



# COURSE OUTLINE

Outline Status: Outline Update (ECD 9746); 2009-2010

## Section I: BASIC COURSE INFORMATION

1. **COLLEGE:** L.A. SOUTHWEST COLLEGE
2. **SUBJECT:** PHYSICAL SCIENCE
3. **COURSE NUMBER:** 001
4. **COURSE TITLE:** PHYSICAL SCIENCE I
5. **UNITS:** 3
6. **CATALOG COURSE DESCRIPTION:**

Designed for the non-science major, this course provides an introduction to the fundamental principles of physics and chemistry. Elementary quantitative concepts are used to supplement the qualitative emphasis of this course.

7. **CLASS SCHEDULE COURSE DESCRIPTION:**

Laws governing our physical universe; how they help us understand our physical environment and modern technology.

8. **INITIAL COLLEGE APPROVAL DATE:** before 2000
9. **LAST UPDATE DATE:** 12/15/09
10. **CLASS HOURS:**

	Standard Hrs Per Week (based On 18 weeks)	Total Hs per Term (hrs per week x 18)	Units
Lecture:	3	54	3
Lab/Activity (w / homework):	0	0	0
Lab/Activity (w /o homework):	0	0	0
Totals:	Lecture: 3	Lecture: 54	Lecture: 3
	Lab: 0	Lab: 0	Lab: 0
	Total: 3	Total: 54	Total: 3
<i>Totals In Protocol:</i>	Lecture: 3	Lecture: 54	
	Lab: 0	Lab: 0	
	Total: 3	Total: 54	Total: 3

**11. PREREQUISITES, COREQUISITES, ADVISORIES ON RECOMMENDED PREPARATION, and LIMITATION ON ENROLLMENT:**

Note: The LACCD's *Policy on Prerequisites, Corequisites and Advisories* requires that the curriculum committee take a separate action verifying that a course's prerequisite, corequisite or advisory is an 'appropriate and rational measure of a student's readiness to enter the course or program' and that the prerequisite, corequisite or advisory meets the level of scrutiny delineated in the policy.

**PREREQUISITES: No**

	Subject	Number	Course Title	Units	Validation Approval Date

**COREQUISITES: No**

	Subject	Number	Course Title	Units	Validation Approval Date

**ADVISORIES: No**

	Subject	Number	Course Title	Units	Validation Approval Date

**12. OTHER LIMITATIONS ON ENROLLMENT:** (See Title 5, Section 58106 and Board Rule 8603 for policy on allowable limitations. Other appropriate statutory or regulatory requirements may also apply):

None
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## Section II: COURSE CONTENT AND OBJECTIVES

### 1. COURSE CONTENT AND OBJECTIVES:

COURSE CONTENT AND SCOPE - <b>Lecture:</b> Outline the topics included in the lecture portion of the course ( <i>Outline reflects course description, all topics covered in class</i> ).	Hours per topic	COURSE OBJECTIVES - <b>Lecture:</b> Upon successful completion of this course, the student will be able to..(Use action verbs - see <u>Bloom's Taxonomy</u> for 'action verbs requiring cognitive outcomes.')
<b>A. PHYSICS</b> 1. The Scientific Method a. How Scientists Study Nature b. The Solar System. c. Universal Gravitation.	5	1. Explain the Scientific Method and apply it to problem solving situations and scientific investigations.
2. Describing Motion a. Newton's Laws of Motion. b. Acceleration of Gravity. c. Force and Motion. d. Newton's Law of Gravitation. e. Solve elementary problems dealing with gravity, force and motion.	5	2. Explain Newton's three Laws of Motion and Newton's Law of Gravitation, and define the relationship between force and motion.
3. Energy a. Work and power. b. Energy - kinetic energy, potential energy and other forms of energy. c. Momentum. d. Solve elementary problems dealing with work, energy and momentum.	5	3. Describe the different forms of energy and explain energy transformations, conservation of energy, and momentum.
4. Matter and Energy a. Temperature and Heat. b. Fluids and their properties - density, pressure and buoyancy. c. Kinetic Theory of Matter - gases, liquids and solids. d. Changes in State - evaporation, boiling and melting. e. Thermodynamics - heat engines and how they work. f. Solve elementary problems dealing with the relations between energy and matter.	5	4. Using the kinetic theory of matter, define temperature, heat, pressure, and changes in state; and explain the First and Second Laws of Thermodynamics.
5. Electricity and Magnetism a. Electric Charge & Coulomb's Law b. Electricity and Matter 1)conductors, insulators, & superconductivity c. Electric Current 1)Ohm's Law, ampere, potential difference, & electric power d. Magnetism 1)magnets, magnetic fields, & electromagnets e. Using Magnetism (electric motors, generators, & transformers) f. Solve elementary problems in electricity.	5	5. Explain the relationship between electricity and magnetism, between electric charge and matter, and define electric current and magnetism and demonstrate how they are used.
6. Waves a. Wave Motion. 1) for longitudinal, transverse, Rayleigh waves b. Wave Behavior. 1) Doppler Effect c. Electromagnetic waves and Spectrum.	5	6. Describe the different types of waves and wave behavior and describe the Electromagnetic Spectrum.

