

Technical Physics I
PHY 241 Section ___

Name:

Email:

Phone:

Office:

Office Hours:

Department: Department of Physics and Astronomy

Class meeting time and place:

Course Description:

Presentation of the principles of mechanics and heat. Lecture and laboratory grades are computed into one grade, and the same grade is recorded for both lecture and lab. Corequisite: MTH 233, PHY 241L

Program Learning Outcomes:

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

1. Demonstrate the ability to apply Newton's Laws to the study of mechanical systems (PLO 1)
2. Describe and apply the Laws of Thermodynamics (PLO 2)
3. Solve mechanics and thermodynamics problems (PLO 3)

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. The student will demonstrate proficiency in the basic and applied fields of physics (SLO 1)
2. The student will apply physical principles to novel situations, both in the classroom and in laboratory settings (SLO 2)
3. The student will develop good experimental technique, including proper setup and care of equipment, conducting experiments and analyzing results in order to observe physical phenomena, assess experimental uncertainty, and make meaningful comparisons between experiment and theory (SLO 3)
4. The student will develop effective written and oral communication skills, especially the ability to transmit complex technical information in a clear and concise manner (SLO 4)
5. The student will appreciate the importance and practice of ethics in science (SLO 5)
6. Demonstrate skills developed in critical thinking, communication (written and visual), empirical and quantitative analysis, and teamwork. (SLO 6. Includes COs 1, 2, 3, 4)

Text and Materials:

Fundamentals of Physics 1st Ed.; Robert W. Gruebel (produced by the Department of Physics and Astronomy and sold only in local bookstores)

Supplement: Schaum's Outline College Physics

PHY 241 Lab Manual (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), 10-12 (Exam 4), 13-14 (Exam 5), all chapters (Final Exam).
- ◆ Students will complete 12 laboratory exercises in the co-requisite lab, keep a laboratory notebook over these exercises, and take a final exam over them at the end of the semester.
- ◆ Homework assignments (math oriented problems that involve learned physics principles) will be given to illustrate the principles covered in lecture. The assignments are from the text and supplement. They are due before the lecture over the homework material and involve approximately fifteen problems per chapter.
- ◆ There will be five exams plus a comprehensive final. Students should become familiar with the policies on cheating and plagiarism.

The Newton's 2nd Law 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**. It will involve the measurement of the acceleration of an object, obtaining results, and comparing them to theoretical results found using Newton's second law. Available equipment will include smart timers, dynamics carts, photogates, super pulleys, and masses. 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 write-up 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 1-4 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 Newton's 2nd Law Project** will allow students to demonstrate their **critical thinking skills** through the design of a simple experiment (inquiry) to verify Newton's second law, 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 two hours and fifty minutes in length. The formal lab write-up associated with this project will require each student to determine his/her own results and draw his/her own 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 for students 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 a 1000 point scale. These points come from six major exams. (Exams 1-5 are worth 100 points each, and the comprehensive final is worth 200 points.) The lab experiment average is worth 100 points. (25% of these points will come from **The Newton's 2nd Law Project.**) The comprehensive lab final and the lab notebook are worth 50 points each. Homework is worth 100 points. Additional credit (bonus points) for attendance to department seminars is worth a maximum of 30 points. This gives a total of 1000 points possible in the course. (For each student, lecture and lab scores will be combined to determine an overall grade in PHY 241. Each student will then receive this overall grade for both lecture and lab.) The grading scale is

900 -1000 – A
 800 < 900 – B
 650 < 800 – C
 550 < 650 – D
 0 <550 – F

Attendance Policy:

The class attendance is the responsibility of each student. All students are expected to attend class regularly. Poor attendance may affect your understanding of the materials and ultimately your grade in the course.

