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PHYS 11A - General Physics: Mechanics
Syllabus for Spring 2015
Prof. Margoniner

General Course Information

Meeting Time

The lecture meets MWF from 11-11:50am at MND 1015.

Catalog Description

PHYS 11A. General Physics: Mechanics. PHYS 11A, 11B, 11C sequence is a three semester course in introductory physics requiring elementary calculus. This sequence satisfies the lower division physics requirement for a major in physics, physical science, chemistry, geology, or engineering. Lecture two hours; discussion one hour; laboratory three hours. Prerequisite: MATH 30, MATH 31; or equivalent certificated high school courses. MATH 31 may be taken concurrently. Graded: Graded Student. Units: 4.0

PHYS 11A fulfills the area B1 GE graduation requirement.

Required Materials

➔ Access to the Internet.
➔ Access to SacCT (http://www.csus.edu/sacct/)
➔ Access to pearsonmylabandmastering.com where you will join the class margoniner11296. See this handout from the publisher for more details. Please enter your saclink user id (the xxx in xxx@saclink.csus.edu) when registering.
➔ A simple scientific calculator.

Course Learning Outcomes

Upon completion of this course, students will be able to:

➔ Analyze and predict the motion of simple objects (motion in 1- and 2-dimensions; circular and rotational motion)
➔ Explain why objects change their motion (forces)
➔ Analyze interactions between objects (energy, work, momentum, and conservation laws)
➔ Recognize that our description of nature is connected to careful observation and reasoning (lab work)

Area B1 Student Learning Outcomes

Upon completion of this course, students will also be able to:

➔ Explain and apply core ideas and models concerning physical systems and mechanisms, citing critical observations, underlying assumptions and limitations.
➔ Describe how scientists create explanations of natural phenomena based on systematic collection of empirical evidence subjected to rigorous testing and/or experimentation.
➔ Access and evaluate scientific information, including interpreting tables, graphs, and equations.
➔ Recognize evidence-based conclusions and form reasoned opinions about science related matters
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To achieve these outcomes, we will solve problems rather than do exercises. In an exercise, you are simply practicing a well-defined procedure for obtaining an answer, and you may think of physics (and other subjects) as simply performing a series of these exercises. In a problem, you have a goal but you have to figure out how to get there. This is what physics (and real life) is really like, and the learning outcomes accurately reflect this. But to get there you have to practice solving a lot of problems rather than doing exercises. This may be new and uncomfortable for you at first, but by the end of the semester you will have achieved a much deeper learning than is possible by merely doing exercises. As in real life, much of the problem-solving will be done in a team environment, where different ideas and ways of thinking will be discussed and analyzed on the way to solving the problem.

Professor Margoniner's Contact Information

Office Location 436 Sequoia Hall
Drop Box Box #6 at the second floor of Sequoia Hall
Office Hours M 1:00-2:00pm in SQU 436
Tu 11:00am-noon in SQU 436
and by appointment
Email Address send e-mail to the class site in SacCT
Office/Home/Cell (530) 746-8372 (Weekdays from 8 am to 9 pm)

Please be aware the Professor Margoniner is working only part time this semester due to family illness.

Lecture, Discussion, & Laboratory

The objective of lecture and discussion meetings is to clarify the hardest concepts, help you connect the different ideas presented in the book, and allow you to practice problem solving. You must come to class with your notes prepared and having completed the appropriate pre-class assignment. You should do the reading carefully enough to understand the most basic concepts presented in the chapter and to formulate appropriate questions to bring to class.

Physics 11A officially has three components: Lecture, discussion, and laboratory. In practice (and due to budget restrictions), there is no difference between lecture and discussion.

The goal of the laboratory is to make the physics you learned from your readings and during class more concrete; and to give you some practice and understanding about methods physicists use to learn about nature. The lab component is a crucial part of the class - lab attendance is mandatory, and that you need to get at least 70% in the lab to pass the class.

Think about your instructor as a coach or guide that will help you make sense of physics, and not as a source of all knowledge. My goal is to help you learn physics while helping you become an independent learner with study skills that will allow you to continue to learn and grow much after your graduation from Sacramento State.

