Instructor: Dr. William Hubbard  
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Course Description:
A calculus-based introduction to classical mechanics. Space and time; straight-line kinematics; motion in a plane; forces and equilibrium; basis of Newton's Laws; particle dynamics; universal gravitation; collisions and conservation laws; work and potential energy; relativistic kinematics and dynamics; vibrational motion; conservative forces; inertial and noninertial frames, central-force motions; rigid bodies; rotational dynamics; and fluids are studied.

Prerequisites
First semester calculus (Math 3A or equivalent) is a mandatory prerequisite for PHYSICS 4A. YOU MUST HAVE COMPLETED THE PREREQUISITE PRIOR TO THIS COURSE WITH A GRADE OF C (OR CR) OR BETTER. If you have not satisfied the prerequisite requirement you may be denied credit for the course even if you pass. Additionally, UC and CSU may not accept transfer credit if the prerequisite is not satisfied.

IF YOU HAVE NOT SATISFIED THE PREREQUISITE REQUIREMENT YOU MAY NOT TAKE THE COURSE.

If you took the prerequisite classes a long time ago and feel that you are a bit “rusty”, I suggest that you find some time early in the semester to review and sharpen your skills.

Required Materials
Scientific calculator with trigonometric functions.
Lab Notebook: It must be a bound (not spiral), quadrille-ruled notebook approximately 8½ x 11 inches. (Suitable notebooks are available in the bookstore.) YOU MUST HAVE YOUR NOTEBOOK WITH YOU AT EVERY LAB AND AT THE LAB EXAM.

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Please read this syllabus carefully. You are responsible to know its contents. “Ignorance of the law is no excuse.”
Course Grade

- Exams (4 @ 10% each) --------------- 40%
- Final Exam ------------------------ 20%
- Quizzes & Homework ------------- 20%
- Laboratory ------------------------ 20%

Your grade will be based entirely on your performance in the areas indicated above. All of the exams will count. (I.e., I will not drop the lowest grade.) There will be no “extra credit” assignments or opportunities.

Exams may include questions related to the Lab.

The final exam is a comprehensive exam covering all of the material in the course. You must pass the final exam in order to receive a grade of C; you must make a C or better on the final exam to receive a grade of A or B.

This is a difficult course and we are required to cover a lot of material. While I applaud your involvement in extracurricular activities such as campus organizations, such participation is not an excuse for poor performance. You are responsible for adjusting your schedule of commitments so that you do not overextend yourself at the expense of your performance in this course. Additionally, while I understand that for some students it is necessary to work while attending college, I cannot make exceptions to the course requirements to accommodate your work schedule.

As a rule-of-thumb a college course requires three hours of out-of-class study every week for each unit of credit. That means that a 4-unit course typically requires 12 hours of study each week in addition to the 3 hours of class and 3 hours of lab. Many students find physics 4A harder than most courses so I strongly recommend allowing yourself even more time than this. Every semester I have a few students who discover about the middle of the semester that they have enrolled in too many courses. Now is the time to think about your load, not after you are doing poorly in every class. How would you handle the situation should you have an exam in every course you are taking in the same week? It happens!

Saddleback College has a responsibility to maintain certain standards in order for its courses to be accepted by the state universities. These standards are constantly under review by the universities. The only reason that you have the opportunity to take courses here for transfer to the university-system schools is because Saddleback has maintained these standards in the past. We here at Saddleback are committed to continuing to maintain these standards so that future generations of students can have the same opportunity currently afforded to you.

Homework Policy

Physics is learned by doing the homework. Trying to learn physics without doing the homework is like trying to learn to play tennis by listening to lectures and reading textbooks. It does not work. You can’t learn to play tennis without picking up your racket and going out on the court – and you can’t learn physics without picking up your pencil and doing the homework. The homework will require several hours per week. Plan your schedule accordingly!
Homework assignments are due as indicated in the attached schedule. No credit will be given for homework that is not turned in on time. A quiz will typically be given at the beginning of class on the day homework is due. It will be very closely based on one of the homework problems. Be sure that you understand all of the homework problems. Be in class on time; quizzes cannot be made up – no exceptions.

**Cheating Policy**

Students caught cheating on an exam, a quiz or a lab assignment will be subject to the college policy. The student should read the Student Handbook and/or the schedule of classes for a description of this policy.

**Attendance Policy:**

Class attendance is vital for several reasons:

- We will occasionally cover material in class that is not in the text. This material will be covered in the exams and quizzes.
- We will see movies, that contain material not covered in the text, and this material will be covered in the exams and quizzes. In general, due to non-availability of facilities, movies cannot be repeated.
- We will occasionally have a “pop quiz” which will count toward your final grade and which cannot be made up.

Class attendance will be recorded as required by college regulations and state law. Any student missing 8 or more hours of instruction or laboratory (combined total) is subject to being dropped from the class. Any student missing 14 consecutive hours of instruction or lab without notifying me of the circumstances will be dropped. If you come in after I have taken roll, be sure to let me know so I can count you as present. If you fail to do this you are likely to be counted absent.

Students coming to class or lab late disrupt the class and often miss important announcements. If you are late it will count toward lecture or lab hours missed. If tardiness becomes a problem, I will lock the classroom and/or lab doors 1 minute after the appointed starting time for the class or lab.

Classes and Labs are scheduled to run for 1 hour 15 minutes and 2 hours 45 minutes respectively. While occasionally you may finish your lab earlier than that, don’t count on it. Do not schedule other activities that require you to rush through the lab in order to finish early.

If you miss an announcement because you were tardy or absent, it is your responsibility to find out about it. Do not expect me to repeat lecture material because you were absent or late.

