Cerro Coso College

Course Outline of Record Report

10/07/2021

PHSC C111 : Physical Science Lecture

General Information

Author:	• Tech Support
Course Code (CB01) :	PHSC C111
Course Title (CB02) :	Physical Science Lecture
Department:	Science
Proposal Start:	Spring 2018
TOP Code (CB03) :	(1901.00) Physical Sciences, General
SAM Code (CB09) :	Non-Occupational
Distance Education Approved:	No
Course Control Number (CB00) :	No value
Curriculum Committee Approval Date:	10/14/2011
Board of Trustees Approval Date:	11/10/2011
External Review Approval Date:	12/15/2011
Course Description:	This course covers conceptual topics in physics and chemistry, with applications to the earth sciences and astronomy, for the non-science major. Topics such as motion, energy, electricity, magnetism, waves, atoms, chemistry and chemical reactions are covered. Not open to students who have completed PHSC 115.
Submission Type:	course integration into elumen No value
Author:	No value

Faculty Minimum Qualifications

Master Discipline Preferred:	• Astronomy • Chemistry • Earth Science • Physical Sciences
Alternate Master Discipline Preferred:	No value
Bachelors or Associates Discipline Preferred:	No value
Additional Bachelors or Associates Discipline Preferred:	No value

Course Development Options

Basic Skills Status (CB08)

Course is not a basic skills course.

Course Special Class Status (CB13)

Course is not a special class.

Grade Options

- Letter Grade Methods
- Pass/No Pass

Allowed Number of Retakes

Course Prior To College Level (CB21)

☐ Allow Students to Gain Credit by Exam/Challenge

Allowed Number of Retakes

0

Course Prior To College Level (CB21)

No value

Rationale For Credit By Exam/Challenge

No value

Retake Policy Description

Non-Repeatable Credit

☑ Allow Students To Audit Course

Course Support Course Status (CB26)

No value

Associated Programs

☑ Course is part of a program (CB24)

Associated Program	Award Type	Active
CC Liberal Arts: Mathematics & Science	A.A. Degree Major	Summer 2018 to Fall 2020
CSU General Education (CSU GE Breadth)	Certificate of Achievement	Fall 2020
Intersegmental General Education Transfer Curriculum Certificate of Achievement	Certificate of Achievement	Fall 2020
Liberal Arts: Mathematics & Science Associate in Arts Degree	A.A. Degree Major	Fall 2020
CSU General Education (CSU GE Breadth) (In Development)	Certificate of Achievement	Fall 2021
Intersegmental General Education Transfer Curriculum Certificate of Achievement (In Development)	Certificate of Achievement	Fall 2021

Transferability & Gen. Ed. Options

Course General Education Status (CB25)

No value

Transferability

Transferable to both UC and CSU

Transferability Status

Pending

Cerro Coso General Education Requirements	Categories	Status	Approval Date	Comparable Course
Area 1.2	Natural Science Physical Sciences	Pending	No value	No Comparable Course defined.

CSU General Education Certification	Categories	Status	Approval Date	Comparable Course
Area B.1	Scientific Inquiry & Quantitative Reasoning Physical Sciences	Pending	No value	No Comparable Course defined.

Intersegmental General Education Transfer Curriculum	Categories	Status	Approval Date	Comparable Course
Area 5.A	Physical & Biological Sciences Physical Science	Pending	No value	No Comparable Course defined.

Units and Hours

Summary

Minimum Credit Units (CB07)	3
Maximum Credit Units (CB06)	3
Total Course In-Class (Contact) Hours	54
Total Course Out-of-Class Hours	108
Total Student Learning Hours	162
Faculty Load	0

Credit / Non-Credit Options

Course Credit Status (CB04)

Credit - Degree Applicable

Course Non Credit Category (CB22)

Credit Course.

Non-Credit Characteristic

No Value

Course Classification Status (CB11)

Credit Course.

Funding Agency Category (CB23)

No value

Cooperative Work Experience Education Status (CB10)

Variable Credit Course

Weekly Student Hours

	In Class	Out of Classs
Lecture Hours	3	6

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54

Laboratory Hours	0	0
Activity Hours	0	0

Course In-Class (Contact) Hours	
Lecture	54
Laboratory	0
Activity	0
Total	54

Course Out-of-Class Hours	
Lecture	108
Laboratory	0
Activity	0
Total	108

Time Commitment Notes for Students

No value

Faculty Load

Extra Duties: 0

Faculty Load: 0

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Prerequisite

MATHC055 - Intermediate Algebra

Students entering PHSC C111 are required to solve problems involving mathematical operations such as ratios, square roots, surface areas related to radius, and solving for a single variable.