d. Light. 1) refraction, reflection, interference, diffraction e. Solve elementary problems dealing with waves.		
7. The Nucleus and the Atom. a. Atom and Nucleus. 1) electron waves and orbits 2) Bohr Model of atom b. Radioactivity and radioactive decay. c. The Hydrogen Atom. d. Quantum Theory of the Atom. 1) Quantum numbers and Exclusion Principle	4	7. Describe the atom, the nucleus, electrons, nuclear structure, and the Quantum Theory.
<b>B. CHEMISTRY</b> 1. The Periodic Law & Classes of Matter a. Elements and Compounds. 1) compound names, formulas & equations b. The Periodic law and Periodic Table (groups & periods) c. Atomic Structure & Theory. 1) electron shells & subshells d. Chemical Activity and Types of Bonds. e. Metals and Nonmetals f. Solve elementary problems writing and balancing chemical equations.	5	8. Describe the classes of matter, explain atomic theory, and relate chemical activity to the Periodic Table.
2. Crystals, Ions, and Solutions a. Solids. 1) metallic bonds and molecular crystals 2) ionic vs. covalent crystals b. Solutions & Solubility 1) polar vs. non-polar liquids 2) Ions (in solution and dissociation) 3) Properties of water c. Acids and Bases. 1) pH scale and salts d. Solve elementary chemical problems involving acids and bases.	5	9. Define and distinguish between crystals, ions, acids, bases, and the pH scale.
3. Chemical Reactions a. Combustion and reactivity of oxygen b. Chemical Energy (exothermic vs. endothermic) c. Commonly Used Fuels. d. Reaction Rates. 1) temperature, concentration, surface area 2) role of catalysts and activation energy e. Oxidation and Reduction. f. Chemical equilibrium g. Electrolysis and electrochemical cells h. Solve elementary chemical problems involving the above concepts.	5	10. Define, distinguish, and give examples of exothermic and endothermic reactions and relate chemical energy to the stability of compounds.
4. Organic Chemistry a. Carbon Compounds. b. Structures of Organic Molecules. 1) structural formulas and isomers c. Organic Compounds. 1) carbon bonds, alkanes, and petroleum products d. Chemistry of Life. 1) carbohydrates, lipids, proteins, nucleic acids 2) hydrocarbon (saturated/unsaturated) and functional groups 3) soil nitrogen e. Photosynthesis	5	11. Describe the structure of organic compounds (carbohydrates, lipids, proteins, and nucleic acids), explain the process of photosynthesis, and relate functional groups to the formation and naming of organic compounds.

f. Solve elementary problems involving structural formulas and isomers.		
	Total:54	
	Total Hrs In Protocol:54	

**1. (cont'd) LAB:**

COURSE CONTENT AND SCOPE - <b>Lab:</b> Outline the topics included in the laboratory portion of the course ( <i>Outline reflects course description, all topics covered in class</i> ).	Hours per topic	COURSE OBJECTIVES - <b>Lab:</b> Upon successful completion of this course, the student will be able to..(Use action verbs - see <i>Bloom's Taxonomy</i> for 'action verbs requiring cognitive outcomes.')
	Total:0	
	Total Hrs In Protocol:0	

