PHYSICS 5A SPRING 2010

Instructors

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TEXT: Young & Geller. COLLEGE PHYSICS, (ISBN 0805390707), 8th edition, publisher Pearson Addison-Wesley, 2007. ***WITH MASTERING PHYSICS.***
Mastering Physics Course ID (This is required to register): **MPMAHAJAN11503**

Course description

PHYS 5A (*Area B1*). General Physics: Mechanics, Heat, Sound. Physics 5A-B sequence is a two-semester course in introductory physics in which fundamental concepts are emphasized including some physiological applications. These courses satisfy the requirement for pre-medical and pre-dental students and biology majors. *Note format change: Lecture 2 hours; Discussion/Lab 4 hours*.
Prerequisite: Recently completed three years of high school algebra and geometry; and a college course in algebra and trigonometry (MATH 9 recommended) for those having an inadequate mathematics background. **Units:** 4.0

Learning objectives

Your specific objective should be to understand and to apply the fundamental laws and results of Newtonian Mechanics, Thermodynamics, and Wave Mechanics. A broader and equally important goal is to develop an analytical, logical approach to problem solving, and to acquire certain level of intuition, or "feel" for understanding of physical phenomena.

Course format

LECTURES will be used to introduce new material. **Each week we will cover the most important material from one chapter.** During the **DISCUSSION/LAB SECTIONS** we will be discussing the topics in more depth, solving select problems and performing laboratory experiments. The select problems are listed in the class outline: we may not get through all problems, but you are responsible for the material covered by these problems. Attendance will not be taken in lecture and discussions, except for the first two weeks. ***You may not miss more than two experiments.*** Regular attendance and active participation in the class will help you understand the material and will not go unnoticed.

MIDTERMS will be taken during the Discussion sessions. Each midterm will contain 4-6 problems and last about one hour. The problems will be similar to those covered in the discussion sessions and homework. The dates are tentatively listed in the attached course outline, any changes will be announced at least a week ahead of time. All midterms are closed book, but

you will be provided with an equation sheet. You may use a scientific calculator (no PDA or phone based calculators allowed) but it may not have any additional information stored in it. ***No credit will be given for answers without work shown***. No make up exams except under documented, mitigating circumstances.

FINAL EXAM is scheduled for Wednesday, May 19 at 10:15 AM – 12:15PM. It is scheduled be held in Mendocino 1015; this will be confirmed near the end of the semester. The final is comprehensive and subject to the same rules as those for the midterms.

HOMEWORK. Problems will be assigned weekly and submitted via Mastering Physics. You will have one week to complete each homework assignment, the specific dates are listed in attached course outline. Detailed solutions to select problems will be posted (on the 2nd floor in the hallway near SQU 242) after the homework is completed. Homework will be automatically graded by Mastering Physics. The grading system can be found in Mastering Physics. We strongly suggest that you do the practice assignment, "Introduction to Mastering Physics," prior to starting the real homework so that you become familiar with the system.

LABORATORY. The labs will be performed during the discussion session. They are listed in the attached course outline. The write-up should be typed and include: the lab title, student's name, a short overview of physical effects studied in this lab, original experimental data (photocopy acceptable, but not retyped), sketches and graphs (if appropriate), data analysis including analytical formulas used for computation, and short conclusion. The graphs should be neatly drawn on graph paper or printed using a computer (Excel, etc). Some lab activities may not count as a "formal" lab and will not require a formal report, but participation is still required. Reports are due at the beginning of the Discussion session one week after the lab is completed.

LAB GRADING PROCESS. Each lab counts as 10 points. If the student completes the data collection then he/she earns 5 points (10 points for those experiments without write-ups). Participation points may be subtracted for inadequate participation, improper use of equipment, or unsafe laboratory practices. The data analysis and written conclusions make up the remaining 5 points. The following items will be critically evaluated in your report: a) use of the correct units, b) graphs and tables, c) calculations, d) use of appropriate formulas, e) understanding of physics concepts, f) reasonable use of significant figures.