Course schedule
The Learning Assistant Program

Learning assistants are students who have recently completed Physics 11A with good grades and are now returning to the class to help other students succeed, deepen their own physics understanding, and to try teaching to see if they would like to explore it as a career. Please keep in mind that learning assistants are not experts. They are slightly more advanced students that are willing to work with you on figuring out problems. Also, learning assistants are explicitly taught not to give you the answer but to instead ask you questions that will help you figure it out by yourself. Keep in mind the Chinese proverb:

*Tell me, I'll forget. Show me, I may remember. Involve me, and I'll understand.*

About the Learning Assistants

Here you can learn a little about our Learning Assistants. We will be recruiting new Learning Assistants at the end of the semester. Let your LA know if you are interested and keep your eyes open for our end of semester recruitment session.

Team Learning

Meaningful learning is achieved only by struggling to make sense of new concepts and fitting them with things you already know. When working as part of a team you are often either asking for help, or helping others, and both processes facilitate learning. Communicating what you don’t understand makes you search for the cause of the difficulty and puts you in the right path for achieving the kind of deep learning I want you experience in our class. The process of helping others also helps you check and solidify what you know.

It is therefore to help you learn better that we will be working in teams in this class. I understand that not all team members will enjoy the process right away, but teamwork is not only important in our class, but in pretty much any job you will ever have. The ability to know how to work collaboratively in a team is a top priority for all engineering and physics employers I ever spoke to.

You will be part of a team of about 5 students for the duration of the semester, and I expect you to work together in and out of the classroom. Teams will be formed in class on week 2 or 3 of instruction. I will use measures of interest (such as your major), content knowledge (force and motion pre-instruction assessment), prior achievement (GPA), and motivation (self-reported) to classify students into five “colors”, each representing a category. You will then form teams with one student of each color.
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Grading

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Grade</th>
<th>Requirement</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-class assignments (PCAs)</td>
<td>10 %</td>
<td>A</td>
<td>95% or more</td>
<td>C</td>
</tr>
<tr>
<td>Homework</td>
<td>10 %</td>
<td>A-</td>
<td>90% or more</td>
<td>C-</td>
</tr>
<tr>
<td>Social homework (Koondis)</td>
<td>5 %</td>
<td>B+</td>
<td>87% or more</td>
<td>D+</td>
</tr>
<tr>
<td>Commit to Study contract</td>
<td>5 %</td>
<td>B</td>
<td>83% or more</td>
<td>D</td>
</tr>
<tr>
<td>Participation</td>
<td>5 %</td>
<td>B-</td>
<td>80% or more</td>
<td>D-</td>
</tr>
<tr>
<td>Teamwork</td>
<td>5 %</td>
<td>C+</td>
<td>77% or more</td>
<td>F</td>
</tr>
<tr>
<td>Laboratory</td>
<td>10 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Exams</td>
<td>50 %</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>3 midterms (10 % each)</td>
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<td></td>
<td></td>
<td></td>
<td>1 final (20%)</td>
<td></td>
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<tr>
<td>Class Total</td>
<td>100 %</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Attention: Note that high exam grades do not guarantee a high course grade. You must be completing pre-class assignments, homework, and participating in lecture/discussion and laboratory in order to earn a high course grade.

Pre-Class Assignments

For the reasons outlined above, there is always a pre-class assignment due before class. The only exception are exam days. These assignments are due 8 am in masteringphysics at the website pearsonmylabandmastering.com. You will need to register and join our class margoniner11296 at the start of the semester. See this handout from the publisher for more details.

Each assignment consists of selected multiple-choice questions, and of one open-ended question: What concepts are you currently having most difficulty with in our class? What would you like to see explained in class?

I will grade this question it in a pass/no-pass way. To make sure you get awarded points I suggest that you read what you wrote and ask yourself:

- Did I write a clear explanation of WHAT I need help with?
- Am I clear as to WHY I don't understand the concept I need help with?

The "correct" answer is one that shows me that you have reflected on the content and tried to make sense of it. Your answer should be written clearly enough so that I can understand your difficulty and how to help you.

Check the course schedule for due dates. There is no make-up for missed pre-class assignments and they can not be turned in late. I will drop your two lowest grades.

