

## **PHYSICS 105: PHYSICS AND SOCIETY**

Assessment Plan Spring 2008  
Revised in May 2016 by Rich Rand

### **The Course**

Physics 105, Physics and Society, is a survey of physics that is an alternative to the much larger Physics 102. It is designed for non-science students who prefer a small class with no multiple-choice assignments or tests. It is one of two courses that can be used to satisfy the science requirement of the College of Arts and Sciences Peace Studies minor, and it can be used to satisfy part of both the UNM Core and the College of Arts and Sciences science requirements. The course is offered every spring semester, and its enrollment is presently about 20 students.

Instruction is in lecture format with demonstration experiments and some in-class worksheets. Classroom discussion is strongly encouraged. Homework is assigned weekly, and collaboration with other students and with the instructor is encouraged. Tests are closed-book and are based on the homework and on a list of general questions distributed earlier. All work is graded by the instructor.

### **Course Goals**

The Department of Physics and Astronomy has set the following goals for Physics 105, *Physics and Society*.

1. Students will develop a general understanding of what science is and is not. Students will be able to recognize and distinguish between scientific and unscientific statements and arguments.
2. Students will develop a general understanding of the logical and quantitative analysis that physicists use in their quest to understand nature and of why they use that analysis.
3. Students will develop an ability to recognize the working of physics in the life of society and in their personal every-day life, and to recognize the basic physics principles involved.
4. Students will be able to communicate effectively about physics subjects.

### **Course Outcomes**

The Department of Physics and Astronomy has established the following outcomes as desired of students in Physics 105, Physics and Society.

Outcome 1: The Nature of Scientific Inquiry. Students will be able to articulate that physics, and all natural science is based on observations of nature that can be replicated and scrutinized by others. Students will be able to articulate that scientific theories are logical and thoroughly tested against observations and that those that contradict observations are discarded.

Relates to UNM/HED Area III-1: describe the process of scientific enquiry.

Outcome 2: Waves and Particles. Students will be able to articulate that there are two great intellectual models of the material universe—particles and waves. Students will be able to articulate how the particle model has led to deep understanding, not only of the motion of planets, but also of the mechanical, thermal, and optical properties of matter. Students will be able to articulate how the wave model has led to deep understanding of material waves (mechanical vibrations, sound, seismic waves, water waves), electromagnetic waves (radio waves, light, X-rays), and quantum waves.

Relates to UNM/HED Area III-2: solve problems scientifically.

Outcome 3: The Laws of Physics. Students will be able to identify the fundamental laws of physics—laws of mechanics, laws of thermodynamics, laws of electromagnetism, laws of quantum physics, and conservation laws. Students will be able to articulate when these laws are valid and when they are known to fail. Students will recognize the working of these laws in the life of society and in their every-day life.

Relates to UNM/HED Area III-2,5: solve problems scientifically; apply scientific thinking to real world problems.

Outcome 4: Analysis. Students will know how to apply the laws of physics and the rules of logic and simple mathematics to understand simple, realistic physical situations.

Relates to UNM/HED Area III-2,4,5: solve problems scientifically; apply quantitative analysis to scientific problems; apply scientific thinking to real world problems

Outcome 5: Communication. Students will be able to communicate effectively about physics subjects. Relates to UNM/HED Area III-3: communicate scientific information.

### **General Assessment Methodology**

Students will be given weekly assignments and will have a midterm test and a cumulative final examination. The assignments and tests will consist of essay-type questions that the instructor will grade in accord with a point that is explicitly part of each problem. Detailed answers will be provided for all homework and exam questions. Each of the desired outcomes will be assessed for all students on the basis of grades on a selection of at least three questions chosen by the instructor from the assignments, the midterm test, and the final examination. Students may also be required to do a final project, which may address an SLO in lieu of embedded questions. If so, it will be graded on a scale of 100.

### **Rubric: Individual Outcomes**

General Rubric. Each outcome will be assessed according to the following table.

Assessment	Score
Exemplary	90-100%
Satisfactory	50-80%
Unsatisfactory	0-49%

The “Score” will be the percentage of the total possible points that the student received on the collection of questions chosen to assess that particular outcome.

### **Assessment Schedule**

Data will be collected every time the course is offered.