We reserve the right to ask a student questions on his or her report in order to properly grade his/her work. You are required to look at your errors and my corrections. Recurring mistakes will be handled with increasing severity.

A passing grade in the laboratory is necessary to pass the course.

Grading system

Your final grade will be calculated based on the following breakdown:

Midterms	45%
Final exam	30%
Lab	15%
Homework	10%
Total	100%

We guarantee the following grades: A = >85%, B = 75% - 85%, C = 65% - 75%, D = 55% - 65%. Depending on the distribution, these ranges may lower by couple of percent points.

Please come to office hours prepared with specific questions on your homework or the course. In order to assess your understanding of physics, we reserve the right to ask you to describe and explain your course of actions during the course of experiment or problem solving session. The questions will be designed to lead to a conclusion that will aid you in your attempts to understand of physics.

MATERIALS: A simple scientific pocket calculator is sufficient for homework, labs, and exams. No books will be loaned to students by the teacher. A copy of the textbook is available in the Resource Center in the library.

ADD/DROP POLICY. Physics 5A is in extremely high demand. As a result, **failure to attend two discussions in the first two weeks will result in administrative drop** to maximize enrollment. Adds will be made only if there is a vacant spot in the course; we can not over-enroll this course due to space and safety considerations.

COMMUNICATIONS. We will use Mastering Physics' mailing list to distribute notes, homework assignments, and upcoming lab descriptions. It's your responsibility to print all relevant materials Use your Sac State account to communicate with me. Generic email providers will often block attachments.

COURSE OUTLINE

Week of Monday	Lecture	DL
Week 1 January 25	Chapter 1. Models, Measurements and Vectors.	Problems: 1.3, 1.4, 1.11, 1.12, 1.18, 1.19, 1.21, 1.35, 1.37 (modify this problem), 1.38, 1.40c, 1.41d, 1.43, 1.45, 1.50, 1.64, 1.62. **No Lab** HW #1: 1.2, 1.5, 1.13, 1.16, 1.40, 1.44.
Week 2 February 1	Chapter 2. Motion Along a Straight Line.	Problems: 2.1, 2.3, 2.6, 2.7, 2.8, 2.19,2.12, 2,14, 2.16, 2.18, 2.29, 2.22, 2.26 , 2,80, 2.28, 2.35, 2.29, 2.30, 2.36, 2.49, 2.51, 2.57, 2.59, 2.53, 2.75, 2.81. Example 2.3. **Lab: Motion with constant velocity and constant acceleration on an incline**; **Basketball bounce.** HW#2: 2.2, 2.5, 2.11, 2.17, 2.19, 2.25, 2.33, 2.27, 2.32, 2.34.
Week 3 February 8	Chapter 3. Motion in a Plane.	Problems: Remaining problems from Ch.2, 3.1, 3.7, 3.9, 3.11, 3.13, 3.15, 3.21, 3.41. **Lab: Projectile motion** HW#3: 2.48, 2.50, 2.56, 3.2, 3.8, 3.10, 3.14, 3.16, 3.20.
Week 4 February 15	Chapter 4. Newton's Laws of Motion.	***Midterm 1, CH. 1-3*** Problems: 4.1, 4.3, 4.5, 4.9, 4.21, 4.23, 4.25, 4.27, 4.31, 4.35, 4.36, 4.39, 4.43, 4.44, 4.47. **No Lab** **Campus-wide furlough day February 15;** **One DL is cancelled.** HW#4: 4.2, 4.4, 4.6, 4.8, 4.12, 4.20, 4.22, 4.24, 4.28, 4.33, 4.34.
Week 5 February 22	Chapter 5. Application of Newton's Laws.	Problems: remaining problems from Ch.4, 5.3, 5.5, 5.9, 5.11, 5.13, 5.15, 5.17, 5.23, 5.31, 5.33, 5.35, 5.41, 5.43, 5.45, 5.47, 5.51, 5.61, 5.77. **Lab: Forces in equilibrium.** HW#5: 5.4, 5.28, 5.34, 5.36, 5.42, 5.44, 5.48.
Week 6 March 1	Chapter 6. Circular Motion and Gravitation.	Problems: 3.31, 3.35, 3.33, 3.37, 6.1, 6.5, 6.7, 6.9, 6.11, 6.17, 6.22, 6.24, 6.43, 6.37. **No Lab.** **Designated furlough day March 4.** **One DL is cancelled** HW#6: 3.34, 3.36, 6.2, 6.4, 6.10, 6.12, 6.16, 6.20, 6.26, 6.34.
Week 7 March 8	Chapter 7. Work and Energy.	***Midterm 2, CH. 4-6*** Problems: 7.3, 7.5, 7.9, 7.11, 7.13, 7.17, 7.21, 7.23, 7.19, 7.25, 7.27, 7.37, 7.45, 7.48, 7.53, 7.55, 7.59. **No Lab.** HW#7: 7.2, 7.4, 7.6, 7.12, 7.22, 7.26, 7.30, 7.34, 7.42, 7.44, 7.52, 7.56.
Week 8 March 15	Chapter 8. Momentum.	Problems: 8.11, 8.13, 8,17, 8,21, 8.25, 8.31, 8.29, 8.61, 8.37, 8.39, 8.45, 8.51, 8.59. **Lab: Work-Energy Theorem** HW#8: 8.8, 8.10, 8.12, 8.20, 8.22, 8.28, 8.38, 8.46.