Homework

The homework consists of tutorials and problems. The homework should also be completed in masteringphysics (pearsonmylabandmastering.com), and is always due at 11:59pm on the date indicated on the course schedule.
A typical homework assignment will usually take upward of 3 hours to complete in its entirety; however, not all problems have to be completed to get full credit. Some of the problems are practice problems and do not contribute to the score. Those are usually easier problems. Credit problems are the ones that contribute to your score. Each homework is worth 100 points but many more are offered in each assignment. This is to allow you to choose which problems will be most beneficial to your learning, and so that you give yourself permission to make mistakes and actually learn from the homework. Just complete as many problems as you need until you reach 100 points. You may complete more problems to get practice, but each individual homework is worth no more than 100%.

I encourage you to work together on homework problems (see social homework next). That said, copying solutions will not teach you the material, and you’re not likely to do well in exams unless you are able to solve problems on your own. Getting 100% in homework but 40% in exams is not going to get you a passing grade in the class!

The homework is graded automatically by MasteringPhysics (except for occasional “essay” questions). Since it is easy to make mistakes while entering answers online, you’ll get a relatively large number of trials for each question. Late homework is accepted after the due date, but your score will be reduced automatically in proportion to how late your submission is (0.2 percentage point for each hour.)

Homework submitted more than about a week late (but before the final exam) will earn at most a score 70%. Check the course schedule for due dates.

Social Homework: Koondis

This semester we are trying out a new online system called Koondis for implementing what is known as “social homework.” The basic idea is that for each homework assignment on MasteringPhysics, your group will be assigned one of the homework problems from that assignment to complete on the Koondis website. Note that you must also complete the problem on MasteringPhysics. Koondis is designed to mimic popular social networking sites like Facebook, but it has tools for including figures and equations. Within your group, each member will be assigned a different role that will rotate with each assignment. For example, one person might be in charge of doing all the required math for the problem, another might be in charge of figuring out the relevant theory (formulas and concepts) to apply for a problem, while another’s role might be to raise questions and challenge the approach being implemented by the group. Admittedly, this system is as new to us as it is to you so we’ll be learning the best practices for making use of it as we go along.

The Koondis system keeps track of your activity on the website: how much you post, how frequently you post, whether your posts are liked by other classmates, etc. It uses this information to generate a score for you, which will be your Koondis score. If unforeseen circumstances arise that call into question the reliability of grades determined by the Koondis system, I reserve the right to reduce the weight of the Koondis portion of your grade, all the way down to zero if warranted.

You will receive an email invitation to join the class from koondis on your saclink email address. Make sure to click on the link and register as soon as possible. Note that the invitations have a personalized code, so do not share it with other students. If you did not receive your invitation, let me know. There is a youtube video to help you get started with Koondis; go watch it.
At the beginning of the semester, you will be asked to fill out a contract in which we will specify some task(s/activity(ies) that you promise to complete in order to earn that 5% of your grade. The contract includes two non-negotiable requirements and one of your choice. You are entitled to switch your option at most once during the semester.

**Option A: Chapter Notes (recommended)**

Reading before class is essential for an interactive and engaging class. If you come to class prepared, we can use the time we have together to understand the hardest concepts in each chapter. Use the “How to read your physics textbook and take meaningful notes” handout as a guide to help you read the textbook and create notes that will help you learn and understand physics.

Bring your notes to class and use them when solving problems with your team. Notes should be taken on paper because physics requires pictures and equations, and also because you will need to use them in class where no computers are allowed. You may want to keep a notebook dedicated to our class.

Ask your learning assistant (or someone else if your LA isn’t available) to check your notes before we start to discuss a new chapter in class. He/she will assign you a grade on it according to the following rubric:

- ★ **Wow!** (3) means that your notes are awesome. So good in fact that you can use them much later to refresh your memory. Even other students may benefit from looking at it.
- ★ **Got it!** (2) means that your notes are fine but probably can only be understood while the material is pretty fresh in your mind.
- ★ **Almost!** (1) means notes are minimal and/or not all important points are present.
- ★ **Oops!** (0) means stop slacking!

Late notes: -1 point if completed while we are covering the chapter; -2 points after that.

Here are some samples of exemplary notes: [chapter 3](#), [chapter 4](#)

And here are not so good ones (faked by LAs): [example 1](#), [example 2](#), [example 3](#)

**Option B: Homework Challenge Problems**

This may be a good option if you are already somewhat comfortable with the basics of mechanics and want to push yourself. Complete the homework challenge problems for each chapter, and write down detailed solutions for each one. Show and explain your work using words, equations, drawings and diagrams. Your answer doesn’t need to be correct, but your thought process should be clearly explained.

