

### Syllabus for Physics 2A/B, General Physics

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Class Time: Lecture TTh 9:30-10:50 AM; Lab W 11:15-12:20PM, or W 12:30-1:35PM  
Office Hours: TBA  
Web Site: <http://physics.sierracollege.edu/people.html>  
**Please check the website at least once or twice a week**

***Students are solely responsible for understanding all items described in this syllabus. Any questions regarding the syllabus should be directed to the instructor immediately. The instructor assumes the student will commit a reasonable amount time and energy in order to succeed in this course. This means that students are responsible for their success in this course. Please don't be intimidated by the length of this syllabus. It was written for your benefit.***

#### Description:

Physics 2B is the second in a sequence of two introductory general physics courses for non-physical science majors. Physics 2B is geared toward students in the health and life sciences. Therefore, the instructor will try to present some examples of the applications of physics in the life and health sciences and in everyday life. The topical content of this course is, typically: sound, electricity and magnetism, geometric and wave optics, and modern physics. **Note:** Physics 2A is a prerequisite for this course. It is important that the student has very good command of the fundamentals of arithmetic, algebra, and trigonometry.

#### Rationale:

The purpose of this course is to help students understand important aspects of the physical world. By "understand" two things are implied:

1. When perceiving a phenomenon, understanding is achieved when the student is able to say, "I see how this works." In other words, the student should be able to identify causes, in order to relate them to each other and to their inevitable consequences (effects).
2. The second meaning, which is much more pragmatic, is that the student must be able to solve problems. This involves translating words into equations and then manipulating them mathematically.

**Note:** To demonstrate an understanding of physics concepts does not imply that the student can "regurgitate" the instructor's lectures on an exam. It implies that the student can solve problems by applying relevant physical principles discussed in the textbook and in lectures.

There are two principal reasons why students elect courses in General Physics. The first one, albeit ideal, is that they really enjoy it and are pleased to understand how things work. Moreover, it satisfies their intellectual curiosity about the physical aspect of nature.

The second reason is that they need it for career preparation. Students preparing to enter the health fields, science, or engineering need to know some physics. Physics articulates important concepts that

relate them in ways that require skills of analysis and synthesis. It is uniquely able to do this since it is the most theoretically structured branch of science. In fact, the skills of analysis and synthesis are important to all students, regardless of their major.

Two often asked questions about physics are: (1) "Is physics difficult?" and (2) "Does it require much work?" Students generally answer both these questions with a resounding "yes." Many often spend more time on their physics course than on any others they may be taking at the time. It does require time and effort to master the skills in understanding the physical aspect nature. If one is to develop mastery of this science, the time and effort involved are comparable to those which must be devoted to learning how to play sport or a musical instrument (**practice, practice, practice!!!**), both of which require dedication and determination. Students who do well in physics usually spend 15-22 hours or so per week reading the textbook and solving problems. In this course, problem solving will be the most beneficial method of mastering concepts.

The student should understand that physics is a cumulative subject. Generally, each new topic or chapter that will be covered requires reasonable mastery of what preceded it. Reasonable mastery of each topic comes slowly. The student must be patient. Anyone who demands instant gratification will undoubtedly experience frustration. Please allot plenty of time when studying each new topic.

What is meant by "reasonable mastery?" In one sense, it means that the student should develop an appreciation of the inductive process whereby one proceeds from very specific phenomena (in many cases common experience) to the formulation of general laws. In another sense, it involves the application of general principles to solve specific problems (deductive reasoning). The student should have a basic understanding how the laws of physics were formulated and how to apply them to problems of the "real" world.

#### **Required and Optional Materials:**

Text: College Physics (required), by Serway, Faughn, and Vuille 9<sup>th</sup> ed. (2012). ISBN-13: 9781111572075.

Physics Now (Optional, but highly recommended. It's a website with practice problems and quizzes; login code is on inside cover of textbook).

