Syllabus for Astrophysics

PH 455/555

Course Name: Astrophysics
Course Number: PH 455/555
Course Credits: 3
Prerequisites: PH 213, PH 315 or equivalent junior-level background in modern physics and thermodynamics

Course Catalog Description
Physics of stars and the cosmos.

Student Learning Outcomes
Students shall be able to:

- Apply rigorously the scientific method in the absence of controlled laboratory experiments
- Perform order of magnitude estimates and solve abstract Fermi problems
- List astrophysically relevant radiation mechanisms, and identify them based on their spectral properties
- Discuss the propagation of radiation in a medium
- Qualitatively discuss the structure of a star and its properties
- Discuss the properties of degenerate matter and the outcome of stellar evolution for stars of different mass
- List the components of the interstellar medium and discuss their interactions
- Describe the properties and evolution of different types of galaxies
- Describe the Big Bang cosmological model, and the evidence to support it
- Discuss the experimental support for the existence of dark matter and dark energy

Graduate students shall in addition to the above be able to:

- Quantitatively compute the structure of a star
- Demonstrate deeper understanding and self-study capabilities in a class topic of their choice
Course Content

- Fundamentals of radiation mechanisms and radiative transfer
- Stellar structure and evolution
- Stellar remnants and compact objects
- Interstellar medium
- Galaxies, clusters, and large scale structure
- Cosmology

Learning resources

Required textbooks:

- *Astrophysics in a Nutshell*
  by Dan Maoz

Evaluation of Student Performance

Students will be graded on weekly homework as well as midterm and final exams.

Statement Regarding Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at [http://ds.oregonstate.edu](http://ds.oregonstate.edu). DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Link to Statement of Expectations for Student Conduct

[http://oregonstate.edu/studentconduct/offenses-0](http://oregonstate.edu/studentconduct/offenses-0)