

**Physics in Society**  
**PHY 100 Section \_\_**

**Name:**

**Email:**

**Phone:**

**Office:**

**Office Hours:**

**Department:** Department of Physics and Astronomy

**Class meeting time and place:**

**Course Description:**

This course covers the most interesting and important topics in physics of the twenty-first century. The course stresses conceptual understanding rather than mathematics with applications to current events. This course aims to give citizens an understanding of socially relevant physics such as medical imaging, alternative energy sources, radioactivity and its uses, nuclear power (and waste), nuclear weapons, ballistic missile defense, global warming, and natural disasters. Lecture and laboratory grades are computed into one grade and the same grade is recorded for both lecture and lab. Co-requisite: PHY 100L.

**Program Learning Outcomes:**

This is a general education core curriculum course and no specific program learning outcomes for this major are addressed in this course.

**General Education Core Curriculum Objectives/Outcomes:**

**Critical Thinking:** to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information, (CO 1)

**Communication Skills:** to include effective development, interpretation and expression of ideas through written, oral and visual communication, (CO 2)

**Empirical and Quantitative Skills:** to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions, (CO 3)

**Teamwork:** to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal, (CO 4)

**Student Learning Outcomes:**

By the end of the course, successful students will be able to:

1. Recognize that the world in which they exist can be described by a few natural laws, (SLO 1)
2. Describe natural phenomena in a conceptual manner rather than mathematically, (SLO 2)
3. Demonstrate skills developed in critical thinking, communication (written and visual), empirical and quantitative analysis, and teamwork, (SLO 3. Includes COs 1, 2, 3, 4)

**Text and Materials:**

The text for this course is Physics for Future Presidents: The Science Behind the Headlines by Richard A. Muller. PHY 100L, the Physics 100 Laboratory, is a corequisite and the lab manual is Interactive Physics - PhET Activities (produced by the Department of Physics and Astronomy and sold only in local bookstores).

### Course Requirements:

- ◆ Students are required to study the following chapters from the course text: 1-3 (Exam 1), 4-6 (Exam 2), 7-9 (Exam 3), 10-13 (Final Exam). (SLOs 1-2 are supported here.)
- ◆ Students will complete 11 laboratory exercises in the co-requisite lab and take a final exam over them at the end of the semester. (SLOs 1-3 are supported here [SLO 3 includes COs 1-4]).
- ◆ Homework assignments will be given eight times during the semester with two due prior to a major exam. These assignments will reinforce the material to be covered on each exam. Students must also participate in class either through the use of electronic clickers or through oral communication. (SLOs 1-3 are supported here.)
- ◆ There will be four major tests including the final (50 multiple choice questions per exam). Each student must provide a SCANTRON form number 882-E in order to take each test including the final. Students should become familiar with the policies on [cheating and plagiarism](#).

### The Global Warming and the Greenhouse Effect Project

This project is a specially designed experiment in the co-requisite lab that will allow students to demonstrate their mastery of **critical thinking skills, communication skills, empirical and quantitative skills, and teamwork skills**. Unlike other experiments performed during the semester, students will (1) design part of this experiment and will (2) be given two weeks to submit a formal, detailed written report of the experiment. They will make use of word documents and spreadsheets to complete the project. Prior to this project students will be doing experiments in the lab as members of teams of no less than three students and no more than five. They will have experienced **teamwork** practice for at least 6-8 weeks prior to this project. These earlier experiments will allow students to also hone their skills in **critical thinking, communication, and empirical and quantitative** analyses. The Global Warming and the Greenhouse Effect Project will allow students to demonstrate their **critical thinking skills** through the design of a simple experiment (inquiry) to determine the level of light absorption by various gases, through the collection of relevant data, and through the drawing of conclusions (evaluation and synthesis) from the results. They will do this during their regular scheduled lab time which is one hour and fifty minutes in length. The formal lab written report associated with this project will require each student to write results and draw conclusions (**written communications**) based on data tables and graphs (**visual communications**) produced in the exercise. Students' **empirical and quantitative skills** will be demonstrated by accuracy of measurements, manipulation and analysis of numerical data, needed calculations, error analyses and informed conclusions. This project involves an experiment where successful **teamwork** is required to set-up and conduct the experiment. Each team member must be willing to consider other's points of view and to work effectively with other members of the team to develop a proper experimental procedure to accomplish their goal. Data will be collected as a team. Each team member must complete the take-home part of this project independently of his/her teammates.