Student Study Guide and Solution Manual (Optional, but highly recommended), by Gordon Teague, and Serway (2012). ISBN-13: 9780840068491

College Physics; Schaum's Outline Series (Optional, but highly recommended), by Bueche, 9<sup>th</sup> ed. (2006). ISBN-13: 9780071448147

#### **Method of Instruction:**

Lecture/Laboratory:

Since the textbook is verbal (contains an abundance of information), it is important that the student carefully study the materials discussed in the textbook. **Lectures will be a summary of the materials presented in the textbook.** Students are strongly encouraged to ask questions on any material covered during the lecture. Due to time constraints, questions on homework will be strictly limited to the first ten minutes of class. If additional help is required, please consult the instructor during office hours (or by appointment).

The laboratory serves two purposes. First, it is used to integrate abstract physical concepts discussed in class with its applications in the real world. This is an important way to help students to better understand concepts such as Newton's Second Law, conservation of energy and momentum, and Faraday's law. Moreover, it gives the student a well-rounded understanding of physics.

The second purpose of the laboratory is to introduce the student to scientific investigation. As a

result, scientific investigations provides the student an opportunity to handle laboratory equipment, and helps her or him develop an appreciation for the care, tedium, and persistence required to make precise and accurate measurements of physical quantities in the real world. Scientific investigations also help each student develop or improve analytical and critical thinking skills.

### Course Requirements:

1. **Homework:** Homework will be assigned for each chapter that is covered in the course. Homework is based upon a web-based package called **WebAssign\*\***, worksheets, and multiple-choice conceptual questions. **Webassign\*\*** homework and Unit 1-4 Conceptual Questions will be worth 20 points (the lowest grade will be dropped). All other homework assignments will be worth 10 points. The overall homework grade percentage will be determined by adding the total number of homework and quiz points (see 2) earned dividing it into the maximum possible points. Homework and quizzes (see 2) will constitute 15% of the course grade.

**\*\*WebAssign** is a web-based package that allows the student to do textbook problems with instant feedback. Since **Webassign** homework is done online, students will not turn in these assignments on paper. The program grades each homework assignment at the click of a button. Each student will be given a certain number of attempts to maximize their grade on a homework assignment. The final grade on an assignment will be emailed to the instructor. **NO late homework will be accepted.**

2. **Quizzes:** During the semester, short quizzes (~10 minutes long) will be administered to ensure students are reading the textbook and keeping up with the lectures. All quizzes are closed book. Quizzes are worth 10 points. The lowest quiz (see below) grade will be dropped. **Absolutely no makeup quizzes are allowed. Quizzes will only be administered during class.**
3. **Labs:** An important part of any Physics course is the laboratory. During the semester, each student will perform laboratory experiments that integrate abstract ideas presented in class with concrete examples of physical phenomena. The lab is intended to help the student to better understand course material while learning practical laboratory techniques. The lab portion (lab reports & quizzes) of this course will count as 20% of course grade. Additional details about the laboratory portion of the course are available in a separate handout. **All lab reports are expected to be turned in on time otherwise, there will be an automatic 5 point deduction for reports that are turned in by 5:00 PM on the due date and a 5 point deduction per weekday thereafter.** For example, if a report is turned in one week late, the maximum number of points possible is **negative 10 points!! A minimum laboratory grade of 50% is required in order to pass the course.**
4. **Exams:** Four equally weighted exams will be administered during regular class time. The exams provide the student an opportunity to show the instructor his/her overall comprehension of course material. Exams will mainly consist of problems related to in class examples, homework, and textbook problems (it pays to work on additional textbook problems). However, students must also be prepared to answer a few conceptual questions. An equation sheet will be provided for the exam. The four exams will constitute 48% of the course grade. The lowest exam score can be replaced with the final exam score. The exams dates are **SET** and are as follows: **September 12, October 8, October 24, and November 19. No make up exams will be allowed on the first missed exam. If an exam is missed, it will be replaced with the final exam score.** The student that misses a second exam should consider dropping the course.
5. **Final:** The Final exam will be the student's opportunity to show the instructor what he/she has learned during the entire semester. It is a comprehensive exam. The Final exam will constitute 17% of the course grade. The Final exam will be held on **Wednesday December 5.** The

instructor **will only** excuse absences that are deemed acceptable by Sierra College. Otherwise, no make-up exam will be given (vacations are not an excusable absence). The make-up exam will usually consist of problems that are different (and sometimes harder) from those that were administered to the rest of the class.

