Syllabus for
PSC 101—Principles of Physical Science Lecture
3 Credit Hours
Fall 2020

I. COURSE DESCRIPTION

An introduction and overview to the physical sciences of astronomy, physics, and chemistry. (Not applicable to 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 purpose of this course is to enable the student to be able to do the following:

A. Recognize critical factors in problems and understand the process for solving problems using abstract mathematical means.

B. Express ideas coherently and effectively in written form.

C. Recognize worldwide concerns and how they apply to him or her.

D. Discover the types of human behavior that 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 that govern physical and chemical threats to the environment and identify how he or she can help mitigate the problems.

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

1. Define the chapter terms.
2. 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.
3. 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; and 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.

Unit II:

1. Define the chapter terms.
2. Describe the following in conceptual terms: Rutherford's model of the atom, Bohr's model of the atom, quantum theory, Dalton's model of the atom, electron energy levels, law of definite proportions, periodic table, periodic law, chemical reactions. Describe the nature of the atomic nucleus and how it affects radioactivity, radioactive decay, Nuclear fission and fusion, Nuclear reactor, chain reaction, 4 elements of a reactor.

Unit III:

1. Define the chapter terms.
2. Describe the following in conceptual terms: Heliocentric theory, Geocentric theory, Kepler's 1st Law of Planetary Motion.
3. Describe the relative motion of the earth, moon, planets, comets, and asteroids.
4. Describe the main features of each planet, including any peculiarities.
5. Describe the types of data that can be gathered from stars and the theories for star formation based on these data.
6. State the observations on which cosmology is based.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

A. Required Materials

1. Textbooks

   Shipman, James T., Jerry D. Wilson D. Wilson, and C. A. Higgins Higgins. *An introduction to physical science*. Boston, MA: Brooks/Cole, Cengage Learning, 2013. ISBN = 9781133112020.

B. Optional Materials

1. Textbooks

   None

2. Other

   None

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. 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, electronic, video, multimedia, or computer software. Plagiarism and other forms of cheating involve both lying and stealing and are violations of ORU's Honor Code: "I will not cheat or plagiarize; I will do my own academic work and will not inappropriately collaborate with other students on assignments." Plagiarism is usually defined as copying someone else's ideas, words, or sentence structure and submitting them as one's own. Other forms of academic dishonesty include (but are not limited to) the following:
   a. Submitting another's work as one's own or colluding with someone else and submitting that work as though it were his or hers;

b. Failing to meet group assignment or project requirements while claiming to have done so;
c. Failing to cite sources used in a paper;
d. Creating results for experiments, observations, interviews, or projects that were not done;
e. Receiving or giving unauthorized help on assignments.

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. Penalties for any of the above infractions may result in disciplinary action including failing the assignment or failing the course or expulsion from the University, as determined by department and University guidelines.

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

B. School Policies and Procedures
1. Attendance at each class or laboratory is mandatory in the School of Engineering at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
2. Any student whose unexcused absences total 33% or more of the total number of class sessions receives an F for the course grade.

C. Course Policies and Procedures
1. Evaluation Procedures
   a. Testing and grading scores are calculated as follows:

4 Exams	200pts
Global Perspective Essay	15 pts
Notebook	10 pts
Attendance	10 pts
TOTAL	235 pts

   b. The final course grade is assigned as follows:
   A=90%
   B=80%
   C=70%
   D=60%
   F=59% and below

2. Whole Person Assessment Requirements
    a. Complete the "Evaluation of Scientific Discoveries" essay and submit under categories "Intellectually Alert and Global and Historical Perspectives."
    b. The Global Perspective Essay is evaluated and included in the Whole Person Assessment.
3. Other Policies and/or Procedures
    a. The Personal Impact Paper should focus on an aspect of physical science that affects each student personally. Each student may choose a form of technology that he or he wishes to understand or some intriguing scientific principle. The minimum length is 250 words, submitted through the Web site Turnitin and due after the first exam.
    b. Students need to read appropriate chapters before each lecture and perform practice problems to prepare for examinations.
    c. 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

Week	Topic	Chapter
1	Measurement	1
2	Motion	2
3	Force and Motion	3
4	Work and Energy	4
5	Review	
	Exam 1	
6	Temperature and Heat	5
7	Waves and Sound	6
8	Optics and Waves	7
9	Electricity and Magnetism	8
	Exam 2	
10	Atomic Physics	9
11	Nuclear Physics	10
12	The Chemical Elements	11
13	Chemical Bonding	12
14	Chemical Reactions	13
	Exam 3	
15	Place and Time	15
16	Sun	16
17	The Moon	17
18	The Universe; Planets, Stars, Galaxies, etc.	18
	FINAL (Exam 4)	

Course Inventory for ORU's Student Learning Outcomes

PSC 101—Principles of Physical Science Lecture
Fall 2020

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 literacy			X	
1B	Spiritual Formation			X	
2	**Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A	Critical thinking, creativity, and aesthetics	X			
2B	Global & historical perspectives		X		
2C	Information literacy		X		
2D	Knowledge of the physical and natural world	X			
3	**Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A	Healthy lifestyle				X
3B	Physically disciplined lifestyle				X
4	**Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A	Ethical reasoning and behavior		X		
4B	Intercultural knowledge and engagement			X	
4C	Written and Oral Communication	X			
4D	Leadership capacity			X	

(Revised 8/1/17)