Week 9 March 22	Chapter 9. Rotational Motion.	Problems: 9.17, 9.26b, 9.25, 9.33, 9.35, 9.42, 9.43, 9.46, 9.50, 9.52. **Lab: Linear momentum conservation law (2-puck collision).** HW#9: 9.8, 9.14, 9.26, 9.34, 9.38.
Week 10 March 29	**Spring break.** **No classes.**	**Spring break.** **No classes.**
Week 11 April 5	Chapter 10. Dynamics of Rotational Motion	***Midterm 3, CH. 7-8.*** Problems: 10.1, 10.3, 10.7, 10.11, 10.23, 10.22, 10.29, 10.35, 10.46. **No Lab.** HW#10: 10.2, 10.4, 10.22, 10.28, 10.36.
Week 12 April 12	Chapter 11. Elasticity and Periodic Motion Chapter 12 . Mechanical Waves and Sound	Problems: 11.1, 11.17, 11.25, 11.27, 11.29, 11.35, 11.37, 11.45, 11,51, 12.3, 12.33, 12.55. **Lab: Angular momentum conservation law (demo), race of cans.** HW#11: 11.2, 11.18, 11.24, 11.26, 11.28, 11.36, 11.44, 12.4.
Week 13 April 19	Chapter 13. Fluid Mechanics	***Midterm 4, CH. 9-11.*** Problems: 13.5a, 13.27, 13.29, 13.31, 13.33, 13.34, 13.28, 13.43, 13.47, 13.49, 13.55, 13.61, 13.66. **No Lab** HW#12: 13.6, 13.26, 13.32, 13.48, 13.50, 13.52, 13.42, 13.44.
Week 14 April 26	Chapter 14. Temperature and Heat	Problems: 14.3, 14.1, 14.7, 14.15, 14.23, 14.27, 14.34, 14.37, 14.43, 14.45. **Lab: Buoyancy force** HW#13: 14.2, 14. 8, 14.18, 14.22, 14.35, 14.38, 14.42, 14.44.
Week 15 May 3	Chapter 15. Thermal Properties of Matter	Problems: 15.3, 15.7, 15.12, 15.27, 15.32, 15.36, 15.37, 15.39, 15.43, 15.45, 15.49, 15.57, 15.79. **Lab: Ideal gas: computer simulation** HW#14: 15.2, 15.4, 15.9, 15.38, 15.40, 15.44, 15.48, 15.50, 15.52, 15.32.
Week 16 May 10	Chapter 16. The Second Law of Thermodynamics	Problems: 16.5, 16.13, 16.15, 16.17, 16.21, 16.29. **Review session.**