

270. Advanced

Mathematical Physics (3)

Prerequisite: PHYS 170A. Covers three topics: group theory, including continuous (Lie) groups, Lie algebras, and an introduction to the theory of representations, Green's functions and their applications to physical problems, and integral equations including diagrammatic methods of solution.

272. General Relativity (3)

Prerequisite: PHYS 203. The principle of equivalence, tensor calculus in curved spacetimes, the Einstein-Hilbert equations, the Schwarzschild solution tests of general relativity, gravitational radiation, introduction to cosmology.

275T. Topics in Contemporary Physics (1-3; max total 6)

Advanced topics in such areas as modern optics, plasma physics, high energy physics, astrophysics, nuclear physics, biophysics. Some topics may have labs.

290. Independent Study (1-3; max total 6)

See *Academic Placement — Independent Study*. Approved for *SP* grading.

298. Project (2-6; max total 6)

Prerequisite: permission of instructor. Scholarly investigation by the advanced graduate student as a culminating experience for the master's degree, including a written project report and an oral defense, and followed by a competency exam. Approved for *SP* grading.

299. Thesis (2-6; max total 6)

Prerequisite: See *Criteria for Thesis and Project*. Preparation, completion, and submission of an acceptable thesis for the master's degree. Approved for *SP* grading.

PHYSICAL SCIENCE COURSES

Physical Science (P SCI)

ASTRONOMY

21. Elementary Astronomy (4)

Prerequisite: MATH 45 (may be taken concurrently) or second-year high school algebra. Concepts, theories, important physical principles, and history of astronomy. Stellar properties, distances, and evolution. Three field trips for observing with telescopes. G.E. Breadth B1. (3 lecture, 2 lab hours)

OTHER

106. History of Physical Science (3)

The development of our understanding of the physical world from ancient times to the 20th century with an emphasis on astronomy, mechanics, thermodynamics, and the nature of matter. An exploration of the evolution of ideas.

131. Concepts of Classical Physics from Babylon to Maxwell (3)

Prerequisites: General Education Quantitative Reasoning and Area B Breadth requirements. Concepts, theories, and laws of classical physics. Mathematics, astronomy, mechanics, light, electricity, magnetism, thermodynamics, chemistry, and the atom. G.E. Integration IB.

168. Environmental Impact of Energy Demands by Society (3)

Analysis of energy crisis; introduction to various forms of energy, energy conversion processes and environmental effects; present energy supply and energy projections; future energy demands and ways of evaluating alternatives.

180T. Topics in Physical Science (1-3; max total 9)

Detailed discussion of special topics within the realm of physical science.

IN-SERVICE COURSES

(See *Course Numbering System*.)

Physical Science (P SCI)

305. Physical Science for Secondary School Teachers (3; max total 6 in any one field)

Prerequisites: secondary credential and two years of teaching experience. Objectives, content, and instructional materials for the physical sciences; fundamental principles and recent developments. Emphasis may be on chemistry, geology, or physics.

350. Physical Science for Elementary School Teachers (3-6; max total 6 in any one field)

Maximum total credit 12 units; not more than 6 units in one field. Prerequisite: elementary credential. Selection of source materials and aids available for illustration of fundamental concepts and principles in physical science; laboratory work in construction, operation, and use of demonstrations and experiments in the elementary school.