



CourseID:	SCI 1A	Discipline:	SCI - Science
TOP:	1901.00 - Physical Sciences, Genera	CB21:	Y = Not Applicable
CC Approval:		Effective Date:	08/17/2015
BOT Approval:	06/02/2015	Degree/Transfer Status:	A = Transfer to UC, CSU
State Approval:		State ID:	CCC000456248
C-ID #:			

COURSE OUTLINE OF RECORD

Course Numbering:

1-99 Associate degree applicable, transferable	200-299 Non-degree, non-transferable
100-199 Associate degree applicable, non-transferable	300-399 Noncredit

I. CATALOG INFORMATION

CourseID: SCI 1A **Title:** Introductory Chemical and Physical Science **Effective Term:** Fall 2015

Discipline: SCI - Science

Catalog Description:

This course provides an investigation of basic principles of physics and chemistry including matter, physical and chemical properties, energy, motion, light, atomic structure, bonding, solutions and chemical reactions. The inter-dependence of chemistry and physics will be emphasized. This course is intended for non-science majors.

Pedagogical Course Cap: 35

Unit(s): 4

Weekly Lecture Hours: 3.00

Weekly Lab Hours: 3.00

Total Contact hours: 108.00

Grading Basis: Graded only (A-F) Pass/No Pass option Pass/No Pass only

Advisories: Eligibility for English 1A or 1AH

Prerequisites: Satisfaction of the CSU system General Education Quantitative Reasoning Requirement (CSU-GE Area B4)

Open entry/exit: Yes No

Repeatable Course: Yes No

Only courses that meet one of the three following criteria are repeatable, select appropriate area:

- Repeatability necessary to meet lower division major requirements at a CSU / UC (Music, Performing Arts must provide appropriate documentation)
- Intercollegiate athletics course
- Academic or Vocational competition course

Meets RC GE, Graduation, or Competency requirements: Yes No

Area A Area B Area B1 Area B2

Area C Area D Area D1 Area D2

Competence in writing Competence in oral communication

Competence in mathematics Computer Familiarity

Awareness of lifetime physical and mental wellness Physical Education

Included in a degree or certificate program: Yes No

Noncredit Category: Y-Not Applicable

II. COURSE CONTENT

Student Learning Outcomes:

Upon completion of this course, students will be able to:

1. Correctly analyze natural phenomena using the concepts of physics and chemistry.
2. Investigate physical phenomena using appropriate equipment and methods, make valid comparisons with theoretical predictions, and communicate those results.

Objectives:

In the process of completing this course, students will:

1. Describe the states of matter and associate phase changes.
2. Classify matter as elements, compounds, mixtures and describe properties of each.
3. Describe basic atomic structure including the fundamental particles and electron energy levels.
4. Explain the history and structure of the periodic table.
5. Explain and describe different ways atoms combine to form compounds.
6. Describe the motion of objects as related through the concepts of position, displacement, speed, velocity and acceleration.
7. Use Newton's Laws to predict and explain the motion of an object.
8. Discuss the type of energy present in a system and use conservation of energy to solve problems.
9. Explain the requirements for a complete circuit in terms of a model of electric charge.
10. Describe color perception based on the wave nature of light and its interactions. Laboratory Objectives
11. Understand fundamentals of taking and recording measurements including measuring length, area, volume, mass, density, significant figures, converting between units and scientific notation.
12. Practical applications to both the chemistry and physics lecture objectives.
13. Drawing conclusions between data and results including constructing graphs and identifying relationships between variables.

Lecture Content:

Measurement & Fundamental Properties

- Fundamentals of measuring length, area, volume and mass
- Density of materials
- The Scientific Method

Structure of Matter

- Atomic theory and basic atomic structure including the relationships between sub-atomic particles
- Periodic Table of Elements and periodic trends to atomic structure
- Characteristics of the atomic, ionic, and molecular classes of matter
- Phases of matter (solids, liquids, and gases) and the connections between the properties using a particle model
- Classification of matter--elements, substances, compounds, mixtures
- Basic characteristics of solutions, including acids and bases, and their relationship to the pH scale

