

## Syllabus for Physics 111: General Physics I

Lecture: MWF 11:10-noon, SCI 101

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<b>Office Hours:</b> (preliminary), W12-1, MW10-11AM, also available by appointment (see me after lectures)			

**Welcome to Phys 111 General Physics I: Mechanics, fluid, sound, and heat using algebra and trigonometry.**

In this semester we will discuss motion, force, energy, fluid, waves, and thermodynamics. This course must be taken concurrently with [PHYS 112](#), the lab session, unless previously passed PHYS 112. **PHYS 112 starts to meet during the first week of class.** Please attend any PHYS 112 sections ASAP and wait for permit numbers, if you have not registered.

**Text:** (required) **James Walker, Physics, Custom Edition for SFSU** (Pearson Custom, 2009). PHYS111 will cover the 18 chapters Volume 1, but you may want to get the combined volume 1+2 book if you will be taking Physics 121. The bookstore has a “bundle” with the textbook, lab manual, and a WebAssign access code for the on-line homework. You can also use James Walker, Physics, 4th edition, (Pearson/Prentice-Hall, 2009) or **James Walker, Physics, 3rd edition**, to save some money (Pearson/Prentice-Hall, 2007).

**Recommended supplements:** You may like the **Study Guide, Vol. 1, by Walker**; available at the bookstore.

**Reading:** Complete each reading assignment **before** the class during which the topic is discussed, otherwise the lectures will be too hard and too quick to follow. Repeat the reading, especially the chapter summary, before doing homework.

**Class attendances:** Attendance and participation in classroom activities are extremely important. Bring your calculator to class. **Be on time** for class. Unannounced quizzes based on homework or reading assignments can be given. We focus on understanding concepts, equations, applications and “**why**” in the lectures, and there is no way to really learn physics by memorizing facts and following steps to plug numbers into equations. Do not use cell-phone, make noise, walk in-out, or do other things to disturb lectures.

**Homework:** There will be a homework assignment **due before each lecture, two to three times a week**. These will be entirely on the WebAssign system. **Once HW due date passes, the system will not accept answers. No HW extensions.** Homework solutions will be posted online every week. **To do homework actively is the most effective step to learn physics.** It is very important! Group study is encouraged, but make sure to **work out your own problems independently** after discussing with your friends or tutors. If you get fish (the homework solutions) without really learn fishing (to solve similar problem alone), you will do poorly in quizzes and exams.

You have to do HW in the first week. **You don't need to pay for it before getting your math exam results.** Registered students and official waiting list students already have accounts. Please start on Jan. 24<sup>th</sup>. Login at <https://www.webassign.net/> Non-official waiting list students who want to add may be able to login on Jan. 30, if passing the math exam.

**Username:** lastname\*\*\*\*

**Institution:** sfsu

**Initial Password:** \*\*\*\*

, where \*\*\*\* is your last 4 digits of SFSU id.

For example: Tom Jones with last 4 digits of SFSU id of 1234 will have username: jones1234 and initial pw: 1234

**Update your email address in your webassign account**, so that you will receive future announcements about exams on time.

Read the instructions **and practice submitting answers with correct numerical format and formula format**, in the first assignment.

Fee: (~\$20 semester), you can pay any time during the first two weeks. The code can be bought through webassign website or together with textbook in the bookstore.

**Problem solving and help session:** SCI 111( TH 1100-1215 T-P 3) (1unit), **Not many sample questions can be solved step by step during the PHYS 111 lectures, due to the fact that we cover more than one chapter each week. Make sure that you sign up for the one unit SCI111, if you need problem solving guide and homework help.** PHYS 112 lab instructors and I also offer help sessions and office hours each week for PHYS 111. Don't count on the very limited lecture hours for HW and problem solving help.

**Exams:** 5 to 6 quizzes, 2 midterms and a comprehensive final. Missing exam will receive zero point, unless previously discussed.

**Academic dishonesty:** Students are expected to perform their own work on all assignments in the course. Dishonesty on an exam, quiz, or homework will result in a grade of zero for that assignment, or even a failing grade for the course.

**Grading:** The final score will be based on the homework and exam scores as indicated below:

Final Exam 30%      Midterms 40% (20% each)      Quizzes (drop 1) 15%      Homework (drop 2) 15%

Final letter grade:      90 and up : A;      75 and up : B;      60 and up : C;      50 and up : D.

**I will not curve. I do give bonus points for your real effort.** I wish everyone to do very well and get B or better (75 out of 100 or better). I do not limit the number of As. Extra bonus points can be given to students who finish bonus assignments actively. (The class average of last semester was B-. 25% students got As, and another 20% failed or dropped.)