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

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): (SLO 5 is demonstrated throughout the course)

Chapters/Exams	Topics Covered	Times/Dates
Chapter 1	Course introduction Lecture and assigned reading on critical thinking in physics (CO 1) Homework problems due (SLOs 1, 2, 4; PLO 3) Scalar and Vector Quantities	(2/3 week)
Chapter 2	Instructor led discussion on critical thinking (CO 1) Homework problems due (SLOs 1, 2, 4; PLO 3) Fundamental Kinematics	(1 week)
Chapter 3	Lecture and instructor led discussion on written and visual communications (CO 2) Homework problems due (SLOs 1, 2, 4; PLOs 1, 3) Statics	(1 week)
Exam I	(Chapters 1, 2, 3) (SLO 1, 2, 4; PLO 1, 3)	Feb. 6
Chapter 4	Homework problems due (SLOs 1, 2, 4; PLOs 1, 3) Dynamics of a Particle	(1 week)
Chapter 5	Homework problems due (SLOs 1, 2, 4; PLOs 1, 3) Work and Energy	(1 week)
Chapter 6	Homework problems due (SLOs 1, 2, 4; PLOs 1, 3) Momentum and Impulse	(1 week)
Exam II	(Chapters 4, 5, 6) (SLO 1, 2, 4; PLOs 1, 3)	Feb. 20
Chapter 7	Homework problems due (SLOs 1, 2, 4; PLOs 1, 3) Rigid Bodies and Rotation	(1 week)
Chapter 8	Homework problems due (SLOs 1, 2, 4; PLOs 1, 3) Solids and Liquids The Newton's 2nd Law Project begins in lab (SLO 1-4, 6, PLOs 1, 3, and COs 1, 2, 3, 4)	(4/3 weeks)
Chapter 9	Homework problems due (SLOs 1, 2, 4; PLOs 1, 3) Solids and Fluids	(1 week)
Exam III	(Chapters 7, 8, 9) (SLOs 1, 2, 4; PLOs 1, 3)	Apr. 3
Chapter 10	Homework problems due (SLOs 1, 2, 4; PLOs 1, 3) Wave Motion and Sound	(4/3 weeks)
Chapter 11	Homework problems due (SLOs 1, 2, 4; PLOs 1-3) Zeroth Law of Thermodynamics	(1 week)
Chapter 12	Homework problems due (SLOs 1, 2, 4; PLOs 1-3) 1 st Law of Thermodynamics	(1 week)
Exam IV	(Chapters 10, 11, 12) (SLOs 1, 2, 4; PLOs 1-3)	Apr. 17
Chapter 13	Homework problems due (SLOs 1, 2, 4; PLOs 1-3) Zeroth Law of Thermodynamics	(2/3 week)
Chapter 14	Homework problems due (SLOs 1, 2, 4; PLOs 1-3) 1 st Law of Thermodynamics	(4/3 weeks)
Exam V	(Chapters 13, 14) (SLOs 1, 2, 4; PLOs 1-3)	May 1
Final Exam	(Comprehensive) (SLOs 1, 2, 4; PLOs 1-3)	May 6 (10:30-12:30)

Course Calendar (Laboratory):

Lab	Week of	Lab Experiments
1	Jan. 28th	Graphical Analysis of Experimental Data (CO 3)*
2	Feb. 4th	Motion in a Straight Line (CO 4)**
3	Feb. 11th	Motion Down an Inclined Plane
4	Feb. 18th	Addition of Vectors
5	Feb. 25th	Trajectory
6	Mar. 4th	The Newton's 2nd Law Project*** (COs 1-4)
7	Mar. 18th	Conservation of Energy
8	Mar. 25th	Conservation of Momentum
9	Apr. 1st	Centripetal Force
10	Apr. 8th	Archimedes' Principle
11	Apr. 15nd	Phase Changes in Water
12	Apr. 22nd	Thermal Expansion
--	Apr. 29th	Lab Final Exam in Room 317

*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 Newton's 2nd Law Project** they will have adequate development of **empirical and quantitative skills** to satisfactorily complete the project

Instruction and class discussion on teamwork skills will begin here. Teamwork skills will be practiced throughout the 12 laboratory experiments. By the time students get to **The Newton's 2nd Law Project they will have adequate instruction and development of **teamwork skills** to satisfactorily complete the project

***This experiment is more comprehensive than the others and will count as 25% 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/>.