PHYSC 1 Course Outline as of Fall 2004

CATALOG INFORMATION

Dept and Nbr: PHYSC 1 Title: LAB PHYSICAL SCIENC
Full Title: Laboratory Physical Science
Last Reviewed: 6/24/2004

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	3.00	17.5	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 210.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
A descriptive introduction into many physical science disciplines integrated with laboratory analysis. Topics include electromagnetic, gravitational, and nuclear energy, optics, chemistry, astronomy, meteorology, and dinosaurs. This course is designed to meet the career demands of those in elementary and secondary education which require a broad-based, descriptive science background. (Not open for students who have completed Physical Science 10)

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 100B or ENGL 100.

Limits on Enrollment:

Schedule of Classes Information:
Description: Not open to students who have completed Phys Sc 10. Intro to physical science disciplines integrated with lab analysis. Electromagnetic, gravitational & nuclear energy. Also optics, chemistry, astronomy, meteorology & dinosaurs. Course is designed for educators requiring a broad-based, descriptive science background. (Grade or P/NP)

Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 100B or ENGL 100.
Limits on Enrollment:
Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	C	Natural Sciences	Fall 1984	Fall 2004
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B1	Physical Science	Fall 1981	Fall 2004
	B3	Laboratory Activity		
IGETC:	**Transfer Area**		Effective:	Inactive:
	5A	Physical Sciences	Fall 1981	Fall 2004
	5C	Fulfills Lab Requirement		

CSU Transfer: Effective: Inactive:

UC Transfer: Effective: Inactive:

CID:

Certificate/Major Applicable:
Not Certificate/Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Physical Science 1 permits the liberal arts major to acquire a general introduction to the descriptive vocabulary, major theoretical constructs, and experimental methods used in Newtonian physics, geology, chemistry, meteorology, and astronomy. Instruction in each one of these subject areas includes weekly laboratory exercises. Students learn, practice and demonstrate competence in data collection, measurement, and error analysis. Upon completion of the course, students will be able to demonstrate knowledge of the physical sciences through lecture-discussion, reading assignments, written assignments, and examinations.

Topics and Scope:

Motion and Force: the difference between acceleration, velocity, and speed. Newton's three laws of motion. Inertia, momentum, and angular momentum.
Gravitation: Galileo's determination of the proportionality of gravity and mass. Newton's law of gravity. Gravity and satellite orbits, escape velocity, orbital velocity, hyperbolic velocity, apogee and perigee.
Energy and Work: the four fundamental forces in nature. Kinetic energy and potential energy. The physical definition and calculation of work.
Temperature and Power: hear energy and friction. The temperature scales

of Celsium, Kelvin, and Fahrenheit. The physical definition of power and the calculation of horsepower.
The Atomic Nucleus: atomic number and atomic weight. Reading the periodic table of the elements. Nuclear fission and nuclear fusion. Atomic bombs, hydrogen bombs, and nuclear power plants.
Atomic Electron Structure: the Bohr and the quantum mechanical models of the atom. Ionic and co-valent chemical bonding. The process of excitation and ionization.
Optics: the components of the relfecting, refraction, and Schmidt-Cassegrain telescope. How to calculate telescope magnification, light gathering power, and resolution. The optical components and proper function of bionoculars.
Chemistry of Life: the combining capacity of the carbon atom. The molecular structure of fats, proteins, and carbohydrates. The structural differences between methane, propane, butane actane, and gasoline.
Calories and Nutrition: the difference between the physical and dietary calorie unit. The caloric content of fats, proteins, and carbohydrates. How to calculate the percent fat content of any given food from its labeled list of ingredients.
Geology: the interior structure of the earth and heat flow from the earth's interior. Faults, earthquakes, and the Richter scale. Plate tectonics and volcanism.
Dinosaurs: the geologic time scale and the process of fossiliation. The unique physical characteristic of the dinosaur. Major species of dinosaurs and theories of their extinction.
Meteorology: identification of the 10 major cloud types. Warm fronts and cold fronts. Predicting weather changes by observing clouds. The six major weather elements and the instruments that measure them.
Motions of the Moon: the lunar phases and lunar tides. The three types of lunar eclipses and the three types of solar eclipses. The moon's synodic and sidereal periods of revolution.
Kepler's Laws: the properties of the ellipse, semi-major axis, semi-minor axis, focus distance, and eccentricity. The ellipse law, the law of equal areas, and the harmonic law.
The Solar System: the properties of the Terrestrial and Jovian planets with respect to planetary atmospheres, planetary surfaces, and planetary interiors. Triton, Titan, and the 4 Galiliean satellites of Jupiter.
Stars and Nebulae: the difference between a star and a planet. Main sequence (sun-like), giant, white dwarf, neutron, and black hole stars.
Galaxies and Cosmology: the milky way galaxy and its size and shape compared to other galaxies. The expanding universe, the Hubble law, and the big bang and steady state theories.

LABORATORY EXERCISES

Measuring the speed of sound
Determining the specific heat of water
Measuring the height of a building by timing the fall of a weight dropped from its roof top
Finding the relationship between image size and the focal length of a lens
The construction of an electrolite battery
Calculating the horsepower generated by running up a stairway
Identifying cloud types and location of precipitation from

infra-red satellite photographs
Measuring the heights of lunar mountains by the Galilean trigonometric method
Construction of an ellipse and determining the shape of Mercury's orbit by observations made in the planetarium
Determining the mass of Jupiter by Kepler's third law
Calculating the calories "burned" in one mile of running
Construction of an "H-R" diagram from a list of the 20 brightest and 20 nearest stars
Properly identifying and color coding the weather fronts, high and low pressure systems, and forms of precipitation on a NOAA surface weather map

Assignment:

Each student is evaluated on their performance in frequent examinations which contain objective, written, and problem solving questions. Final evaluation also requires that each student competently complete at least one of the following written assignments: comprehensive research paper, analytic essay, lab report, book report, extra credit report, or field assignment. Students will be required to master textbook and research material independently outside of class.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Written homework, Essay exams, Term papers	Writing 10 - 40%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, Lab reports, Quizzes, Exams	Problem solving 10 - 30%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances, Performance exams	Skill Demonstrations 0 - 20%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, Completion	Exams 35 - 70%

Other: Includes any assessment tools that do not logically fit into the above categories.

None

Other Category
0 - 0%

Representative Textbooks and Materials:
Physical Science: A Dynamic Approach: Robert Dixon
The Physical Universe: Krauskopf and Beiser
Physical Science: Principles and Applications: Payne and Falls