**Make-up Exams**

Makeup exams are given only for extreme circumstances. Proof of excused absence will be required, e.g., doctors note, police report of accident. The makeup exams are harder (and different) from the normal exam. Pop quizzes can not be made up – no exceptions.
**Students with Disabilities**

If you have specific disabilities and require accommodations, you must let me know during the first week of the semester so that your needs may be appropriately met. You will need to provide documentation of your disability to the Special Services Office in the Student Services Center, Room 113.

**Lab policy**

No student who is not properly enrolled in the class will be permitted to attend Lab sessions – no exceptions.

This semester we will perform several lab assignments designed to familiarize the student with laboratory techniques. Laboratory techniques include not only proper experimental procedures but also proper documentation and write-ups of the laboratory work. The student is responsible for performing all labs listed in the attached Course Calendar. Missed labs cannot be made up. Lab work for every lab must be documented in the Lab Notebook. A Formal Write-up for one of the labs shall be completed and turned in (on the dates indicated) in the Course Outline. (You will receive an instruction sheet.)

If you forget to bring your lab notebook, your grade for that lab will be reduced significantly – no exceptions.

In this lab we will attempt to simulate the environment of a real research laboratory. This will be reflected in the Lab Notebook policy (see section on Lab Notebook and Lab Notebook Instructions) as well as your performance in the lab. You will be graded (in part) on my evaluation of your performance (experimental techniques and creativity), your productivity (how much of the lab do you finish in the allotted time) and your professionalism (your ability to interact in a positive fashion with your lab partner(s) and other colleagues).

**Lab Instruction Sheets**

Most Lab Instruction Sheets will be available on the Physics Web Page, www.saddleback.edu/div/mse/phys. Be sure you get the instruction sheet for this section of the course. (Other instructors may use different instruction sheets.) Some labs may not have instruction sheets available on the web page. In this case, instruction sheets will be provided to you before the lab.

**Laboratory Attendance Policy**

Attendance in the laboratory is mandatory. If you miss a lab you will receive a zero for your Lab Notebook for that lab. In addition, if you miss more than one lab, your lab grade will be reduced by 10 points for each additional lab missed.

If you do not have your lab notebook with you, your Lab Notebook grade for that lab will be reduced by ½.

If you come in late, you disrupt the entire lab. Your lab partner will have been assigned to another group and I will have to either disrupt that group by taking your lab partner out or assign you to a group already in progress. I do not like either option and I will reduce your lab grade accordingly.
Lab Notebook

A Lab Notebook (in the “real world”) is a legal document! In this class, we will pretend that the experiments that we perform are real scientific experiments that may have to be defended at some later date in defense of a patent claim or other legal dispute.

You must have your Lab Notebook with you in every lab. You are not to write anything related to the experiment on anything except the Lab Notebook. This means absolutely no notes or calculations on scrap paper. REPEAT: This means absolutely no notes or calculations on scrap paper.

More detail is provided in the accompanying handout Lab Notebook Instructions.

Laboratory Modus operandi

Please take your regularly assigned (class room) seats at the beginning of the lab in order to facilitate taking the attendance. Labs will typically begin with a short lecture related to the experiment for that day. This will be followed by an actual experiment performed by the students in groups of 2 (or 3 if necessary).

During the course of the experiment all students will keep a Lab Notebook as described above.

The equipment we use to perform these experiments is pretty good and students usually get good agreement between theory and experiment. If you detect a significant discrepancy between your measured values and what you expect based on your error analysis, you are probably doing something wrong! Look for the problem. If you can’t identify it, ask your instructor.

At the completion of the experiment, BEFORE THE EXPERIMENTAL APPARATUS IS DISASSEMBLED, the student must show the instructor his/her Lab Notebook. (All lab partners should present their books simultaneously.) The instructor will discuss your entries with you in order to be sure that you have all of the necessary information to complete the notebook write-up. If any necessary information is missing it is usually easy to go back and get it before the apparatus is dissembled but very difficult later! THEREFORE: ALWAYS DISCUSS YOUR RESULTS WITH YOUR INSTRUCTOR BEFORE YOU DISASSEMBLE THE APPARATUS!

Lab notebooks will be collected at the end of the semester and graded. (They will be returned to you after they are graded.)

Formal Lab Write-up

No scientific work is of any value unless it is presented to someone else in a clear and persuasive manner. The “someone else” may be the Scientific Community in which case the presentations would be in the form of a published paper in a scientific journal. Or it might be someone else in your company who has the authority to make use of your work (to improve company profits, for example) in which case the presentation would be in the form of an internal company memorandum. Either way, presenting the results of your work is imperative.
Physics 4A Spring 2007

The Formal Lab Write-up for this course should conform to the instructions in the Formal Lab Write-up instruction sheet which you will be given later.

**Lab Grade**

Your lab grade will be determined as follows:

- Lab Notebook 50%
- Formal Lab Write-ups 30%
- Subjective Evaluation of Laboratory Skills (Presence, Punctuality, Performance, Productivity, Professionalism) 20%

If you miss a Lab your grade will be reduced as described in the section on Lab Attendance Policy above.

If you are late to lab it significantly disturbs the efficient operation of the Lab. Therefore, if you are late for a Lab, your grade for that lab will be reduced significantly.

In the Subjective Evaluation I will look for those things that an employer would look for in an employee – attendance, punctuality, performance, productivity and professionalism. Chronic lateness or absence will seriously impact your Subjective Evaluation.

You must have a passing grade in Lab in order to receive a grade of C or higher. You must have a C or higher in Lab in order to receive a grade of A or B.