6. ***Class Participation:*** The goal in each lecture is to have a lively discussion of physics concepts. Students are always encouraged to ask questions relevant to the lecture. Class participation involves (1) attendance and (2) participation in dialogue relevant to the lecture. Classroom participation will be used as one of the considerations for borderline grades. At the beginning of each lecture, a copy of the official roll sheet will be passed around for each student to initial. Remember students not attending lecture can't participate. **The instructor is legally entitled to drop students without notice for excessive absences.**

If a student's work schedule conflicts with the course, the student should consider dropping the course. The instructor will not drop a student from the course if he/she stops attending class.

### **Grading:**

The conversion of numerical grades to letter grades can be established only approximately in advance. The instructor believes that exams should challenge the "A" student. A good approximation for this course is the following:

89%-100%=A 76%-88%=B 61%-75%=C 60%-50%=D <50%=F

Students are not entitled a particular letter grade unless he/she has earned it.

In solving homework and exam problems, your method of approach or reasoning is as important as your ability to get the correct answer. Always show your work. Partial credit will be given for responses that fall short of perfection.

Each student's course grade will be calculated by the following formula:  **$[1.5(H.G.)+2(L.G.)+1.7(F.E.G.)+(4.8E.G.)]/10$** , where H.G. is the homework grade percentage; L.G., the lab grade percentage; F.E.G., the final exam grade percentage; and E.G., exam grade percentage of all three exams. For example, if the Homework and Lab averages are 85%, while the exam and final exam averages are 45%, the overall course average is 61%, which is a low C grade.

**A student cannot get an "A" in the class if his/her laboratory grade percentage is less than 70%.**

**Students with a laboratory grade percentage less than 50% automatically fail the course.**

**Students that miss three lab meetings will be automatically dropped from the course.**

### Reading Assignments and Tentative Lecture Schedule

	<b>Monday</b>	<b>Wednesday</b>
Aug. 20-23	Intro to Course; Simple Harmonic Motion Read 13.1-13.6	Properties of Waves Read 13.7-13.11
Aug. 27-30	Properties of Sound Read 14.1-14.5	Behavior of Sound Waves Read 14.6-14.9
Sept. 3-6	<b>HOLIDAY</b>	Behavior of Sound Waves Read 14.9-14.13: <b>Unit 1</b> <b>Questions Due by 5PM</b>
Sept. 10-13	Intro & Electric Forces Read 15.1-15.3	<b>EXAM 1</b>
Sept. 17-20	Electric Fields Read 15.3-15.6	Electrical Energy Read 16.1-16.5
Sept. 24-27	Capacitance Read 16.6-16.10	Ohm's Law & Series Parallel Circuits Read 17.1-17.8
Oct. 1-4	RC Circuits and AC Current Read 18.5-18.8 & 21.1: <b>Unit 2</b> <b>Questions Due by 5PM</b>	Magnetic Fields Read 19.1-19.5
Oct. 8-11	<b>EXAM 2</b>	Sources of Magnetic Fields Read 19.6-19.10
Oct. 15-18	Faraday's Law and Lenz's Law Read 20.1-20.4	Applications of Faraday's Law Read 20.5
Oct. 22-25	Electromagnetic Waves Read 21.8-21.13: : <b>Unit 3</b> <b>Questions Due by 5PM</b>	<b>EXAM 3</b>
Oct. 29-Nov. 1	Reflection and Refraction Read 22.1-22.7	Mirrors Read 23.1-23.3
Nov. 5-8	Lenses Read 23.4-23.7	Wave Optics-Interference Read 24.1-24.4
Nov 12-15	<b>HOLIDAY</b>	Wave Optics-Diffraction Read 24.5-24.9: : <b>Unit 4</b> <b>Questions Due by 5PM</b>
Nov. 19-22	<b>EXAM 4</b>	Relativity Read 26.1-26.4
Nov 26-29	Relativity Read 26.5-25.6	Nuclear Physics Read 29.1-29.3
Dec. 3-6	Nuclear Physics Read 29.4-29.6	<b>FINAL EXAM</b>

The instructor reserves the right to make modifications to this list.