Ask your learning assistant (or someone else if your LA isn’t available) to check your notes before we start to discuss a new chapter in class. He/she will assign you a grade on it according to the following rubric:

- ★ **Wow!** (3) means that your solution is so clearly explained that another student may learn from it
Got it! (2) means that your solution is fine but probably can only be understood while the material is pretty fresh in your mind.

Almost! (1) means that your solution shows little effort and/or not all problems are presented.

Oops! (0) means stop slacking!

Late work: -1 point if completed less than 1 week late; -2 points after that.

Participation

It is very important to participate in class and points will be given for attendance to class and participation online. Here are some of the participation activities. More will be offered in class.

➔ **Mechanics Survey** (double participation points). This evaluation must be taken at the beginning and again at the end of the course for credit. Your grade in this evaluation will NOT affect your grade but you must take it seriously in order to receive the participation points.

➔ **Introductions**. Complete this short assignment on MasteringPhysics to introduce yourself to the class.

➔ **Introduction to MasteringPhysics**. See assignment on MasteringPhysics. Due 1/31 at 11:59pm.

➔ **Contact your LA** by email or text before the first midterm to earn this credit.

➔ **LA Evaluations**: We do these online at the same time as Peer Evaluations (see below), but it’s a separate form.

➔ **Finish-at-home Problems**: Sometimes we will end class in the middle of a problem and I will ask you to finish that problem for the next class. Show your LA that you completed it at the beginning of the next class.

➔ **What helps you learn?** Link to the survey will be emailed to you later in the semester.

➔ **Advice to future students**: At the end of the semester, I will ask you to give some advice about the class for future students.

Teamwork

Group quizzes will be given randomly throughout the semester and collected for grading. The member of the group who writes up the solution for the group will rotate each time. Other roles within the group may be enforced and will also rotate. It is imperative that you develop a good working relationship with your group to be successful on these quizzes.

A couple of times during the semester I will ask you to evaluate your team members anonymously. You will be asked something you like about your teammates’ work, and something you wish they’d improve. This feedback will give each of you a chance to adjust your involvement in the team. Completing all peer evaluations is mandatory because they can be very important for the success of a team. If you fail to complete any of the peer evaluations in a satisfactory and timely manner, you will lose 25% of your Teamwork grade for each missed peer evaluation and a fraction of this for late or incomplete evaluations.

Check the [course schedule](#) for due dates.

Exams
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There will be three 50-minutes exams and one two-hour final exam. A typical exam will consist of a number of short-answer questions (possibly multiple choice) and a few longer problems to be worked out. Any subject matter covered in class, homework, textbook, or labs may be included.

The exams will be closed book and closed notes, except for one double-sided (4”x6”) card of notes that you may bring with you. Your card must be handwritten because the process of making it will help you organize your ideas. Please have your name clearly marked on the top. Unmarked, photocopied or typed notes will be considered academic dishonesty.

You are allowed a scientific calculator, but nothing may be programmed on it. I reserve the right to clear the memory of your calculator prior to or during the exams.

Under no circumstances will there be make-up exams. I trust that you may have a very real and significant reason for missing an exam, but it is just not practical to arrange for make-up exams. If you miss a midterm for a legitimate, officially recognized excuse, your final exam grade will replace it. If you miss a midterm without a valid excuse your grade on it will be a zero.

The final exam follows the same rules, but is two-hour long and you will be allowed four (4) double-sided note cards. The exam is comprehensive, but will be somewhat weighted toward the material covered after the last midterm exam.

Midterms
- Friday, February 20, chapters 1-3
- Friday, March 20, chapters 4-7
- Friday, April 24, chapters 8-10

Final exam
- Monday, May 18, 10:00 am–12:15 pm, all chapters

Laboratory

We attempt to synchronize the experiments with the topics being discussed in lecture as much as possible, but the labs are run independently. Lab attendance is mandatory (missing more than two labs will get you an F), and a passing grade (70%) in the lab part of the course is a requirement for passing the whole course! Your lab instructor will communicate your lab grade to your lecture instructor at the end of the semester.
Online Resources

SacCT will be used for class announcements; e-mail communications; download of class presentations and other documents; and links to external websites.

