN-13: 978-1108431385 ; ISBN-10: 1108431380](#)

### **Course Content:**

1. Sense of Space and Time
2. Units and Speed of Light in Vacuum
3. Light year, Astronomical Unit
4. Scientific Notation
5. Value of Astronomy
6. Early History of Astronomy + Galileo
7. Newton
8. The Spectrum
9. Radiation and the atmosphere
10. Telescopes

11. • Spectroscopy, Doppler Effect
12. • Observatories and Spacecraft
13. • Constellations, Twinkling
14. Coordinate Systems
15. The Ecliptic and other effects
16. Time, International Date Line and Calendars
17. The Origin of the Solar System and our Sun
18. Phases, Eclipses, Transits and Theories of Cosmogony
19. The Earth's Interior
20. Tides, Atmosphere and The Weather
21. Global Warming and The Ozone Hole
22. Terrestrial Planets
23. Giant Planets
24. Pluto and the Exoplanets
25. Comets, Asteroids, Meteorites and Meteor Showers
26. Extinction of the Dinosaurs
27. The Universe
28. Stars and measuring their properties
29. Stellar Evolution: Light to Medium Sized Stars
30. Stellar Evolution: Heavy Stars
31. Galaxies
32. Universe in Evolution
33. Extra-terrestrial Life
34. High Energy Physics