**Tentative Laboratory Schedule:**

<u>Week</u>	<u>Scheduled Activity</u>
Aug 20-23	<b>Oscillatory Motion</b> (due in two weeks)
Aug 27-30	<b>Damped Harmonic Motion Presentation</b>
Sept. 3-6	<b>Properties of Sound</b> (due in two weeks): Questions Regarding Exam 1
Sept. 10-13	<b>Properties of Sound</b> (due the following week)
Sept. 17-20	<b>Ohm's Law Lecture (Read 17.1-17.4) &amp; Multi-Meter Quiz</b> (due in two weeks)
Sept 24-27	<b>Multi-meter Quiz</b> (due in one week)
Oct. 1-4	<b>Capacitor Lab</b> (due the following week): Questions Regarding Exam 2
Oct. 8-11	<b>Ohm's Law</b> (due the following weeks)
Oct. 15-18	<b>DC Circuits</b> (due the following week): Questions Regarding Exam 3
Oct. 22-25	<b>Magnetic Force</b> (due the following week)
Oct. 29-Nov. 1	<b>Electromagnetic Induction</b> (due the following week)
Nov. 5-8	<b>Optical Instruments Lecture; Optics of the Eye</b> (due in two weeks)
Nov 12-15	<b>Optics of the Eye</b> (due the following week): Questions Regarding Exam 4
Nov. 19-22	<b>Diffraction</b> (due in two weeks)
Nov 26-29	<b>Final Exam Overview; Nuclear Energy Lecture</b> Read 30.1-30.3
Dec. 3-6	<b>No Lab; Preparation for Final Exam</b>

## EXAM POLICY

1. All backpacks, purses, and similar items must be placed on the floor and must be closed. Hats must be stored in a backpack or placed on the floor.
2. **No electronic devices** . This includes items such as
  - Laptops
  - Cell phones
  - PDAs
  - iPods
  - WalkmansSuch items must be turned off and placed in a purse or backpack.
3. Programmable or Graphing calculators **are not** allowed during exams. Only scientific calculators are allowed. We can supply them during an exam upon request.
4. There must be an empty seat between you and the person to your right and the person to your left.
5. There will be a **10% deduction** for students that refuse to turn in their exams, when asked to do so (at the end of class). Extra time beyond class time will not be allowed on any exams.
6. **Students not adhering to these policies will be considered as cheating on the exam.**
7. Students caught cheating on an exam will receive a zero.
  - Students caught cheating on an exam **will not be allowed** replace their lowest exam grade with their final exam score.
  - Cell phones that are not stored away can be construed as cheating.
8. Show your work on non-multiple choice problems. NO WORK=NO CREDIT.

**Students are encouraged to only bring pencils or pens on exam days.**

## Course Objectives

**A thorough understanding of physics requires the student to evaluate data and synthesize ideas to solve conceptual and numerical problems. The list of objectives below is intended to assist the student in this endeavor.**

### Laboratory Objectives:

The objectives listed below are aligned with the goals for introductory laboratories developed by the Executive Board of the American Association of Physics in 1997 (<http://www.aapt.org/policy>). Thus students are expected to:

1. Recognize the importance of experimental evidence as one of the main byways of physics knowledge.
2. Integrate abstract concepts from lecture objectives listed below into their concrete applications through experimentation.
3. Demonstrate a basic understanding of the standard instruments used in measuring and observing phenomena involving concepts in thermodynamics, waves, optics, and modern physics.
4. Explain the difference between precision and accuracy.
5. Express, characterize, and communicate the effect of experimental error on measured values.
6. Manipulate data and apply quantitative techniques, such as graphing and statistical analysis.
7. Interpret the graphical representation of data.
8. Evaluate the validity of experimental data.
9. Identify environmental factors that affect the integrity of experimental data or observations.
10. Demonstrate proficiency in using computers for the collection, analysis, and graphical display of data.
11. Exhibit cooperative skills in the collection and analysis data.
12. Develop clear, cogent reporting of experimental design, observations, analysis, and conclusions in a variety of formats ranging from informal discussion and oral presentations to formal laboratory papers and reports that adhere to accepted guidelines for formal presentation.