**Grading Policy:**

Each student's grade is based on an 800 point scale. These points come from four major exams worth 150 points each for a total of 600 points. The lab experiment average is worth 100 points. (20% of these points will come from **The Global Warming and the Greenhouse Effect Project.**) The lab final (given with the lecture final) is worth 100 points. This gives a total of 800 points possible in the course. (For each student, lecture and lab scores will be combined to determine an overall grade in PHY 100. Each student will then receive this overall grade for both lecture and lab.) The homework, class attendance and participation combine for a total of about 40 bonus points. The grading scale is

720-800 – A  
640-719 – B  
560-639 – C  
480-559 – D  
0-479 – F

**Attendance Policy:**

Students are expected to attend all lectures and all laboratory exercises. In general, absences can be excused for reasons including illness, family emergency or participation in certain university-sponsored events. Absences from exams and laboratory exercises are the only absences that require documentation. Bonus points are used to encourage class attendance.

**Academic Integrity (A-9.1)**

Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at [http://www.sfasu.edu/policies/academic\\_integrity.asp](http://www.sfasu.edu/policies/academic_integrity.asp)

**Withheld Grades Semester Grades Policy (A-54)**

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

## Course Calendar (Lecture)

All text material covered relates to SLOs 1-3. COs are individually noted.

<b>Week</b>	<b>Topics Covered</b>
Week 1	Course introduction <b>Lecture and assigned reading on critical thinking in physics (CO 1)</b> Key Energy Surprises <b>Instructor led discussion on critical thinking (CO 1)</b>
Week 2	Solar Power Homework Assignment 1 due
Week 3	The End of Oil <b>Lecture and instructor led discussion on written and visual communications (CO 2)</b>
Week 4	Sources of Energy (Review) Homework Assignment 2 due <b>Exam 1</b>
Week 5	Radioactivity in Medicine <b>Lecture and instructor led discussion on empirical and quantitative skills (CO 3)</b>
Week 6	Nuclear Weapons <b>Lecture and assigned reading on teamwork (CO 4)</b> <b>Instructor led discussion on teamwork (CO 4)</b> Homework Assignment 3 due
Week 7	Nuclear Power
Week 8	Applications of Radioactivity (Review) Homework Assignment 4 due <b>Exam 2</b>
Week 9	Space and Satellites
Week 10	Gravity Applications Homework Assignment 5 due
Week 11	Humans in Space
Week 12	Gravity and Space (Review) Homework Assignment 6 due <b>Exam 3</b>
Week 13	Climate Change <b>The Global Warming and the Greenhouse Effect Project begins in lab (SLO 3 and COs 1, 2, 3, 4)</b>
Week 14	Spying with Invisible Light Homework Assignment 7 due
Week 15	New Technologies Homework Assignment 8 due
Week 16	Final Exam Week – <b>Exam 4</b>

## Course Calendar (Laboratory):

### LABORATORY COURSE CALENDAR

All experiments relate to SLOs 1-3

Week Of	Experiment
Sept. 9	Lab 1 - Models of the Hydrogen Atom *
16	Lab 2 - Photoelectric Effect
23	Lab 3 - Nuclear Fission
30	Lab 4 - Alpha and Beta Decay
Oct. 7	Lab 5 - Radioactive Dating
14	Lab 6 - Simplified MRI
21	Lab 7 - Lasers
28	Lab 8 - Gravity Force Lab
Nov. 4	Lab 9 - Bending Light
11	Lab 10 - Blackbody Spectrum
18	Lab 11 – The Global Warming and the Greenhouse Effect ** (COs 1-4)
25	Continue working on Lab 11
Dec. 2	Lab Exam

\*Instruction on how to correctly collect and analyze scientific data will begin here and will continue throughout the laboratory experience. By the time students get to **The Global Warming and the Greenhouse Effect Project** they will have adequate development of **empirical and quantitative skills** to satisfactorily complete the project.

\*\*This experiment is more comprehensive than the others and will count as 20% of the lab experiment grade. It is designed to allow students to demonstrate their skills in **critical thinking, communication, empirical and quantitative** analyses, and **teamwork**. Students will have two weeks to complete a formal report using word processors and spreadsheets.

#### Students with Disabilities

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to <http://www.sfasu.edu/disabilityservices/>.