890. Problems in Physical Science
Fall, Winter, Spring, Summer. 1 to 12 credits. May reenroll for a maximum of 15 credits. Bachelor's degree in a physical science.

PHYSICAL SYSTEMS IN AGRICULTURE AND NATURAL RESOURCES
See Agricultural Engineering.

PHYSICS

College of Natural Science

The content of courses 401, 405, 410 and 412, as well as the problems course, 890, may vary from term to term. Brochures giving detailed information about individual courses are available in the Science and Mathematics Teaching Center and the Office of the Assistant Dean for Lifelong Education. These courses are primarily designed for in-service teachers and interested adults and are offered in off-campus locations.

203. Foundations of Physical Sciences
Fall, Winter, Spring, Summer. 4(3-3) 12 credits of Natural Science.
An introduction to physical science for non-science majors. The basic concepts relating to human interaction with the physical environment. Topics selected from the sciences, chemistry, and the earth and space sciences.

400. Physical Science for Teachers
Fall, Winter, Spring, Summer. 3 or 4 credits. May reenroll for a maximum of 12 credits. Teacher certification with science major or minor.
For in-service teachers stressing process, inquiry, meaning and field experience. Topics will be generated from classroom experiences of participants.

405. Topics in Physical Science
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits if different topic is taken. Approval of department.
Presentation of single topics from the physical sciences by senior faculty and guest lecturers. Topics are selected to facilitate development of strong physical science programs in schools.

410. Seminar on Recent Advances in Physical Science
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits if different topic is taken. Approval of department.
A series of lectures by senior faculty of topics on the history, development, the most recent advances and possible future trends in the earth sciences.

412. Recent Advances in Earth Science
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits if different topic is taken. Approval of department.
A series of lectures by senior faculty on the history, development, most recent advances and possible future trends in the earth sciences.

430. Planetarium and Classroom Instruction
Summer. 4(3-2) AST 119 or AST 217 or AST 329
Practical operation, techniques, and methods of instruction for astronomy and other sciences in the planetarium theater and the classroom.

431. Problems in Planetarium Education
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits. Approval of department.
Individual study, training, or project under the direction of a faculty member. Often the training will be in the area of actual delivery of planetarium presentations.

Prerequisites to nearly all the first courses in the 300-400 level course sequences are stated in terms of the Introductory Physics courses. The course selected for prerequisite is that which requires the least number of credits and the least mathematical background and which department considers adequate. The corresponding term of any introductory sequence that requires a mathematical background equal to or greater than that of the stated prerequisite may be substituted for the stated prerequisite.

All 400 level physics courses (except 430 and 431) require 289 or 293H.

100. The Science of Sound I:
Rock, Back and Oscillators (N)
Spring 4(4-0)
The place of man in the physical universe. Cosmology, complexities on the human scale, paradoxes of sub-atomic physics, universal constants for life, future for man, space colonization. Approved through Winter 1981.

201. The Science of Sound II
Spring 3(3-0) or 4(4-0) PHY 201.
Interdepartmental with the Department of Mechanical Engineering.
Man sound relationship, Production, propagation, detection of sounds. Voice, hearing, scales, timbre, musical instruments, Room acoustics, Electronic reproduction and synthesis of music. Demonstrations emphasized.

202. The Science of Sound III
Spring 3(3-0) or 4(4-0) PHY 201.
Interdepartmental with and administered by the Department of Mechanical Engineering.

203. Science of Light and Color for Nonscientists
Spring 4(4-0)
Properties of light with applications to mirrors, lenses, eyes, cameras, lasers, holography. Light spectra, color TV, color vision, filters, pigments. Black and white and color photography.

277. Physics for Audiology and Speech Sciences
Fall, Spring. 3(3-2) MTH 109. Not open to students with credit in PHY 227.
Interdepartmental with the Department of Audiology and Speech Sciences.
Introductory physics for Audiology and Speech Sciences majors: Kinematics, Newton's Law, conservation of energy and momentum, waves and vibrations, sound propagation, resonance, speech production.

278. Introductory Physics
Fall, Winter, Spring. 3(4-0) MTH 109 or MTH 111 or concurrently. Not open to students with credit in PHY 227.
Mechanics, including Newton's Law, momentum, energy, and conservation laws.

279. Introductory Physics I, CBI
Fall, Winter, Spring. 3 credits. MTH 109 or MTH 111 or concurrently.
Mechanics including Newton's Law, momentum, energy, and conservation laws.

288. Introductory Physics
Fall, Winter, Spring. 3(4-0) PHY 237.
Heat, electricity and magnetism.

288B. Introductory Physics II, CBI
Fall, Winter, Spring. 3 credits. PHY 237.
Heat, electricity and magnetism.

288B. Introductory Physics II
Fall, Winter, Spring. 3(4-0) PHY 238.
Wave motion, sound, light, and modern developments.