### Lecture Objectives:

#### Sound

The students will be able to:

1. Describe the characteristics of sound waves in terms of frequency.
2. Understand the general physical characteristics that determine the speed of sound in a fluid and in a solid and solve problems for the speed of sound under varying circumstances.
3. Define intensity and intensity level and calculate how they vary with distance.
4. Describe the Doppler Effect and apply the equations to solve for changes in wavelength and frequency of a wave as the motion of the observer and/or source change.
5. Apply the principle of interference to sound waves to explain the variation in loudness relative to the position with respect to two sources.
6. Describe the circumstances that lead to standing waves. Be able to sketch the first several harmonics of standing waves on strings and in air columns under varying boundary conditions. Solve problems involving standing waves.
7. Describe forced vibrations and resonance.
8. Use the principle of interference to describe the phenomena of beats. Be able to calculate the beat frequency.
9. Describe sound quality and how it determines the tones coming from musical instruments.
10. Describe how the ear interacts with a sound wave to produce sound. Specifically, be able to describe the structures of the ear that are involved in transforming a wave into the physiological phenomena of sound.

## Electric Forces and Fields

The students will be able to:

1. Be able to describe and explain the following physical properties of charge:
  - a. Positive and negative charges and their origin
  - b. Forces of attraction and repulsion between charges
  - c. Charging by induction and conduction
  - d. Insulators and conductors.
2. Describe and explain all of the relevant parameters of Coulomb's Law and apply to solving problems involving the forces between point charges.
  - a. Positive and negative charges and their origin
  - b. Forces of attraction and repulsion between charges
  - c. Charging by induction and conduction
  - d. Insulators and conductors.
3. Describe and explain an electric field and be able to calculate the field due to a collection of point charges.
4. Use electric fields to calculate the force on a point charge.
5. Define and explain the rules for electric field lines.
6. Draw electric field lines for simple charge distributions.
7. Describe and explain the properties of conductors in electrostatic equilibrium.
8. Describe and explain how the Van de Graff generator works.

## Electrical Energy and Capacitance

The students will be able to:

1. Define and explain electric potential and potential difference and be able to calculate the electric potential due to a distribution of point charges.
2. Qualitatively and quantitatively describe and explain the electric potential of charged conductors.
3. Understand the concept of equipotential surfaces and apply it to describe and explain charge distributions in conductors.
4. Define capacitance and calculate the capacitance for a parallel plate capacitor.
5. Determine the equivalent capacitance for capacitors connected in series and/or parallel.
6. Determine the amount of energy stored in capacitors.
7. Conceptually explain the effect a dielectric has on the capacitance and calculate the increase in capacitance given the dielectric constant.

## Electric Current

The students will be able to:

1. Define electric current and conceptually understand the microscopic model of electron flow.
2. Measure the current in circuits and the voltages across the elements in the circuit.
3. Define and explain resistance, resistivity and what is meant by Ohm's Law.

## Direct Current (DC) Circuits

The students will be able to:

1. Describe and explain sources of emf.
2. Calculate the equivalent resistance for parallel and series connections of resistors.
3. Describe and explain Kirchhoff's rules.
4. Analyze and explain the behavior of RC circuits.

## Magnetism

The students will be able to:

1. Describe and explain magnets and magnetic fields.
2. Solve problems involving magnetic forces on current carrying conductors.
3. Describe, explain and calculate the torque on a current loop and use to explain the electric motor.
4. Describe, explain, and calculate the magnetic field due to a long straight wire, current loops, and solenoids.

5. Describe and explain Ampere's Law.
6. Calculate the magnetic force between parallel conductors.

### Induced Voltages and Inductance

The students will be able to:

1. Describe and explain
  - a. Induced electromotive force (emf) and magnetic flux
  - b. Faraday's Law of induction
  - c. Motional emf
  - d. Lenz's Law.
2. Apply the concepts in number 1 to calculate the induced emf for different circumstances, and to describe and explain the behavior of a generator.
3. Describe and explain self-inductance.
4. Describe and explain the behavior of RL circuits.
5. Describe and explain the energy stored in a magnetic field.

