PEP 151 Introduction to Astronomy

Department of Physics and Engineering Physics
Stevens Institute of Technology
Semester: Spring 2023

Schedule: **Mondays & Fridays 1:00 - 2:15 pm**
Instructor: **Prof. Ting Lu**
Contact: **tlu11@stevens.edu**
Office: **Burchard 510**
Office Hours: **Tuesdays 1 pm – 3 pm**

Textbook

* Minimum requirement
Free online textbook:
OpenStax Astronomy, https://openstax.org/details/books/astronomy

* Optional alternative (but not required):
The Essential Cosmic Perspective, by Bennett, Donahue, Schneider and Voit, 8th edition

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Course Objectives/Outcomes

1. Understand the basic units and different scales of the Universe.
2. Be able to interpret and explain the apparent motion of astronomical objects, reasons for seasons and tides.
3. Know how to deduce astronomical properties, such as distance to the object, luminosities, and diameters.
4. Explain features of the Hertzsprung-Russell diagram.
5. Perform statistical analysis of astronomical data to determine physical quantities.
6. Given the light curve of the Cepheid variable stars, determine its period, absolute magnitude and distance.

Grading Scheme

Grades are calculated from a weighted average of the following:

Homework……..……...24%
Labs……...14%
Observational assignments……12%
Class participation (full credit will be given if participation >50%)…….…5%
In-class Quizzes……..…….……18%
Final exam…….27%

Tentative Lecture Schedule

(OpenStax Chapters)

Week Number	Topics
1	Ch 1: Science and the Universe: A brief tour Ch 2: Observing the Sky: The Birth of Astronomy
2	Ch 3: Orbits and Gravity Ch 4: Earth, Moon, and Sky
3	Ch 5: Radiation and Spectra Ch 6: Astronomical Instruments
4	Ch 7: Other Worlds: An Introduction to the Solar System Ch 8: Earth as a Planet Ch 9: Cratered Worlds
5	Ch 10: Earthlike Planets: Venus and Mars Ch 11: The Giant Planets Ch 14.3: Formation of the Solar System
6	Ch 12: Ring, Moons and Pluto Ch 13: Comets and Asteroids: Debris of the Solar System
7	Rest of Ch 14: Cosmic Samples Ch 15: The Sun: A Garden Variety Star
8	Ch 16: The Sun: A Nuclear Powerhouse Ch 17: Analyzing Starlight
9	Ch 18: The Stars: A Celestial Census Ch 19: Celestial Distances
10	Ch 20: Between the Stars: Gas and Dust in Space Ch 21: The Birth of Stars Ch 22: Stars form Adolescence to Old Age

11	Ch 23: The Death of Stars Ch 24: Black Holes and Curved Spacetime
12	Ch 25: The Milky Way Galaxy Ch 26: Galaxies
13	Ch 27: Active Galaxies, Quasars and Supermassive BHs Ch 28: The Evolution and Distribution of Galaxies
14	Ch 29: The Big Bang Ch 30: Life in the Universe