**1. (cont'd) SLO:**

The student will.. ( <b>outcome</b> )	As measured by the following method.. ( <b>assessment strategy</b> )	And, if applicable, scored by the following learning rubric. (provide attachment)	Results are examined to determine if the outcome is achieved. Include planned or actual assessment date. ( <b>results &amp; evaluation</b> )	Recommendations to improve teaching and learning. ( <b>modifications</b> )
1. The student will be able to demonstrate an understanding of basic concepts of physics.	1. Embedded questions in the final exam.		1. Fall 2010	
2. The student will be able to demonstrate an understanding of basic concepts of chemistry.	2. Embedded questions in the final exam.		2. Fall 2010	
3. The student will be able to demonstrate an understanding of the Scientific Method.	3. Embedded questions in the final exam.		3. Fall 2010	
4. The student will be able to demonstrate critical thinking.	4. Embedded questions in the final exam.		4. Fall 2010	

**2. REQUIRED TEXTS:**

Provide a representative list of textbooks and other required reading; include author, title and date of publication:

The Physical Universe, 12th Edition Krauskopf and Beiser. 2008
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**3. READING ASSIGNMENTS:**

Provide a representative list of textbooks and other required reading; include author, title and date of publication:

Weekly reading from the required text.

**4. WRITING ASSIGNMENTS:**

Writing assignments, as required by Title 5, in this course may include, but are not limited to the following:

Trip Report(s)

**5. REPRESENTATIVE OUTSIDE ASSIGNMENTS (HOMEWORK):**

Out of class assignments (Homework) may include, but are not limited to the following:

Homework problems sets. Field Trip(s).

**6. REPRESENTATIVE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING:**

Provide examples of assignments, as required by Title 5, that demonstrate critical thinking.

Exam questions that emphasize understanding, homework problem sets, and Field Trip Reports. An example of a critical thinking question/problem from homework: a man loads 1000 sacks of flour onto a truck in 30 minutes. Each sack weighs 20 kg. The truck is 1 meter above the cart. Calculate the power that the person develops lifting the sacks.

**7. METHODS OF EVALUATION:**

Title 5, section 55002 requires grades to be 'based on demonstrated proficiency in subject matter and the ability to demonstrate that proficiency, at least in part, by means of essays, or, in courses where the curriculum committee deems them to be appropriate, by problem solving exercises or skills demonstrations by students.' Methods of evaluation may include, but are not limited to the following (please note that evaluation should measure the outcomes detailed 'Course Objectives' at the beginning of Section II):

Exams and exercises involving multiple choice, essay, true/false and problem solving questions.

**8. METHODS OF INSTRUCTION:**

Please Check All That Apply

- Lecture
- Discussion

- Laboratory**
- Activity**
- Field Experience**
- Independent Study**
- Other (Please Explain)**

**9. SUPPLIES:**

List the supplies the student must provide.

A basic scientific calculator (non-graphing)

**10. COMPUTER COMPETENCY:**

If applicable, explain how computer competency is included in the course.

**11. INFORMATION COMPETENCY:**

If applicable, explain how information competency is included in the course.

**12. DIVERSITY:**

If applicable, explain how diversity (e.g., cultural, gender, etc.) is included in the course.

**13. SCANS COMPETENCIES:**

(required for all courses with vocational TOP Codes; recommended for all courses)

**SCANS** (Secretary's Commission on Necessary Skills) are skills the Department of Labor identified, in consultation with business and industry leaders, which reflect the skills necessary for success in the workplace. Check the appropriate boxes to indicate the areas where students will develop the following skills (please note that all SCANS competencies do not apply to all courses):

*RESOURCES*

- Managing Time:** Selecting relevant goal-related activities, ranking them in order of importance, allocating time to activities, and understanding, preparing and following schedules.

**Managing Money:** Using or preparing budgets, including making cost and revenue forecasts; keeping detailed records to track budget performance, and making appropriate adjustments.

