

# ALL COURSES

## PHYSICAL SCIENCE

### **PHSC XXXX: Physical Science with Laboratory**

Physical Science with Laboratory

Four hours of science with laboratory from CHEM, ENVS, GEOL, PHSC, PHYS

CHEM 1113 A Survey of Chemistry: Survey of Chemistry and CHEM 1111 Survey of Chemistry Laboratory: Survey of Chemistry Laboratory

CHEM 2124 General Chemistry I: General Chemistry I

CHEM 2134 General Chemistry II: General Chemistry II

ENVS 1004 Principles of Environmental Science: Principles of Environmental Science

GEOL 1004 Essentials of Earth Science: Essentials of Earth Science

GEOL 1014 Physical Geology: Physical Geology

PHSC 1004 Principles of Environmental Science: Principles of Environmental Science

PHSC 1013 Introduction to Physical Science: Introduction to Physical Science and PHSC 1021 Physical Science Laboratory: Physical Science Laboratory

PHSC 1053 Astronomy: Astronomy and PHSC 1051 Observational Astronomy Laboratory: Observational Astronomy Laboratory

PHSC 1074 Physical Science Inquiry: Physical Science Inquiry

PHYS 1114 Applied Physics: Applied Physics

PHYS 2014 Algebra-Based Physics I: Algebra-Based Physics I

PHYS 2114 Calculus-Based Physics I: Calculus-Based Physics I

### **PHSC 4XXX: PHYSICAL SCI TRANSFER ELECTIVE**

Credit transferred from another institution and articulated for physical science upper division elective.

### **PHSC 3XXX: PHYSICAL SCI TRANSFER ELECTIVE**

Credit transferred from another institution and articulated for physical science upper division elective.

### **PHSC 2XXX: PHYSICAL SCI TRANSFER ELECTIVE**

Credit transferred from another institution and articulated for physical science lower division elective.

### **PHSC 1XXX: PHYSICAL SCI TRANSFER ELECTIVE**

Credit transferred from another institution and articulated for physical science lower division elective.

### **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 Principles of Environmental Science and ENVS 1004 Principles of Environmental Science

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 Orientation to Physical Science. 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 Principles of Environmental Science (when taken with PHSC 1021 Physical Science Laboratory)

Prerequisite: A score of 19 or above on the mathematics section of the ACTE exam or completion of MATH 0903 Beginning and Intermediate Algebra, 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.

Note: 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 Introduction to Computer Based Systems or equivalent is required.

### **PHSC 1021: Physical Science Laboratory**

ACTS Common Course - PHSC 1004 Principles of Environmental Science (when taken with PHSC 1013 Introduction to Physical Science)

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

An introduction to laboratory experiences in the physical sciences, including physics, chemistry, earth sciences, and astronomy.

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

Laboratory two hours. \$40 laboratory fee.

### **PHSC 1051: Observational Astronomy Laboratory**

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

Offered: Fall

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

Co-requisite: PHSC 1053 Astronomy or consent of instructor.

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.

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

Note: Course PHSC 1051 Observational Astronomy Laboratory 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 Observational Astronomy Laboratory.

Laboratory 3 hours; 1 credit hour. \$40 laboratory fee.

### **PHSC 1053: Astronomy**

ACTS Common Course - PHSC 1204 (when taken with PHSC 1051 Observational Astronomy Laboratory)

Offered: Fall

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

Co-requisite: PHSC 1051 Observational Astronomy Laboratory or consent of instructor.

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.

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

Note: Course PHSC 1053 Astronomy will run simultaneously with PHSC 3053 Astronomy and duplicate credit will not be allowed. Credit for PHSC 3053 Astronomy 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 Astronomy.

### **PHSC 1074: Physical Science Inquiry**

Prerequisites: A score of 19 or above on the mathematics section of the ACTE exam or the completion of MATH 0903 Beginning and Intermediate Algebra, 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

Prerequisites: 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

Prerequisite: MATH 1113 College Algebra

Optional co-requisite: PHSC 1051 Observational Astronomy Laboratory or consent of instructor.

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.

Note: When taken concurrently with PHSC 3051, satisfies general education physical science laboratory requirement upon successful completion of both courses. Credit for PHSC 3053 Astronomy requires completion of a term paper and a research project for upper division students.

Note: Duplicate credit for previously offered PHSC 3043 is not allowed.

### **PHSC 3213: Science Education in the Elementary School**

Cross-listed: BIOL 3213 Science Education in the Elementary School

Prerequisites: 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.

Note: To enroll in an internet section (TC1 or AT1) of this course, one of these prerequisite courses is required: COMS 1003 Introduction to Computer Based Systems, EDMD 3013 Integrating Instructional Technology, or equivalent.

Lecture two hours, laboratory two hours; three credit hours. \$40 laboratory fee.

### **PHSC 3223: Science Education in the Middle Level**

Cross-listed: BIOL 3223 Science Education in the Middle Level

Prerequisites: 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 Science Education in the Secondary School

Prerequisites: 16 hours in biology or 16 hours in physical science and SEED 2002 Education as a Profession.

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 Integrating the Three Dimensions of Science

Prerequisites: 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 The Nature and Context of Science

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 Teaching Methods for STEM

Prerequisites: Junior Standing, ECED 2001, ECED 2002, PHSC 3243 Integrating the Three Dimensions of Science 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 Teaching in the Secondary School

Intensive on campus exploration of the principles of curriculum construction, teaching methods, use of community resources, and evaluation as related to teaching physical science.