

PHYSICAL SCIENCE (PHSC)

PHSC XXXX Physical Science with Laboratory

Physical Science with Laboratory Four hours of science with laboratory from CHEM, ENVS, GEOL, PHSC, PHYS CHEM 1113: Survey of Chemistry and CHEM 1111: Survey of Chemistry Laboratory CHEM 2124: General Chemistry I CHEM 2134: General Chemistry II ENVS 1004: Principles of Environmental Science GEOL 1004: Essentials of Earth Science GEOL 1014: Physical Geology PHSC 1004: Principles of Environmental Science PHSC 1013: Introduction to Physical Science and PHSC 1021: Physical Science Laboratory PHSC 1053: Astronomy and PHSC 1051: Observational Astronomy Laboratory PHSC 1074: Physical Science Inquiry PHYS 1114: Applied Physics PHYS 2014: Algebra-Based Physics I PHYS 2114: Calculus-Based Physics I

PHSC 1001 Orientation to Physical Science

Offered: Fall.

Introduction to vital university affairs, department and university resources and curriculum. The course emphasizes information and skills that increase a student's likelihood of a successful college career. All students majoring in programs within the Department of Physical Sciences are strongly encouraged to take this course during their first fall semester on the Arkansas Tech University campus.

PHSC 1004 Principles of Environmental Science

Cross-listed: BIOL 1004 and ENVS 1004.

This course is designed to bring the student to a basic but informed awareness of and responsible behavior toward our environment and the role of the human race therein. The content will include a study of the philosophical and scientific basis for the study of ecosystems and the environment, the nature of ecosystems, the techniques used to study the environment, the origin and development of current environmental problems, the interdisciplinary nature of environmental studies, the processes of critical thinking and problem solving, and the moral and ethical implications of environmentally-mandated decisions. Lecture three hours, laboratory three hours. \$40 laboratory fee.

PHSC 1011 Orientation to Physical Science II

Offered: Spring.

Continuation of PHSC 1001. Introduction to programs of study and employment opportunities for students of the physical sciences. All students majoring in programs within the Department of Physical Sciences are strongly encouraged to take this course during their spring semester on the Arkansas Tech University campus.

PHSC 1013 Introduction to Physical Science

ACTS Common Course - PHSC 1004 (when taken with PHSC 1021).

Prerequisite: A score of 19 or above on the mathematics section of the ACTE exam or completion of MATH 0903, Intermediate Algebra, with a grade of "C" or better.

An introduction to the natural laws governing the physical world, with emphasis upon the discovery and development of these laws and their effect upon man. Includes topics in physics and chemistry and may include other topics from other disciplines in physical science such as astronomy, meteorology, and/or geology. This course may not be taken for credit after completion of two laboratory courses in the physical science disciplines.

Note: To enroll in an internet section (TC1) of this course, the prerequisite COMS 1003 or equivalent is required.

PHSC 1021 Physical Science Laboratory

ACTS Common Course - PHSC 1004 (when taken with PHSC 1013).

Co-requisite or Prerequisite: To be taken concurrent with or following completion of PHSC 1013.

An introduction to laboratory experiences in the physical sciences, including physics, chemistry, earth sciences, and astronomy. Laboratory two hours. \$40 laboratory fee.

Note: To enroll in an internet section (TC1) of this course, the prerequisite COMS 1003 or equivalent is required.

PHSC 1051 Observational Astronomy Laboratory

ACTS Common Course - PHSC 1204 (when taken with PHSC 1053).

Offered: Fall.

Co-requisite: PHSC 1053 or consent of instructor.

Prerequisite: A score of 19 or above on the mathematics section of the ACTE exam or completion of MATH 0903 with a grade of "C" or better.

An introduction to astronomical observations and techniques. Students will have the opportunity to use telescopes at the ATU astronomical observatory (weather permitting) to make observations and collect scientific data for analysis. This course includes telescope orientation, constellation recognition, identifying celestial objects, and interpreting astronomical data. Course PHSC 1051 will run simultaneously with PHSC 3051 and duplicate credit will not be allowed. Credit for PHSC 3051 requires completion of an observational research project for upper division students, but is not required of students enrolled in PHSC 1051. Laboratory 3 hours; 1 credit hour. \$40 laboratory fee.

Note: When taken concurrently with PHSC 1053, this course satisfies the general education physical science laboratory requirement upon successful completion of both courses.

PHSC 1053 Astronomy

ACTS Common Course - PHSC 1204 (when taken with PHSC 1051).

Offered: Fall.

Co-requisite: PHSC 1051 or consent of instructor.

Prerequisite: A score of 19 or above on the mathematics section of the ACTE exam or completion of MATH 0903 with a grade of "C" or better.

A study of our universe; constellations, celestial motions, tools and methods of astronomical observations, the solar system, properties of stars and the interstellar medium, the birth, life and death of stars, our Milky Way galaxy, dynamics of stellar systems and other galaxies, and cosmology. Course PHSC 1053 will run simultaneously with PHSC 3053 and duplicate credit will not be allowed. Credit for PHSC 3053 requires completion of several assignments, a term paper and a research project for upper division students, but is not required of students enrolled in PHSC 1053.

Note: When taken concurrently with PHSC 1051, satisfies general education physical science laboratory requirement upon successful completion of both courses.