**Prerequisites:** [MATH 109](#) or equivalent. You need a passing grade on the [Physics Dept. Math Entrance readiness exam](#), <http://www.physics.sfsu.edu/Academics/Readiness.html> (about algebra, geometry, trigonometry), which will be administered during the **SECOND MEETING OF LECTURE**. (Make sure to take the exam if you want to add). **If you fail the entrance exam, you will be dropped from both PHYS 111 and PHYS 112.**

### Lecture Schedule (tentative):

lect.	day	date	Content	chap.	sec.	other events
1	M	01/24	Units & Dimensions, Sci. Notation	1	1-8	
	W	01/26	Math exam			Math Exam
2	F	01/28	Position, displacement, velocity	2	1-4	
3	M	01/31	acceleration; constant acceleration motion,	2	5-6	
4	W	02/2	free fall;	2	7	Quiz 1
5	F	02/4	Vectors,	3	1,2	Last Day to Drop (02/04)
6	M	02/ 7	Vectors operations, relative motion	3	3-6	
7	W	02/9	2D kinematics; projectile motion	4	1-5	
8	F	02/11	Mass, forces, ,Newton's laws,	5	1-4	
9	M	02/14	weight, Normal forces, Tension, Spring force	5,6	5/7;6/2	
10	W	02/ 16	free body diagram, 2D force decomposition,	5	5	
11	F	02/18	Static & kinetic friction;	6	1	Last Day to Add (02/18)
12	M	02/21	forces in equilibrium	6	3	
13	W	02/23	Circular motion & centripetal force;	6	5	
14	F	02/ 25	Gravity and planets	12	1-2	
	M	02/28	Midterm 1			Midterm 1. Chapters 1- 6.
14	W	03/ 2	Work	7	1	
15	F	03/4	kinetic energy, power,	7	2,4	
16	M	03/ 7	Conservative & non-conservative force, Potential energy,	8	1-2	
17	W	03/9	Conservation of mechanical energy	8	3-4	
18	F	03/11	Review			
19	M	03/14	Momentum; impulse, Momentum of a system (vector),	9	1-3	
20	W	03/ 16	Conservation of momentum, Collisions	9	4-6	
21	F	03/18	2D Collisions, Center of mass,	9	6-7	Last Day for CR/NC (03/18)
22	M	03/21	Angular motion, rotational kinematics,	10	1-3	
23	W	03/23	Momentum of Inertia, Rotational kinetic energy	10	5	
24	F	03/ 25	Torque, Angular Acceleration	11	1,2	
	M	03/28-04/1	Spring Break, No class			Spring break
25	M	04/4	Static equilibrium, Balance	11	3,4	
26	W	04/ 7	Angular momentum and its conservation	11	5-7	
27	F	04/8	simple harmonic motion, mass on a spring	13	1-4	
28	M	04/11	Energy, Pendulum, resonance	13	5-8	
	W	04/13	Midterm 2			Midterm 2. Chapters 7-12
29	F	04/ 15	FLUIDS: density, pressure, static equilibrium.	15	1-3	
30	M	04/18	Archimedes' principle & buoyancy,	15	4-5	
31	W	04/20	Flow, Bernoulli's equation, Viscosity	15	6-9	
32	F	04/22	Temperature, Specific heat,	16	1-2,5	Last day to withdraw (04/22)
33	M	04/ 25	heat and work, thermal expansion, heat exchange	16	3-4	
34	W	04/27	Ideal gas law, kinetic theory, deformation	17	1-3	
35	F	04/29	latent heat, phase changes	17	4-6	
36	M	05/02	Wave on a string, standing waves	14	1-3,8	
37	W	05/04	Sound wave, intensity, Doppler effect	14	4-5	
38	F	05/06	Doppler effect, interference, beats...	14	6-9	
39	M	05/09	Thermodynamics laws (0 <sup>th</sup> and 1 <sup>st</sup> )	18	1-4	
40	W	05/11	Therm. laws (2 <sup>nd</sup> and 3 <sup>rd</sup> ) Heat engines and refrigerators	18	5-7	
41	F	05/13	Makeup, wrap up and review			
		May 16	Final Exam Chapter 1-18	1-18		Final Exam: 10:45-1:15 SCI 101

**Checklist of what you should do: (12-14 hours a week is expected in order to understand 18 chapters in 16 weeks.)**

- **Read the text before each lecture, otherwise lectures will definitely be too quick and too hard for you.**
- **Understand all concepts, equations and “why”** in lectures. You will get lost if you just memorize facts or plug numbers.
- **Don’t miss class.** To make-up takes 3 times of lecture time. **Carefully review notes** if you have an unavoidable absence.
- **Study in groups and help each other,** but do not simply give or ask for answers.
- **Do homework independently after discussions.** Make sure that you understand everything by **yourself**. Mark those hard ones.
- **Request keys on webassign. Review HW solutions posted after due date. Redo all the hard ones** before quizzes and exams.
- **Go to at least one help session every week.** PHYS 111 lectures are not long enough for showing many step by step examples.
- **Improve your math skills.** Otherwise, you will have a hard time solving equations for physical quantities.
- **Keep up with the materials as it is covered.** New sessions build on the previous. It is much harder to catch up once fall behind.