Matter and its Changes

- Phases of matter and associated phase changes
- Chemical and physical changes, and classifying chemical and physical properties of matter
- Basic principles of chemical bonding and chemical reactivity
- Energy changes during chemical reactions

Motion, Forces and Energy

- Motion of objects as related through the concepts of position, displacement, speed, velocity, and acceleration
- Interpretation of distance vs. time and speed vs. time graphs
- The relationship between a net force and the motion of an object

Explain how action and reaction forces are related to each other

Lab Content:

Note: Laboratory exercises will accompany the majority of the above listed topics. Specific experiments will depend on the laboratory facilities available. Some of the common experiments are:

1. Lab Safety and quiz
2. Measurement
3. Position, displacement, velocity and acceleration\
4. Force and motion
5. Energy types and transformations
6. Buoyancy
7. Calorimetry
8. Atomic Structure
9. Matter Phases
10. Chemical and Physical reactions
11. Household chemical identification

III. METHODS OF DELIVERY

- | | |
|--|--|
| <input checked="" type="checkbox"/> Lecture | <input type="checkbox"/> Hybrid |
| <input checked="" type="checkbox"/> Laboratory | <input type="checkbox"/> Live Interactive Two-Way Presentation |
| <input type="checkbox"/> Online | |

IV. METHODS OF INSTRUCTION

May include but not limited to:

- | | | | |
|---|--|---|---|
| <input checked="" type="checkbox"/> Demonstrations | <input checked="" type="checkbox"/> Discussion | <input type="checkbox"/> Guest Presenters | <input type="checkbox"/> Role Playing |
| <input type="checkbox"/> Guided Practice | <input type="checkbox"/> Guided Research | <input type="checkbox"/> Guided Writing | <input checked="" type="checkbox"/> Media/Audiovisual |
| <input checked="" type="checkbox"/> Small Group | | | |
| <input checked="" type="checkbox"/> Other (Specify)
Computer simulations | | | |

V. SPECIAL FACILITIES

- Yes No

Science laboratory capable of running physics and chemistry experiments

VI. SAMPLE HOMEWORK/OUT OF CLASS ASSIGNMENTS

- | | |
|---|---|
| <input checked="" type="checkbox"/> Reading Assignments | <input type="checkbox"/> Reading Reports |
| <input checked="" type="checkbox"/> Writing Assignments | <input type="checkbox"/> Lab Reports |
| <input checked="" type="checkbox"/> Essays | <input checked="" type="checkbox"/> Problem Solving |
| <input type="checkbox"/> Journals | <input type="checkbox"/> Computational |
| <input checked="" type="checkbox"/> Projects | |
| <input type="checkbox"/> Research | |
| <input type="checkbox"/> Other | |

VII. METHODS OF EVALUATION/GRADING

Indicate percentage:

- | | |
|---|--|
| <input type="checkbox"/> Case Studies | <input type="checkbox"/> Presentations |
| <input type="checkbox"/> Computational Problem Solving | <input checked="" type="checkbox"/> 15 % Project(s) |
| <input type="checkbox"/> Field Work | <input type="checkbox"/> Quizzes |
| <input checked="" type="checkbox"/> 15 % Final Exam | <input type="checkbox"/> Research |
| <input type="checkbox"/> Laboratory Exams | <input type="checkbox"/> Skill Demonstration(s) |
| <input checked="" type="checkbox"/> 10 % Laboratory Reports | <input type="checkbox"/> Essays |
| <input checked="" type="checkbox"/> 35 % Exams | <input checked="" type="checkbox"/> 15 % Class Participation |
| <input type="checkbox"/> Non Computational Problem Solving | <input checked="" type="checkbox"/> 10 % Written assignments |
| <input type="checkbox"/> Other, please specify | |

VIII. RECOMMENDED MATERIALS OF INSTRUCTION

- Credit, degree applicable course, textbooks are college level
- Credit, non-degree applicable course
- A. Textbooks:
 1. **Recommended** Hewitt, Suchocki, and Hewitt. *Conceptual Physical Science*, 5th ed. New York: Addison-Wesley, 2010
- B. Materials Other than textbooks:
 1. **Supplemental** Laboratory procedures developed by instructors. Instructor Lab Manual, none, 2014
 2. **Recommended** Current journal articles from sources such as Scientific America and Nature.

