SAN DIEGO COMMUNITY COLLEGE DISTRICT
CONTINUING EDUCATION
COURSE OUTLINE

SECTION I

SUBJECT AREA AND COURSE NUMBER

PHYN 510

COURSE TITLE

PHYSICAL SCIENCE 1

TYPE COURSE

NON-FEE

CATALOG COURSE DESCRIPTION

The course emphasizes developing a qualitative conceptual understanding of general principals and models, and the nature of science. It is an introductory course to physics and meets the California State Standards and the expressed goal to support science literacy with a curricula that promotes higher level thinking and application of concepts. (FT)

LECTURE AND LABORATORY HOURS

Minimum of 54 hours

ADVISORY

NONE

RECOMMENDED SKILL LEVEL

Students should have a TAVE reading score of 8.0 or CASAS equivalent

COURSE GOALS

ESLR'S

1. Students will be effective communicators and listeners who utilize spoken, written, and nonverbal communication.
2. Students will identify, assimilate, and synthesize information independently and cooperatively to make informed choices, solve problems, and accomplish goals.
3. Students will demonstrate interpersonal skills by learning and working cooperatively in a diverse environment.
4. Students will continuously expand their knowledge to adapt to changing conditions to fulfill their roles as individuals, family members, workers and community members.

COURSE GOALS (CONTINUED)

5. Students will demonstrate learning gains or competencies relevant to their needs and course objectives.

Upon completing the course, students will have mastered the key content standards for Physics as identified by the State of California, including the key components of following/design procedures, conduct experiments, gather data and draw conclusions; develop explanations using evidence and logic; use appropriate tools and technology to perform tests, collect data; apply appropriate mathematics; apply physics to the real world; understand how all natural objects, events and processes are connected and follow a basic set of concepts; understand how systems are compose of interrelated parts; understand laws of motion, energy, conservation of energy and motion; understand concepts of waves; electricity, magnetism, and matter.

COURSE OBJECTIVES

Upon completing this course students will:

1. Understand Newton's laws that predict the motion of most objects.
2. Know the laws of conservation of energy and momentum and how they provide a way to predict and describe the movement of objects.
3. Know that energy cannot be created or destroyed, although in many processes energy is transferred to the environment as heat.
4. Know that waves have characteristic properties that do not depend on the type of wave and use this as a basic for understanding the concept.
5. Know electric and magnetic phenomena and how they are related and their many practical applications.
6. Follow and design procedures, conduct experiments, gather data, construct graphs from data and draw conclusions based on data and/or graphs.
7. Use appropriate tools and technology to perform tests, collect data, analyze data, and display data.
8. Apply mathematics in context of activities.
9. Apply their physics understanding to real world problems through challenge projects.

SECTION II

COURSE CONTENT AND SCOPE

1. Newton's Laws, Energy, Momentum and Circular Motion
   - 1.1. Unbalanced forces change the speed and direction, and/or momentum of objects
   - 1.2. Newton's laws of motion can predict the effects of forces on objects
   - 1.3. Energy is transformed in systems such as falling objects
   - 1.4. Momentum is conserved in both elastic and inelastic collisions
   - 1.5. Circular motion requires a constant force acting towards the center of the circular path to maintain constant velocity
   - 1.6. Formulas and mathematics can be used to describe and explain laws of motion
2. Gravity, Momentum, Energy, and Motion

COURSE CONTENT AND SCOPE (CONTINUED)

- 2.1. Gravitation is a universal force; the force of gravity affects all objects near the surface of earth
- 2.2. Transformation of energy from one form to another
- 2.3. The laws of conservation of energy and momentum
- 2.4. Graphs which identify relationship between variables

3. Waves and Light
   - 3.1. How waves have energy and can transfer energy when they interact with matter
   - 3.2. Waves superimposing one on another, bend around corners, reflect off surfaces, absorbed by other materials, change direction
   - 3.3. Use mathematical model regarding wave speed, wavelength, and frequency
   - 3.4. Different types of waves, radio, electromagnetic, microwaves, radiant heat, visible light, ultraviolet radiation, x-rays and gamma rays
4. Electricity and Thermodynamics
   - 4.1. Total universe energy being constant
   - 4.2. Two kinds of electric charges
   - 4.3. Concept of currents
   - 4.4. Ohm’s Law
   - 4.5. Heat
5. Electricity and Magnetism
   - 5.1. Relationship between electricity and magnetism
   - 5.2. Sources of magnetic fields
   - 5.3. Electric forces
6. Probability and Atomic Particles
   - 6.1. Scientific explanations and models
   - 6.2. Scientific investigations and relationship with mathematics and technology.
   - 6.3. Measurement
   - 6.4. Graphs and equations
   - 6.5. Indirect measurement
   - 6.6. Patterns
   - 6.7. Model, plot and analyze radioactive decay

APPROPRIATE READINGS

Text, internet websites, periodicals which address the issues of the content and scope.

WRITING ASSIGNMENTS

As assigned by instructor

OUTSIDE ASSIGNMENTS

Apply classroom learning to real life physics related issues (research based upon analysis, data collection from appropriate sources).

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Students will construct and test hypotheses. Responses to tests, worksheets required critical thinking proficiency to succeed.

EVALUATION

Students will be evaluated through the use of worksheets, chapter and unit tests, supplemental writing assignments, classroom participation (individually and working cooperatively in a group), and attendance.

METHOD OF INSTRUCTION

The primary methods of instruction will include but not be limited to lectures, class discussions, small group assignments, cooperative learning, web based research, self-paced assignments.

TEXTS AND SUPPLIES

Active Physics, American Association of Physics Teachers, 2006

Teacher supplied supplemental materials needed for data collection, analysis.

PREPARED BY Maxine Sherard/John Sullivan DATE July, 1982

DATA REVISED BY Gary Gleckman DATE May 11, 2007

Instructors must meet all requirements stated in Policy 3100 (Student Rights, Responsibilities and Administrative Due Process), and the Attendance Policy set forth in the Continuing Education Catalog.

REFERENCES:

San Diego Community College District Policy 3100
California Community Colleges, Title 5, Section 55002
Continuing Education Catalog