

PEP 336 Introduction to Astrophysics and Cosmology

Department of Physics and Engineering Physics

Stevens Institute of Technology

Semester: Spring 2021

Schedule: Mondays & Fridays 3:00-4:15pm

Instructor: Prof. Ting Lu

Contact: tlu11@stevens.edu

Office: Burchard 510

Office Hours: Wednesdays 10:30 am – 12:30 pm

Textbook

*An Introduction to Modern **Stellar** Astrophysics 2nd edition, by Ostlie and Carroll*
or

An Introduction to Modern Astrophysics 2nd edition, By Carroll and Ostlie
or

Foundations of Astrophysics, by Ryden and Peterson

Course Objectives

This course aims to provide understandings of basic properties and evolutions of stars in a more quantitative way, from the spectral formation, protostar cloud, different life stages of stars, to the remnants of stars. Properties of our own galaxy and other galaxies will also be discussed.

Course Prerequisites

PEP111.

Learning Outcomes:

- I know how to estimate fundamental properties of stars such as luminosity and mass through various methods.
 - I can explain the absorption line features of stars through calculations of abundance of elements at different temperatures (Boltzmann equation and Saha equation).
 - I understand under what condition the star would be in hydrostatic equilibrium and the sources of pressure that can support the star.
 - I can determine the condition for instability of gas cloud at different temperature and density through Jeans criterion.
 - I understand the major stages of the evolution of stars of different masses.
 - I know the basic structures and properties of different types of galaxies.
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Grading Scheme

Homework	35%
Labs	35%
Final Exam	30%
Class participation (extra credit).....	5%

Lecture Schedule (tentative and subject to change)

Week Number	Topics
1	Basic units, scales, fundamental properties of stars and their measurements.
2	Spectral classification and spectral formation
3	Stellar atmosphere
4	Stellar interior
5	Stellar model building
6	Protostar formation (Jeans criterion)
7	Main-sequence evolution
8	Post main-sequence evolution
9	Remnants of stars

10	Milky Way Galaxy
11	Galaxy classification, mass profile, dynamics
12	Galaxy evolution
13	Correlations among galaxy properties
14	AGN, large-scale structure