The online system MasteringPhysics will be used in this class for pre-class assignments and homework. It requires a registration code that can be purchased either with the textbook at the bookstore, or separately from the MasteringPhysics web site. You will then need to join the class margoniner11296. The registration code automatically gives you online access to the full textbook when bought with the book. If you don’t care for a hard copy of the textbook, the registration code is sufficient for the class provided you select to include the e-text when buying the code. If you do not get a registration code, you will not be able to do any of the pre-class assignments and homework that count toward the final grade.

In addition to a complete online version of the textbook, MasteringPhysics gives you access to a number of resources that I encourage you to take advantage of. These include in particular, the study area, with videos of experiments (some of which will be demonstrated in class), video tutor solutions, concept simulations, ...

One advantage of MasteringPhysics is that it can give you instant feedback on homework problems and guide you through the solution of many problems. The flip side of the coin is that it is sometimes unforgiving, and you need to be very precise in what you enter as your answers. Try not to get frustrated when you make a silly mistake and remember that there are always many more problems/points offered than what you need to get 100% on the homework.

Out-of-class help

Succeeding in college, especially in science classes, does not come “for free,” but requires a lot more work that what you may be used to from high school or other classes. You will need to work several hours a week (probably at least 10 hours) to read and understand the theory, do the homework and make sure you are able to work out similar, but different, problems on your own!

The college of Natural Sciences & Mathematics has put together some information that can be helpful to learn good studying habits. It can be found at http://www.csus.edu/nsm/commit/. I encourage you to read it.

I am always happy to help students and am available during the office hours indicated above. Outside these hours, you’re welcome to try your luck and knock on my door or, preferably, make an appointment, but be aware that I can be busy. Additionally, you may ask questions by email and I’ll try and answer quickly.

In addition, the physics department has a tutoring center (SQU 124) staffed by faculty and advanced students, which is open about 15-20 hours a week (a schedule is available on the door of SQU 124, at the Physics office, SQU 230, or on the Department of Physics’ web site).

I strongly recommend that you take advantage of these possibilities. It is important not to fall behind in this class as every chapter builds on the preceding ones!

The web can also be a useful resource of additional information about the class material. Be careful
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though that not everything you find online is correct.

Some Other Things You Should Know

➔ Add policy: Talk to the lab instructors. Make sure to come to all classes if you are hoping to add.
➔ Drop policy: I will not sign any drop forms if the class is impacted. It is your responsibility to drop before the second week of class if you feel this class is too hard. Missing two meetings in the first two weeks of classes, without prior approval from me, will result in an administrative drop.
➔ It is your responsibility to know what announcements were made in class and what subject was covered. If you miss a class, come see me in office hours, or ask a friend.
➔ It is your responsibility to check announcements and e-mail at SacCT frequently.
➔ The best way to contact me is using the mail tool in SacCT. I will try to reply to you within 24 hours, but I do not check my email on weekends.
➔ Keep this syllabus for your reference. If you need to print it again, go to the course website on SacCT.
➔ If you have a disability and require accommodations, you need to provide disability documentation to Services to Students with Disabilities (SSWD), Lassen Hall 1008, (916) 278-6955. Please discuss your accommodation needs with me after or during my office hours early in the semester.

Student Conduct and Discipline

The textbook is a great resource and you should use it often, just not in class! Lecture/Discussion is the time to be engaged with your peers and can not be used for catching up on the reading. If you need to simple check for a formula, or the value of a constant, you are most welcome to ask me or to use the instructor’s textbook copy which will be in front of the room during every class (exams included).

Cell phones are not allowed in class. You must turn off your cell phone before class starts. If there is a very strong reason why you need your cell phone on, you need to let me know beforehand, and put it to vibrate.

Laptops are great study tools but are NOT allowed during class for the same reasons explained above.

Tablets may be used for taking notes only.

Code of conduct: The faculty of the Department of Physics and Astronomy will not tolerate academic dishonesty. Falsification of data, copying, unauthorized collaboration, plagiarism, alteration of graded materials, or other actions (as described in, but not necessarily limited to the Sacramento State Policy Manual) will be promptly reported to the Office of Student Affairs. The offending student will be penalized on the assignment in question. Serious infractions will result in course failure and a recommendation for administrative sanctions. If you have any questions please come talk to me.

--- These descriptions and timelines are subject to change at the discretion of the Professor ---