

ASTR - ASTRONOMY

ASTR 600 Order-of-Magnitude Astrophysics

Credit 1. 1 Lecture Hour.

Introduction to the utility of order of magnitude calculations and the ability to think intuitively; short overviews of basic physical concepts followed by interactive activities and problem solving at the board. May be repeated for credit.

Prerequisite: ASTR 314 or equivalent, or approval of instructor.

ASTR 601/PHYS 641 Extragalactic Astronomy

Credits 3. 3 Lecture Hours.

Overview of observations of galaxies and large-scale structures in the Universe to understand their formation and evolution from theoretical and observational perspectives; galaxy luminosity functions; evolution of stellar populations and chemical enrichment; clusters and AGN.

Prerequisites: PHYS 601; or ASTR 314 and PHYS 302; or approval of instructor.

Cross Listing: PHYS 641/ASTR 601.

ASTR 602/PHYS 642 Astronomical Observing Techniques and Instrumentation

Credits 3. 3 Lecture Hours.

Theory and practice of obtaining and analyzing astrometric, photometric, spectroscopic, and interferometric measurements of astronomical sources across the electromagnetic spectrum; principles of design, fabrication, assembly, test, deployment, and use of astronomical instruments.

Prerequisites: PHYS 615 or equivalent; or approval of instructor.

Cross Listing: PHYS 642/ASTR 602.

ASTR 603/PHYS 643 Stellar Astrophysics

Credits 3. 3 Lecture Hours.

Theoretical and observational aspects of stellar astrophysics; thermodynamic properties of stellar interiors; energy sources; nuclear processes and burning stages; convective and radiative energy transport; evolutionary models; atmospheres; stability and pulsations; chemical enrichment processes; population synthesis.

Prerequisites: PHYS 606 and PHYS 607 or equivalents; or approval of instructor.

Cross Listing: PHYS 643/ASTR 603.

ASTR 604/PHYS 644 Cosmology

Credits 3. 3 Lecture Hours.

Basic principles of modern cosmology and particle physics; general relativity; cosmic inflation; Big Bang nucleosynthesis; expansion of the universe; cosmic microwave background; large-scale structure of the Universe; properties of particles; dark matter; dark energy.

Prerequisites: PHYS 615 or equivalent; or approval of instructor.

Cross Listing: PHYS 644/ASTR 604.

ASTR 605/PHYS 645 Galactic Astronomy

Credits 3. 3 Lecture Hours.

Basic nature and structure of constituents of Milky Way galaxy; distribution and motions of stars and gas; origin evolution and distribution of large-scale chemical abundances and kinematic patterns across populations; models of galaxy formation and implications of modern observations.

Prerequisites: PHYS 601 and PHYS 607 or equivalents; or approval of instructor.

Cross Listing: PHYS 645/ASTR 605.

ASTR 606/PHYS 646 Radiative Transfer

Credits 3. 3 Lecture Hours.

Fundamental radiative processes in stellar and planetary atmospheres; radiative fields; Stokes parameters; Mueller matrix formalism; radiation from moving charges; Compton scattering; plasma effects; atomic structure and radiative transitions; molecular structure and spectra; multiple scattering.

Prerequisites: PHYS 302, PHYS 304, PHYS 408, and PHYS 412 or equivalents; or approval of instructor.

Cross Listing: PHYS 646/ASTR 606.

ASTR 681 Seminar

Credit 1. 1 Lecture Hour.

Subjects of current importance; normally required of all graduate students in astronomy. May be repeated for credit.

ASTR 685 Directed Studies

Credits 1 to 9. 1 to 9 Other Hours.

Individual problems not related to thesis.

Prerequisite: Approval of instructor.

ASTR 689 Special Topics in...

Credits 1 to 4. 1 to 4 Lecture Hours.

Selected topics in an identified area of astronomy. May be repeated for credit.

Prerequisite: Approval of instructor.

ASTR 691 Research

Credits 1 to 23. 1 to 23 Other Hours.

Research toward thesis or dissertation.

Prerequisite: Baccalaureate degree in physics or equivalent.