**Managing Material and Facility Resources:** Acquiring, storing, allocating, and distributing materials, supplies, parts, equipment, space or final products in order to make the best use of them.

### *INTERPERSONAL*

**Participating as Member of a Team:** Working cooperatively with others and contributing to group's efforts with ideas, suggestions and effort.

**Teaching Others New Skills:** Helping others learn needed knowledge and skills.

**Exercising Leadership:** Communicating thoughts, feelings, and ideas to justify a position, encouraging, persuading, convincing or otherwise motivating an individual or group, including responsibly challenging existing procedures, policies or authority.

**Negotiating:** Working toward agreement that may involve exchanging specific resources or resolving divergent interests.

**Working with Cultural Diversity:** Working well with men and women and with people from a variety of ethnic, social, or educational backgrounds.

### *INFORMATION*

**Acquiring and Evaluating Information:** Identifying a need for data, obtaining the data from existing sources or creating them, and evaluating their relevance and accuracy.

**Organizing and Maintaining Information:** Organizing, processing and maintaining written or computerized records and other forms of information in a systematic fashion.

**Interpreting and Communicating Information:** Selecting and analyzing information and communicating the results of others, using oral, written, graphic, pictorial, or multimedia methods.

**Using Computers to Process Information:** Employing computers to acquire, organize, analyze and communicate information.

### *SYSTEMS*

**Understanding Systems:** Knowing how social, organizational and technological systems work and operating effectively with them.

**Monitoring and Correcting Performance:** Distinguishing trends, predicting impacts of actions on system operations, diagnosing deviations in the functioning of a system/organization, and taking necessary steps to correct performance.

- Improving or Designs Systems:** Making suggestions to modify existing systems in order to improve the quality of products or services and developing new or alternative systems.

### *TECHNOLOGY*

- Selecting Technology:** Judging which sets of procedures, tools or machines, including computers and their programs, will produce the desired results.
- Applying Technology to Tasks:** Understanding overall intent and proper procedures for setting up and operating machines, including computers and their reprogramming systems.
- Maintaining and Troubleshooting Equipment:** Preventing, identifying, or solving problems with equipment, including computers and other technologies.

### **Section III: RELATIONSHIP TO COLLEGE PROGRAMS**

**1. THIS COURSE WILL BE AN APPROVED REQUIREMENT FOR AN APPROVED ASSOCIATE DEGREE OR CERTIFICATE PROGRAM: No**

a. If yes, the course will be a portion of the 'approved program' listed on the State Chancellor's Inventory of Approved Programs (approved programs can be found on the State Chancellor's Office website at <https://misweb.cccco.edu/webproginv/prod/invmenu.htm>)

**2. GENERAL EDUCATION REQUIREMENTS FOR THE ASSOCIATE DEGREE STATUS:**

**a. Area Requested: A. Natural Science**

**Approval Date:**

If applicable, provide an explanation of how the course meets the General Education parameters for one of the five general education areas - Natural Sciences, Social and Behavioral Sciences, Humanities, Language and Rationality, Health and Physical Education -- contained in Board Rule 6201.14 -General Education Requirements.  
[http://marlin.laccd.edu/district/BoardRules\\_AdmRegs/boardrules.htm](http://marlin.laccd.edu/district/BoardRules_AdmRegs/boardrules.htm)

**b. Area Requested: None**

**Approval Date:**

If applicable, provide an explanation of how the course meets the General Education parameters for one of the five general education areas - Natural Sciences, Social and Behavioral Sciences, Humanities, Language and Rationality, Health and Physical Education -- contained in Board Rule 6201.14 -General Education Requirements.  
[http://marlin.laccd.edu/district/BoardRules\\_AdmRegs/boardrules.htm](http://marlin.laccd.edu/district/BoardRules_AdmRegs/boardrules.htm)

## Section IV: ARTICULATION INFORMATION

(Complete in consultation with College Articulation Officer)

### 1. TRANSFER STATUS:

a. <b>Transferable to the University of California: Yes</b>  b. <b>UC Approval Date:</b>	c. <b>Transferable to the California State University: Yes</b>  d. <b>College Approval Date:</b>
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### 2. GENERAL EDUCATION FOR TRANSFER:

<p><b><i>IGETC Certification</i></b></p> <p>a. <b>Area Requested: 5A : Physical Science</b>                  b. <b>Date Requested:</b>                  c. <b>IGETC Approval Date:</b></p> <p>If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in IGETC Certification Guidelines.</p> <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 10px;"></div>	<p><b><i>CSU Certification</i></b></p> <p>a. <b>Area Requested: B1 : Physical Science</b>                  b. <b>Date Requested:</b>                  c. <b>CSU Approval Date:</b></p> <p>If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in CSU Certification Guidelines.</p> <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 10px;"></div>
<p>a. <b>2nd Area Requested:</b>                  b. <b>Date Requested:</b>                  c. <b>IGETC Approval Date:</b></p> <p>If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in IGETC Certification Guidelines.</p> <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 10px;"></div>	<p>a. <b>2nd Area Requested:</b>                  b. <b>Date Requested:</b>                  c. <b>CSU Approval Date:</b></p> <p>If applicable, provide an explanation of how the course meets the appropriate General Education parameters, as defined in CSU Certification Guidelines.</p> <div style="border: 1px solid black; height: 20px; width: 100%; margin-top: 10px;"></div>

### 3. MAJOR REQUIREMENT FOR TRANSFER:

**Will this course be articulated to meet lower division major requirements?:**

**List college/university and the majors:**

**CAN NUMBER:**                      **CAN SEQUENCE #:**

CAN Approval -

Date requested:                      Date approved:

## Section V: SUPPLEMENTAL COURSE INFORMATION

1. **DEPT/DIVISION NAME:** Natural Sciences, Health and Physical Ed

2. **DEPT/DIVISION CODE:** 07

3. **SUBJECT CODE:** 741

4. **SUBJECT ABBREVIATION:** PHYS SC

5. **RECOMMENDED MINIMUM QUALIFICATION AREA:**

6. **ABBREVIATION FOR TRANSCRIPTS:** PHYSICAL SCIENCE 1

7. **DEGREE CREDIT:**

Indicate whether the course meet the 'standards for approval' for degree credit course set forth in Title 5, section 55002(a)(2), which requires the course to have a degree of intensity, difficulty, and vocabulary that the curriculum committee has determined to be at the college level: **Degree Applicable**

8. **GRADING METHOD:** LETTER GRADE

9. **REPETITIONS:** # of times repeated for credit: **0**

If this course is repeatable, explain how repetition of this course meets Title 5, section 55041(c)(2)(B):

10. **PRIOR TO TRANSFERABLE LEVEL:**

This course attribute applies to **English, Writing, ESL, reading and mathematics** courses ONLY. If applicable, indicate how many levels below the transferable level this course should be placed: **Not applicable**

11. **CREDIT BASIC SKILLS:**

Title 5, section 55000(j) defines basic skills as 'courses in reading, writing, computation, and English as a Second Language, which are designated as non-degree credit courses pursuant to Title 5, section 55002(b).': **No**

12. **CROSS REFERENCE:**

Is this course listed as equivalent in content to existing College/District courses in another discipline?: **No**

If Yes, list courses (documentation of cross-discipline agreement must be provided):

13. **COURSE SPECIFICALLY DESIGNED FOR STUDENTS W/ DISABILITIES:**

Title 5, section 56029 allows a course to be repeatable when continuing success of the students with disabilities is dependent on additional repetitions of a specific class. Is this course designated as an 'approved special class' for students with disabilities?: **No**

If yes, provide an explanation of how this course meets the requirements of Title 5, section 56029:

**14. COOPERATIVE EDUCATION STATUS:**

Title 5, section 55252 allows for two types of Cooperative Education: 1) General Work Experience Education -- i.e., supervised employment, which is intended to assist students in acquiring desirable work habits, attitudes and career awareness, which need not be related to the students' educational goals; or 2) Occupational Work Experience Education - - i.e., supervised employment, extending classroom based occupational learning at an on-the-job learning station, which is related to the students' educational or occupational goal. Is this course part of the college's approved cooperative work experience education program?: **No**

**15. COURSE CLASSIFICATION: Liberal Arts and Sciences**

Note: A course's Classification, TOP Code and SAM code must be aligned e.g., Courses with an 'Occupational' Course Classification must have an 'Occupational' TOP Code and a SAM Code of A, B, C, or D; courses that do not have an 'Occupational' Course Classification cannot have an Occupational TOP Code and must have an 'E' SAM Code. Courses coded as 'basic skills' in #11 should be coded 'Adult and Secondary Basic Skills.'

