

Mechanics and Heat I
PHY 131 Section ____

Name:**Email:****Phone:****Office:****Office Hours:****Department:** Department of Physics and Astronomy**Class meeting time and place:****Course Description:**

Study of the fundamental 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. Prerequisites: MTH 133 and 138, or permission from the department chair. Corequisite: PHY 131L

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. Demonstrate the ability to apply Newton's laws to the study of mechanical systems (**SLO 1**)
2. Describe the laws of thermodynamics (**SLO 2**)
3. Solve mechanics and thermodynamics problems using conservation principles (**SLO 3**)
4. Demonstrate skills developed in critical thinking, communication (written and visual), empirical and quantitative analysis, and teamwork. (**SLO 4**. Includes COs 1, 2, 3, 4)

Text and Materials:

College Physics 9th Edition by Serway/Faughn/Vuille

PHY 131 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 (Exam 2), 5 (Exam 3), 6 (Exam 4), 7-8 (Exam 5), 9-12 (Final Exam).
- ◆ Students will complete 12 laboratory exercises in the co-requisite lab 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 will be found on the WEB at <http://webassign.net>. They are due after the completion of the lectures on each chapter and involve approximately ten problems per chapter.
- ◆ There will be six major tests including the 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 an 800 point scale. These points come from six major exams. (Exam 1 is worth 100 points, Exams 2, 3, and 4 are worth 50 points each, Exam 5 is worth 75 points, and the Final Exam is worth 135 points.) The lab experiment average is worth 100 points. (25% of these points will come from **The Newton's 2nd Law Project**.) The lab final is worth 100 points. Homework is worth 115 points and class attendance is worth 25 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 131. Each student will then receive this overall grade for both lecture and lab.) The grading scale is

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

Attendance Policy:

The class attendance is the responsibility of each student. All students are expected to attend class regularly. The total of 25 points for class attendance is a part of the 800 possible points in the course. The student will be penalized one point for each missed class period. 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):

Chapters/Exams	Topics Covered	Times/Dates
Chapter 1	Course introduction Lecture and assigned reading on critical thinking in physics (CO 1) Conversion of Units Homework problems due (SLO 1)	(one half week)
Chapter 2	Instructor led discussion on critical thinking (CO 1) Motion in One-Dimension Homework problems due (SLO 1)	(one week)
Chapter 3	Lecture and instructor led discussion on written and visual communications (CO 2) Vectors and Two-Dimensional Motion Homework problems due (SLO 1)	(one week)
Exam I	(Chapters 1, 2, 3) (SLO 1)	Jan.31
Chapter 4	Lecture and assigned reading on teamwork (CO 4) Newton's Laws of Motion Instructor led discussion on teamwork (CO 4) Homework problems due (SLO 1)	(one and a half weeks)
Exam II	(Chapter 4) (SLO 1)	Feb. 14
Chapter 5	Energy Homework problems due (SLOs 1, 3)	(one and a half weeks)
Exam III	(Chapter 5) (SLOs 1, 3)	Feb. 28
Chapter 6	Momentum and Collisions The Newton's 2nd Law Project begins in lab (SLO 4 and COs 1, 2, 3, 4) Homework problems due (SLOs 1, 3)	(one and a half weeks)
Exam IV	(Chapter 6) (SLOs 1, 3)	Mar. 21
Chapter 7	Rotational Motion-Gravity Homework problems due (SLOs 1, 3)	(one week)
Chapter 8	Rotational Equilibrium Homework problems due (SLOs 1, 3)	(one week)
Exam V	(Chapters 7, 8) (SLOs 1, 3)	Apr. 11
Chapter 9	Solids and Fluids Homework problems due (SLOs 1, 3)	(one week)
Chapter 10	Thermal Physics Homework problems due (SLOs 1, 2, 3)	(one half week)
Chapter 11	Heat and Internal Energy Homework problems due (SLOs 1, 2, 3)	(one week)
Chapter 12	The Laws of Thermodynamics Homework problems due (SLOs 1, 2, 3)	(one half week)
Final Exam	(Chapters, 9, 10, 11, 12) (SLOs 1, 2, 3)	May. 9 (8:00-10:00 am)

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
3	Feb. 11th	Motion Down an Inclined Plane
4	Feb. 18th	Trajectory
5	Feb. 25th	Addition of Vectors
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. 8th	Centripetal Force
10	Apr. 15th	Archimedes' Principle
11	Apr. 22nd	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

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/>.

Variations Across Different Sections:

Only minor variations exist across different sections of PHY 131. Some sections:

- May give fewer and equally weighted exams.
- May differ in how much homework counts toward the overall grade.