Please fill the blanks with reserved time slots for PHYS 111. (2 to 3 times per week, 0.5-4 hours per event as suggested below)

Reading text before lectures: (1-3hr)	_____	_____	_____	_____
Review Lecture notes:(0.5-1 hr)	_____	_____	_____	_____
Do HW: (1-4 hrs)	_____	_____	_____	_____
Review HW solutions:(0.5-2 hrs)	_____	_____	_____	_____
Attend SCI 111 or office hours:	_____	_____	_____	_____

**How to make homework easier:**

- Start to attempt HW ASAP. In order to finish, **allow 2-4 days (4-8 hours)** for reviewing, practicing, and reading before the due date.
- Review the text, chapter summary, lecture notes, and problem-solving steps on notes and textbooks..
- Understand your questions before plugging numbers into equations.
- Start the problem by drawing a diagram. Explain your solution in words.
- If homework looks hard, first try to solve the sample problems on the book and lecture notes without peeking.
- Pay attention to units. Check results and order of magnitude to make sure they are reasonable. Pay attention to round off error.
- **Get help--but only after trying the problems yourself.** Discussions are allowed and encouraged. But NEVER cheat! Offering or asking homework answers completely destroy the precious learning opportunities.

**Make sure that you sign up for the one unit SCI111,if you need problem solving guide and homework help.** Don’t count on the very limited lecture hours for HW help and problem solving help.

\* Students with medical conditions or leaning disabilities who need reasonable accommodations are encouraged to contact me for necessary arrangements. The DPRC is available to facilitate the process ([dprc@sfsu.edu](mailto:dprc@sfsu.edu))

Please visit **my website** for updates, **lecture notes, and HW solutions.** <http://www.physics.sfsu.edu/~wman/phy111.htm>

Please keep an eye on your **webassign announcements** and **sfsu email accounts** for announcements.

*Please keep in touch and let me know how you are doing and how I can help. I am looking forward to a fun and successful semester. Let’s start the journey to the fun Physics world. Enjoy!*

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**Course objectives and Student Learning Outcomes: You will be able to**

1. Learn how to translate realistic physical problems into the equations which describe them; solve these equations for the variables describing the problem; and interpret the results to describe the resulting behavior of the realistic physical system.
2. Learn to carry out numerical evaluation of algebraic results rapidly and accurately, using appropriate units for physical quantities.
3. Describe simple physical systems by graphing system variables, and interpret graphs of system variables.
4. Relate the equations of physics to intuitive concepts.
5. Study Newton’s laws of motion and learn how to apply them to simple mechanical systems.
6. Learn the physical concept of energy and how it relates to different physical systems.
7. Study the phenomena involved in gravitation, wave motion and oscillations.
8. Study the concepts and phenomena in the fields of heat, thermodynamics and thermal physics.

1-4 are SLOs which met GE program requirements and 5-8 are course-specific student learning outcomes.

All the SLOs are linked to the numerical and conceptual questions we study and solve in lectures, HWs, quizzes and exams.

Last updated Jan/18)

### **Math Readiness Exam:**

**Those who past the math exam on Jan. 06 do not need to take it again.**

**Others are required to take it during the second lecture. Wed. 11:10 AM, SCI 101**

The readiness exam covers the following topics: No outside aids, including calculators, are allowed.

- Exponents, roots, and scientific notation - ability to add, subtract, multiply, divide, and take powers and roots of variables and numbers expressed in scientific notation.
- Algebra – Ability to solve linear and quadratic algebraic equations, including use of the quadratic formula. Ability to solve for one variable in terms of other variables. Ability to solve a set of two simultaneous equations.
- Geometry – Basic knowledge of angles, triangles, perimeters and areas of figures.
- Trigonometry – Ability to use sin, cos, and tan functions and the Pythagorean Theorem.
- Graphing – Knowledge and ability to work with graphs of linear and quadratic functions, including understanding slopes and intercepts and ability to write the equation for a straight line based on knowledge of the coordinates of two points on the line.
- High-School Physics – Some elementary questions at the level of high-school physics courses.

There is a very useful on-line course that you can use to prepare for the readiness test.

Go to the [ALEKS web site](#) and sign up for Math Prep for College Physics, 9TXVD-3PJN (Phys 111 Spring 2011)

The cost is \$30 for 18 weeks of access. (Purchase ALEKS Math (18 weeks))

**Math exam results will be posted on course website by Monday morning.**

**If you fail the entrance exam, you will be dropped from both PHYS 111 and PHYS 112.**