Syllabus for
PSC 101—Principles of Physical Science Lecture
3 Credit Hours
Fall 2008

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**: Students will be able to recognize critical factors in problems and understand the process for solving problems using abstract mathematical means.

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

C. **Global Perspectives and Citizenship**: Students will recognize world-wide concerns and how they apply to the individual.They will discover the types 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. The relationship of wave theory to music will be presented in terms of vibrating strings and resonating pipes. The Doppler Effect will be explained and related to applications in physics, meteorology, and astronomy.

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 effects 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. State the observations on which cosmology is based.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

Required Materials

Textbook

Shipman, J., Wilson, J., Todd, A., An Introduction to Physical Sciences 11th ed. NewYork: 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 is calculated as follows:

3 exams @ 20% each	=	60%
1 final exam @ 30%	=	30%
Personal Impact Paper	=	5%
Global Perspective Essay	=	5%
TOTAL		100%

      (2) The Personal Impact Paper (PIP) is a report about some aspect of physical science that affects you as an individual. You may choose a machine or form of technology that you wish to understand or some principle of chemistry or astronomy you find intriguing. The minimum length is 250 words and the report must be submitted through the web site, "Turnitin". The due date is the class following the first examination.
      (3) The Global Perspective Essay will be evaluated to be included in your e-Portfolio. It is due no later than the class period following the second examination.

(4) The final course mark is 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
   Complete "Evaluation of Scientific Discoveries" essay and submit under categories, Intellectually Alert and Global and Historical Perspectives.
3. Makeup Work
   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	Introduction	
2	Method, Metrics and Math	1
3	Linear Velocity and Acceleration	1
4	Newton's Laws of Motion	2
5	Angular Motion	3
6	Work, Power, Energy	4
7	Gas and Pressure	4
8	Heat Energy	5
9	Wave Energy	6
10	Exam No. 1	
11	Structure of the Atom ****PIP report due**	9
12	Atoms	11
13	Electron Configuration	11
14	Periodic Chart	11
15	Physical States, Chemical Bonds	12
16	Chemical Reactions	13
17	Hydrocarbons	14
18	Fats	14
19	Carbohydrates	14
20	Amino Acid and Proteins	14
21	Nucleic Acids	14
22	Exam No. 2	
23	Historical Astronomy	15
24	Earth-Moon System ***Global Perspective Essay Due***	17
25	Solar System-General	15
26	Inner Planets	15
27	Outer Planets	15
28	The Sun	18
29	Tools of Astronomy	18
30	Types of Stars and Star Life Cycle	18
31	Cosmology	18
32	Exam No. 3	
33	Special Relativity;	
34	General Relativity	

FINAL EXAM WEEK

Course Inventory for ORU's Student Learning Outcomes

PSC 101 - Principles of Physical Science Lecture
Fall 2008

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				√