IX. ATTACHED FILES

**X. ADVISORY/PREREQUISITE/COREQUISITE JUSTIFICATION CONTENT
CONTENT REVIEW FOR ALL COURSES IN ADDITION TO BASIC SKILLS COURSES**

REQUISITES	
Prerequisite -- NONCRSE A Non Course Requisite	
<p>CSU GE Quantitative Reasoning Requirement Any course satisfying the CSU GE Quantitative Reasoning Requirement will require the student to do the following</p> <ol style="list-style-type: none"> 1. Use mathematical formulas to model and analyze quantitative data. 2. Use arithmetic operations in non-trivial ways. 3. Work multi-step quantitative problems derived from word descriptions. 	<ol style="list-style-type: none"> 1. Students will be required to analyze experimental data gathered in laboratory exercises. 2. Students will be required to apply the concepts and laws of physical science to the solution of problems. 3. Students will be required as part of problem solutions to perform non-trivial arithmetic operations. 4. Students will be required to set up problems using dimensional analysis. 5. Students will be required to balance chemical equations. 6. Students will be required to determine solution concentrations. 7. Many of the problems given during the course will require the students to apply and algebraically manipulate mathematical formulas.
ESTABLISHING PREREQUISITES OR COREQUISITES	
<p>Every prerequisite or corequisite requires content review plus justification of at least one of the seven kinds below. Prerequisite courses in communication and math outside of their disciplines require justification through statistical evidence. Kinds of justification that may establish a prerequisite are listed below.</p>	
<p>Check one of the following that apply. Documentation may be attached.</p>	
<p><input type="checkbox"/> Significant statistical evidence indicates that the absence of the prerequisite course is related to unsatisfactory performance in the target course. Justification: Indicate how this is so.</p> <p><input type="checkbox"/> The health or safety of the students in this course requires the prerequisite. Justification: Indicate how this is so.</p> <p><input checked="" type="checkbox"/> The prerequisite course is part of a sequence of courses within or across a discipline.</p> <p><input type="checkbox"/> The prerequisite is required in order for the course to be accepted for transfer to the UC or CSU systems. Justification: Indicate how this is so.</p> <p><input type="checkbox"/> The prerequisite/corequisite is required by law or government regulations. Explain or cite regulation numbers:</p> <p><input type="checkbox"/> The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course. Justification: Indicate how this is so.</p> <p><input type="checkbox"/> The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course. Justification: Indicate how this is so.</p> <p><input type="checkbox"/> Three CSU/UC campuses require an equivalent prerequisite or corequisite for a course equivalent to the target course:</p>	

Justification:

Advisory -- ENGL 125 Writing Skills for College

Writing Skills (eligibility for English 125)
(as outcomes for English 252)

1. Writing complete English sentences and avoiding errors most of the time.
2. Using the conventions of English writing: capitalization, punctuation, spelling, etc.
3. Using verbs correctly in present, past, future, and present perfect tenses, and using the correct forms of common irregular verbs.
4. Expanding and developing basic sentence structure with appropriate modification.
5. Combining sentences using coordination, subordination, and phrases.
6. Expressing the writer's ideas in short personal papers utilizing the writing process in their development.

1. Correctly formulating answers to descriptive problems.
2. Drawing conclusions from experimental observations and writing them down in coherent sentences.
3. Correctly writing a lab report incorporating proper English usage.
4. Writing one or more papers.

Advisory -- ENGL 126 Reading Skills for College

Reading Skills (eligibility for English 126)
(as outcomes for English 262)

1. Using phonetic, structural, contextual, and dictionary skills to attack and understand words.
2. Applying word analysis skills to reading in context.
3. Using adequate basic functional vocabulary skills.
4. Using textbook study skills and outlining skills.
5. Using a full range of literal comprehension skills and basic analytical skills such as predicting, inferring, concluding, and evaluating.

1. Reading and comprehending a college level science textbook.
2. Reading and comprehending a laboratory procedure (including safety instructions).
3. Reading and comprehending problem solution examples.