AND

Advisory

ENGLC070 - Introductory Composition

Reading - 1 Level Prior to Transfer
Content Review
Students entering PHSC C111 are expected to identify central points, both explicit and implied, of scientific periodical articles and textbooks, outline and summarize complex and technical scientific readings, interpret difficult and figurative language: academic discourse and scientific terminology , write lab reports in an accepted format. Students are also expected to answer essay questions in clear and error free prose based on readings from texts and scientific journals and also outline and summarize assigned readings texts and scientific journals.

The reading advisory level provides the student with the requisite skills to meet this expectation.
Writing - 2 Levels Prior to Transfer
Content Review
Students entering PHSC C111 are expected to identify central points, both explicit and implied, of scientific periodical articles and textbooks, outline and summarize complex and technical scientific readings, interpret difficult and figurative language: academic discourse and scientific terminology , write lab reports in an accepted format. Students are also expected to answer essay questions in clear and error free prose based on readings from texts and scientific journals and also outline and summarize assigned readings texts and scientific journals.
The writing advisory level provides the student with the requisite skills to meet this expectation.

Entrance Skills

Entrance Skills	Description
No value	No value

Limitations on Enrollment

Limitations on Enrollment	Description
No value	No value

Specifications

Methods of Instruction

Methods of Instruction	Demonstration
Rationale	No value
Methods of Instruction	Discussion
Rationale	No value
Methods of Instruction	In-class writing
Rationale	No value
Methods of Instruction	Lecture
Rationale	No value

Methods of Instruction	Outside reading
Rationale	No value
Methods of Instruction	Peer analysis, critique & feedback
Rationale	No value
Methods of Instruction	Presentations (by students)
Rationale	No value
Methods of Instruction	Problem Solving
Rationale	No value
Methods of Instruction	Written work
Rationale	No value
Methods of Instruction	Other
Rationale	Recitation

Assignments

A. Homework assignments from the relevant chapter, including participation in the recitation/discussion session. Example: Students must solve problems on distance, velocity and acceleration and participate in discussions distinguishing the relationship among these three terms. B. Assigned readings from the textbook and/or other sources. Example: Students must read the relevant chapter on forces and how to analyze the forces that a person parachuting to earth encounters. C. Research Paper/Presentation. Example: Students are required to present a paper on the chemicals found in their household and the benefits and dangers of each. D. Critical Analysis of course relevant topics that appear in the media. Example: Students are required to read two science-based (not popular media) articles on both sides of the climate change discussion and present a cogent synopsis, including the strengths and weaknesses of each paper.

Methods of Evaluation	Rationale
Tests	Exams and Quizzes evaluate the students' ability to apply techniques taught in class and apply these techniques in problem solving. Example: The first midterm exam requires students to conceptually solve equations relating to the motion of an object under the influence of gravity and air resistance.
Homework	Regular homework assignments reinforce material learned in class and evaluate the student's ability to learn outside the classroom. Example: A homework assignment covers the conceptual analysis of electric current in the household
Participation	

Participation in Problem Solving evaluates the student's ability to solve problems in a group environment. Example: Students participate in the analysis of the speed of sound

Equipment

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Hewitt, P. G. Suchocki, J., & Hewitt, L. A. .	Conceptual Physical Science. , 5th,	Addison-Wesley	2012	

Other Instructional Materials

No Value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

No value

CSLOs

Solve problems related to motion, momentum and energy using the appropriate theoretical concept. Expected SLO Performance: 70.0

Perform an analysis of thermodynamic concepts in order to solve problems in heat transfer and phase change. Expected SLO Performance: 70.0

Use the concepts of electromagnetism and wave theory to solve problems related to electricity, magnetism, waves and sound. Expected SLO Performance: 70.0

Solve problems involved in basic chemistry, chemical bonding, reactions and mixtures using the concepts of conservation of mass, bonding theory and atomic theory. Expected SLO Performance: 70.0

Analyze and utilize the scientific method and proper scientific formatting in problem solving. Expected SLO Performance: 70.0

