Astronomy Core Courses

- ## 270. Astrophysical Dynamics

  Units: 4
  Lecture, three hours. Orbital dynamics: two-body problem, three-body problem, resonances, tides, migration. Galactic potentials. Milky Way structure and observed properties of galaxies. Collisionless Boltzmann equation and relaxation processes. Stability of stellar systems. Spiral structure. Letter grading.

- ## 271A. Electromagnetic Radiation in Astrophysics I

  Units: 4
  Lecture, three hours. Fundamentals of radiation field and Maxwell equations. Covariant formulation of fields and particles. Fundamentals of radiative transfer. Radiation from accelerated charges and mechanisms of continuous radiation. Line radiation. Thermal, statistical, and ionization equilibrium. Letter grading.

- ## 271B. Electromagnetic Radiation in Astrophysics II

  Units: 4
  Lecture, three hours. Advanced topics in radiation relevant to astrophysics. Radiative scattering and diffusion. Radiative transfer in extended media. Curve of growth analysis and abundance determinations. Photo-dissociation, line emission, radiative recombination cross-sections. Dust processes. Polarized light, Stokes parameters. Letter grading.

- ## 272. Stellar Astrophysics

  Units: 4
  Lecture, three hours. Observations of stars. Equations of stellar structure and stellar models. Nuclear energy sources. Star formation. Binary stars. Main sequence stellar evolution. Compact objects: white dwarfs, neutron stars, and black holes. Brown dwarfs. Letter grading.

- ## 273. Diffuse Matter in Space

  Units: 4
  Lecture, three hours. Basic equations of fluid dynamics with applications to shocks, winds, and accretion. Fluid instabilities. Fundamentals of magnetohydrodynamics. Interstellar medium: molecular clouds, warm and hot phases of interstellar medium, HII regions. Particulate interstellar matter. Letter grading.

- ## 274. Extragalactic Astrophysics I

  Units: 4

Lecture, three hours. Observational foundations of Big Bang. Friedmann equation. Cosmic inflation. Cosmic microwave background. Big Bang nucleosynthesis. Structure formation. Observations and theory of galaxy evolution. Galaxy clusters. Intergalactic medium. Letter grading.

- ## 281. Quantum Mechanics for Astrophysics

Units: 4
Lecture, four hours. Designed for departmental graduate students. Quantum mechanical topics in areas of interest for astrophysics applications. Hydrogen atom, radiative transitions, complex atoms, molecular spectroscopy including electronic, vibrational, and rotational transition, nuclear reaction theory. Letter grading.