Syllabus for
PSC 101—Principles of Physical Science Lecture
3 Credit Hours
Summer 2007

I. COURSE DESCRIPTION

An introduction and overview to the physical sciences of astronomy, physics, and chemistry. (Does not count toward major or minor in science. Not open to students with previous college-level course in physics.)
Prerequisite: Entry-level knowledge of high school algebra is recommended.
Corequisite: PSC 101 Lab.

II. COURSE GOALS

The University recognizes several general outcomes that arise from pursuing an education at ORU. Of these, the following three outcomes are expected as a result of taking this course:

A. **Problem Solving and Analysis**: The student will be able to recognize critical factors in problems and understand the process for solving problems using abstract mathematical means.

B. **Communication**: The student will learn to express ideas coherently and effectively in written form.

C. **Global Perspectives and Citizenship**: The student will develop and understand the world-wide concern and how they apply to the individual. They will discover those aspects of human behavior which create stress on the physical environment.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

A. Terminal Objectives
As a result of successfully completing this course, the student will be able to do the following:

1. Use algebra to solve word problems in the area of physics.
2. Predict physical and chemical behavior based on conceptual models.
3. Describe the structure, balance, and organization in the physical universe.
4. State the factors which govern physical and chemical threats to the environment and identify how they as individuals can help mitigate the problems.

B. Unit Objectives
As a result of successfully completing each unit of the course, Principles of Physical Science, the student will be able to do the following:

1. Unit I
   a. Define the chapter terms.
   b. Express the following in mathematical and conceptual terms: large or small numbers using power of 10 notation, the law of conservation of angular momentum, the acceleration of gravity, the metric system of

units, Newton's three laws of motion, conservation of linear momentum, the relationship between distance, velocity, and time for uniformly accelerated motion.

c. Express the following in mathematical and conceptual terms: gravitational potential energy, law of conservation of energy, law of universal gravitation, Fahrenheit, Celsius, and Kelvin temperature scales, the ideal gas law, Boyle's law, laws of thermodynamics, wave theory and how it applies to sound, light, and other forms of electromagnetic energy.

2. Unit II
   a. Define the chapter terms.
   b. Describe the following in conceptual terms: Rutherford's model of the atom, Bohr model of the atom, quantum theory, Paul exclusion principle, electron energy levels, law of definite proportions, periodic table, periodic law, chemical reactions, hydrocarbons, fats, proteins, carbohydrates, and nucleic acids. Describe the nature of the atomic nucleus and how it affects radioactivity, radioactive decay, as well as nuclear fission and fusion.

3. Unit III
   a. Define the chapter terms.
   b. Describe the following in conceptual terms: Heliocentric theory, Geocentric theory, Kepler's Laws of Planetary Motion, Special Relativity, and General Relativity.
   c. Describe the relative motion of the earth, moon, planets, comets, and asteroids.
   d. Describe the main features of each planet, including any peculiarities.
   e. Describe the types of data that can be gathered from stars and the theories for star formation based on these data.
   f. Discuss (or state, perhaps) the observations on which cosmology is based.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

Required Materials
Textbook
Shipman, J., J. Wilson and A. Todd, An Introduction to Physical Sciences 11th ed. New York: Houghton Mifflin Company, 2006.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures
   1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
   2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
   3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software. By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other

means.

4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
5. Students are to be in compliance with University, school, and departmental policies regarding ePortfolio requirements. Students should consult the ePortfolio handbooks for requirements regarding general education and the students' majors.
   a. The penalty for not submitting electronically or for incorrectly submitting an ePortfolio artifact is a zero for that assignment.
   b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. Course Policies and Procedures

1. Evaluation Procedures
   a. Assignments—Students need to read appropriate chapters before each lecture and perform practice problems to prepare for examinations.

   b. Testing and Grading

      (1.) The final course grade will be calculated as follows:

article review	=	5%
ePortfolio essay	=	5%
2 exams @ 30% each	=	60%
1 final exam @ 30%	=	30%
TOTAL		100%

      (2.) Two written assignments are required. The first one is a one page summary or critique of a published article about physical science. It must be typed and at least 250 words long. Include a photocopy of the article with your review. The second assignment is an ePortfolio essay that must be submitted through the ePortfolio website. Instructions about the essay will be distributed in class.

      (3.) The final course mark will be assigned as follows:

A	=	90 - 100.0 %
B	=	80 - 89.9 %
C	=	70 - 79.9 %
D	=	60 - 69.9 %
F	=	0 - 59.9 %

2. ePortfolio Requirements
   None.

3. Makeup
   Whether the student is present or absent, the student is responsible for all material and all assignments and for all exams announced by this syllabus.

VI. COURSE CALENDAR

SESSION	TOPIC	CHAPTER
1	Method, Metrics and Math &Velocity	1&3

2	Acceleration , Newton's Laws & Angular Motion	3&4
3	Work, Power, Energy, Gas & Pressure	4&5
4	Heat Energy & Wave Energy	6&7
5	**Exam No. 1 *ARTICLE REVIEW DUE***	
	Structure of the Atom	12
6	Periodic Chart, Physical States & Chemical Bonds	12&13
7	Chemical Reactions & Hydrocarbons	13&14
8	Functional Groups	14
9	Biochemical Compounds	14
10	**Exam No. 2 *ePorftfolio Essay Due***	
	Historical Astronomy & Earth-Moon System	16&21
11	Solar System: Inner Planets, Outer Planets	17
12	The Sun & Tools of Astronomy	18
13	Types of Stars and Star Life Cycle	18
14	Cosmology	19
15	**Final Exam**	

Course Inventory for ORU's Student Learning Outcomes

PSC 101 - Principles of Physical Science Lecture
Summer 2007

This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities		Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1	**Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A	Biblical knowledge			√	
1B	Sensitivity to the Holy Spirit				√
1C	Evangelistic capability				√
1D	Ethical behavior			√	
2	**Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A	Critical thinking	√			
2B	Information literacy			√	
2C	Global & historical perspectives		√		
2D	Aesthetic appreciation				√
2E	Intellectual creativity			√	
3	**Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A	Healthy lifestyle			√	
3B	Physically disciplined lifestyle				√
4	**Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A	Communication skills			√	
4B	Interpersonal skills				√
4C	Appreciation of cultural & linguistic differences				√
4D	Responsible citizenship			√	
4E	Leadership capacity				√

(Revised 1/15/04)