PHSC 1074 Physical Science Inquiry

Prerequisite: A score of 19 or above on the mathematics section of the ACTE exam or the completion of MATH 0903, Intermediate Algebra, with a grade of "C" or better.

This course is designed to model physical science teaching and learning through the process of inquiry. Topics explored are Interactions and Energy, Forces, Systems, Behavior of Gases, Physical Changes, and Chemical Changes. The focus is upon the construction of knowledge regarding science content and process skills essential to the preparation of teachers of physical science in early childhood education. It is recommended for early childhood education majors seeking to fulfill undergraduate requirements in preparation for upper level science methods courses and is equivalent to 3 hours of lecture and 3 hours of laboratory experience in physical science. However, the course requires that students participate as active learners in an activity-based, cooperative learning style curriculum. \$40 laboratory fee.

PHSC 2003 Physics in Society and the Environment

The course is a study of physics in society and in relation to the environment. The development of physics is considered in historical and contemporary contexts.

PHSC 3033 Meteorology

Offered: Spring.

Prerequisite: any physical science course (PHSC, GEOL, CHEM, PHYS)
A study of the weather, the physics of the atmosphere, and associated phenomena.

PHSC 3053 Astronomy

Offered: Fall.

Co-requisite: PHSC 1051 or consent of instructor.

Prerequisite: MATH 1113.

Optional A study of our universe; constellations, celestial motions, tools and methods of astronomical observations, the solar system, properties of stars and the interstellar medium, the birth, life and death of stars, our Milky Way galaxy, dynamics of stellar systems and other galaxies, and cosmology. Credit for PHSC 3053 requires completion of a term paper and a research project for upper division students. Duplicate credit for previously offered PHSC 3043 is not allowed.

Note: When taken concurrently with PHSC 3051, satisfies general education physical science laboratory requirement upon successful completion of both courses.

PHSC 3213 Science Education in the Elementary School

Cross-listed: BIOL 3213.

Prerequisite: Junior standing, ECED 2001, ECED 2002, and at least six credit hours in science.

An overview of the most recent and research-based strategies and techniques for planning, teaching, and assessing elementary science. Inquiry-based methods and other constructivist approaches as described in the National Science Education Standards will be emphasized. Design and execution of learning activities for an elementary school setting are required. Lecture two hours, laboratory two hours; three credit hours. \$40 laboratory fee.

Note: To enroll in an internet section (TC1 or AT1) of this course, one of these prerequisite courses is required: COMS 1003, EDMD 3013, or equivalent.

PHSC 3223 Science Education in the Middle Level

Cross-listed: BIOL 3223.

Prerequisite: 16 hours in science and MLED 2001.

This course is designed to provide pre-service teachers with an integrated approach to the teaching of science in the middle grades. Theoretical and practical aspects of teaching science will be explored and students will develop curricular materials based on their explorations. Lecture two hours, laboratory 2 hours. \$40 laboratory fee.

PHSC 3233 Science Education in the Secondary School

Cross-listed: BIOL 3233.

Prerequisite: 16 hours in biology or 16 hours in physical science and SEED 2002.

This course will examine the issues of nature and history of science, developing lessons and assessments, and science education standards for the prospective secondary school teacher. Curriculum development, including assessment and planning skills, utilizing various instructional media and inquiry methodology are emphasized. Design and execution of learning activities for a secondary school setting are required. Lecture two hours, laboratory two hours. \$40 laboratory fee.

PHSC 3243 Integrating the Three Dimensions of Science

Cross-listed: BIOL 3243.

Prerequisite: Junior Standing and at least 8 hours of science.

This course integrates the three major areas of discipline in science: physical science, life science and earth science, using as a focus the processes and cross-cutting concepts of science, technology, engineering and mathematics (STEM). \$40 laboratory fee.

PHSC 3252 The Nature and Context of Science

Cross-listed: BIOL 3252.

Offered: Spring.

Prerequisite: At least 12 hours of science courses.

This seminar course examines science from a holistic perspective. It will concentrate on examining how current science develops scientific knowledge including unifying concepts across scientific disciplines, the place of science within modern society, technology and its role in science and society, and current scientific methodology.

PHSC 3253 Teaching Methods for STEM

Cross-listed: BIOL 3253.

Prerequisite: Junior Standing, ECED 2001, ECED 2002, PHSC 3243 and completion of at least 8 hours of science.

An overview of strategies and techniques for planning, teaching, and assessing elementary science. An emphasis will be placed on best practices, crosscutting concepts, and core ideas outlined in current National Science Frameworks developed in conjunction with the National Research Council. Current adopted standards such as the Next Generation Science Standards (NGSS) and Common Core State Standards will be emphasized in designing learning experiences that integrate science, technology, math, and engineering (STEM) with language arts skills. Inquiry-based methods and other constructivist approaches as described in the National Science Education Frameworks will be emphasized. Design and execution of learning activities for an elementary school setting are required. Lecture two hours, laboratory two hours; three credit hours. \$40 laboratory fee.

PHSC 4701 Special Methods in Physical Science

Offered: On demand Prerequisites: Admission to student teaching phase of the teacher education program.

Co-requisite: SEED 4909 Intensive on campus exploration of the principles of curriculum construction, teaching methods, use of community resources, and evaluation as related to teaching physical science.

PHSC 6883 Workshop

Prerequisite: EDFD 6003 or permission of instructor.

The workshop will require the equivalency of fifteen clock hours of instruction per credit hour.