Outline

Course Outline

A. Motion and Equilibrium
1 Aristotle On Motion
2 Galileo's Concept of Inertia
3 Mass—A Measure of Inertia
4 Net Force
5 The Equilibrium Rule
6 Support Force
7 Equilibrium Of Moving Things
24.
7 Equilibrium Of Moving Things
8 The Force of Friction
9 Speed and Velocity
a. Speed
b. Instantaneous speed
c. Average speed
d. Velocity
10 Acceleration
B. Newton's Laws of Motion
1. Newton's First Law Of Motion
2. Newton's Second Law of Motion
3. Forces and Interactions
4. Newton's Third Law of Motion
5. Vectors
6. Summary of Newton's Three Laws
C. Momentum and Energy
1. Momentum
2. Impulse
3. Impulse-Momentum Relationship
4. Conservation of Momentum
a. Collisions
5. Energy
a. Work
6. Power
7. Potential Energy
8. Kinetic Energy
a. Work-Energy Theorem
b. Kinetic Energy and Momentum Compared
9. Conservation of Energy
10. Machines
a. Efficiency
D. Thermal Energy and Thermodynamics
1. Thermal Energy
2. Temperature
3. Absolute Zero
4. Heat
5. Quantity of Heat
6. The Laws of Thermodynamics
7. Specific Heat Capacity
8. Thermal Expansion
a. Expansion of Water
E. Heat Transfer and Change of Phase
1. Conduction
2. Convection
3. Radiation
a. Emission of Radiant Energy
b. Absorption of Radiant Energy
c. Reflection of Radiant Energy
d. Cooling at Night by Radiation
4. Newton's Law Of Cooling
5. Heat Transfer and Change of Phase
6. Evaporation
7. Condensation
8. Boiling
9. Melting and Freezing
10. Energy and Change of Phase
F. Static and Curernt Electricity
1. Electric Force and Charge

a. Conservation of Charge
2. Coulomb's Law
a. Charge Polarization
3. Electric Field
4. Electric Potential
5. Voltage Sources
6. Electric Current
a. Direct Current and Alternating Current
7. Electrical Resistance
8. Ohm's Law
a. Electric Shock
9. Electric Circuits
a. Series Circuits
b. Parallel Circuits
c. Parallel Circuits and Overloading
d. Safety Fuses
10. Electric Power
G. Magnetism and Electromagnetic Induction
1. Magnetic Poles
2. Magnetic Fields
3. Magnetic Domains
4. Electric Currents and Magnetic Fields
a. Electromagnets
b. Superconducting Electromagnets
5. Magnetic Forces on Moving Charges
a. Magnetic Force on Current-Carrying Wires
b. Electric Meters
c. Electric Motors
6. Electromagnetic Induction
a. Faraday's Law
7. Generators and Alternating Current
8. Power Production
9. The Transformer—Boosting or Lowering Voltage
10. Field Induction
H. Waves and Sound
1. Vibrations and Waves
2. Wave Motion
a. Wave Speed
3. Transverse and Longitudinal Waves
4. Sound Waves
a. Speed of Sound
5. Reflection of Sound
6. Refraction of Sound
7. Forced Vibrations
8. Resonance
9. Interference
a. Beats
b. Standing Waves
10. Doppler Effect
11. Wave Barriers And Bow Waves
12. Shock Waves and the Sonic Boom
13. Musical Sounds
a. Musical Instruments
I. Light Waves
1. Electromagnetic Spectrum
2. Transparent and Opaque Materials
3. Color
a. Selective Reflection
b. Selective Transmission
c. Mixing Colored Lights
d. Mixing Colored Pigments
e. Why the Sky Is Blue
f. Why Sunsets Are Red
g. Why Clouds Are White
4. Diffraction
5. Interference
a. Interference Colors by Reflection from Thin Films

6. Polarization
J. Atoms and Periodic Table
1. The Elements
2. Atoms Are Ancient and Empty
3. Protons and Neutrons
4. Isotopes and Atomic Mass
a. Figuring Physical Science: Calculating Atomic Mass
5. The Periodic Table
6. Periods and Groups
K. Elements of Chemistry
1. Chemistry: The Central Science
2. The Submicroscopic World
3. Physical and Chemical Properties
4. Determining Physical and Chemical Changes
5. Elements to Compounds
6. Naming Compounds
7. Chemical Equations
a. Balancing Unbalanced Equations
L. Mixtures
1. Most Materials Are Mixtures
a. Mixtures Can Be Separated By Physical Means
2. The Chemist's Classification of Matter
3. Solutions
4. Purifying the Water We Drink
5. Desalination
6. Wastewater Treatment
a. Advanced Integrated Pond Systems
M. How Atoms Bond
1. Electron-Dot Structures
2. The Formation of Ions
a. Molecules Can Form Ions
3. Ionic Bonds
4. Covalent Bonds
5. Polar Covalent Bonds
6. Molecular Polarity
7. Metallic Bonds
a. We Should Conserve and Recycle Metals
N. Chemical Reaction
1. Reaction Rates
2. Catalysts
3. Energy and Chemical Reactions
a. An Exothermic Reaction Involves a Net Release of Energy
b. An Endothermic Reaction Involves a Net Absorption of Energy
4. Relative Masses of Atoms and Molecules
5. Molar Mass