**16. TOP CODE - (6 digits XXXX.XX): **1901.00****

Course content should match discipline description in Taxonomy of Programs found at <http://ecd.laccd.edu/TaxonomyOfPrograms.doccurriculum.htm>

**17. SAM CODE (Student Accountability Model): **E****

**18. FUNDING AGENCY CODE:**

**19. STATE COURSE ID:**

**Section VI: APPROVAL STATUS****1. APPROVAL STATUS:**

		Approval Date Of	Board Date	Requested Effective Semester	Approved Effective Semester
a.	<input type="checkbox"/> <b>New Course</b>	<b>College:</b>	Board:	Effective Semester:	Effective Semester:
b.	<input type="checkbox"/> <b>Addition of Existing District Course</b>	<b>College:</b>	Board:	Effective Semester:	Effective Semester:
c.	<input type="checkbox"/> <b>Course Change*</b>	<b>College:</b>		Effective Semester:	Effective Semester:
d.	<input checked="" type="checkbox"/> <b>Outline Update</b>	<b>College: 12/15/09</b>			Effective Semester:
e.	<input type="checkbox"/> <b>New Course</b>	<b>College:</b>		Effective Semester:	Effective Semester:
f.	<input type="checkbox"/> <b>New Course</b>	<b>College:</b>	Board:	Effective Semester:	Effective Semester:

\* Changes to a course require the completion of a 'Course Change Request' form and approval by the college's Curriculum Committee. In some cases districtwide approval is also required; see, Administrative Regulation E-65, section 3(c) for details.

## Section VII: APPROVAL INFORMATION FOR NEW OR ADDED COURSES

(complete in consultation with Department Chair and the appropriate Academic Administrator)

1. **ORIGINATOR: Doose, Paul**

2. **DEPARTMENT: 07**

3. **IF THIS IS A NEW COURSE, INDICATE HOW THE COLLEGE PLANS TO MEET THE EXPENSE OF THIS COURSE:**

By additional funds. Describe:

By deleting courses from the college catalog and course database. List specific courses to be deleted:

By deleting sections of existing course. List courses and number of sections to be deleted:

FIRST YEAR:    SECOND YEAR:    THIRD YEAR:

By rotating sections of existing courses. List courses and number of sections to be rotated, as well as the semesters in which they will be offered:

4. **IMPACT**

**IMPACT -- Will this course directly impact other course offerings and/or associate degree or certificate programs on campus? No** (If yes, briefly explain how)

5. **METHOD OF SUPPORT**

**-- Indicate how the college plans to support the proposed course:**

A. Additional staff -- List additional staff needed:

B. Classroom -- List classroom type needed:

C. Equipment -- List new equipment needed and indicate funding source for any new equipment:

D. Supplies- List supplies and indicate dollar value:

E. Library/Learning Resources- The course initiator shall consult with the College Librarian and review the college library, book, periodical, and electronic resource collections relevant to this course. List additional titles and resources to be considered for purchase as funding permits:

No additional resources are necessary.

## CERTIFICATION AND RECOMMENDATION

- This course meets Title 5 requirements for Associate Degree applicable college credit towards an Associate Degree.
- This course meets Title 5 requirements but does not satisfy the requirements for an Associate Degree applicable course.

**We certify that the information and answers above properly represent this course.**

Originator	Date
Department/Cluster Chairperson	Date
Articulation Officer	Date
Librarian	Date
Dean (if applicable)	Date
Curriculum Committee Chairperson	Date
Academic Senate President	Date
Vice President, Academic Affairs	Date