### Alternating Current (AC) Circuits

The students will be able to:

1. Describe and explain in a qualitative way.
  - a. the behavior of resistors, inductors and capacitors in an AC circuits
  - b. resonance.
2. Describe and explain the transformer and calculate the current and voltages across the primary and/or secondary terminals.
3. Describe and explain in a qualitative way an electromagnetic wave.

### Reflection and Refraction

The students will be able to:

1. Describe and explain
  - a. the nature of light
  - b. reflection and refraction
  - c. the law of refraction
  - d. dispersion and prisms.
2. Use Snell's Law to calculate the path followed by light traveling from one medium to another.
3. Use the topics in number one to explain the characteristics of a rainbow.
4. Describe and explain total internal reflection. Be able to calculate the critical angle for various scenarios.

### Mirrors and Lenses

The students will be able to:

1. Describe and explain image formation for plane, spherical, and convex mirrors using the law of reflection and ray tracing.
2. Describe and explain images formed due to refraction.
3. Use ray tracing and the thin lens approximation to locate and describe images formed by thin lenses.

### Wave Optics

The students will be able to:

1. Use the principle of interference to describe and explain Young's Double Slit experiment.
2. Describe and explain phase changes due to reflection.
3. Describe and explain thin film interference.
4. Describe and explain diffraction, single slit diffraction, and the diffraction grating.
5. Describe and explain polarization and the variety of ways to achieve it.

### Optical Instruments:

The students will be able to

1. Describe and explain selected of the following
  - a. The simple magnifier
  - b. The compound microscope
  - c. The camera
  - d. The telescope
  - e. The eye
  - f. The Michelson interferometer
  - g. Resolution of single slit or circular apertures.

### Modern Physics

The students will be able to:

1. Distinguish between the physical aspects of classical physics and modern physics.
2. Describe and explain selected topics in modern physics.

# Attention!

## 1<sup>st</sup> time WebAssign users, look here!!!

If you are in Physics 4A-C, 2A, or 2B, you will be required to complete your homework assignments using an online service called WebAssign. It provides a number of advantages for completing these assignments, such as creating a unique set of problems for each and every student by modulating the problem's data.

To log in the first time go to <http://www.webassign.net> click "**I have a class key**", type in the class key **sierracollege 7926 4464** and select "**I need to create a Webassign account**" if you are new to Webassign. Then enter your preferred used name and a password. Fill in the required student information too. Finally, click "**Create my Account**". Each time you log into Webassign you will need to enter your the following

Example (student named John Doe with password 1234):

Username: jdoe

Institution: sierracollege

Password: 1234 (this will be masked as asterisks on the web page)

Once you are logged in, follow the on-screen directions to complete the registration procedure using your "Student Access Card" which you purchased at the Bookstore. When you enter your access code according to the directions, do not enter the hyphen (or "dash"). For example if your access code is AT5671-4388, then enter AT56714388 into the box.

Remember to change your password! After logging in, you will see a "change password" link in the top toolbar. Click this, enter your old password and your new password twice, and click "submit". You now have a secret password that only you know. Do not share this with anyone. If you forget your password, see your instructor.

Technical Support: After you log in, notice that under "Student Resources" (upper left) there is a "Technical Support" link. You can follow this to the "Student Manual" which is a complete student user's manual that you are invited to study.

## If Webassign marked you wrong again, did you remember to.....

1. Use only 3 significant figures. Webassign accepts your answer with  $\pm 1\%$  uncertainty.
2. Use scientific notation if the number is very small or very large. When using scientific notation use the letter 'e' or 'E'.

Example:

$$11\ 400 = 1.14e4 = 1.14E4$$

$$2\ 590\ 000 = 2.59e6 = 2.59E6$$

$$0.00000569 = 5.69e-6 = 5.69E-6$$

3. Enter the correct sign on your answer; if it is positive leave it out and if it is negative use '-'.  
Example:

$$+11\ 400 \text{ enter } 1.14e4$$

$$-11\ 400 \text{ enter } -1.14e4$$

4. Enter your answer with the correct units.

5. Use the correct magnitude for your answer when the units are specified.

Example:

$$1\,120\text{ N} = 1.12\text{ kN (kilonewtons)}$$

$$5\,230\,000\text{ N} = 5.23\text{ MN (meganewtons)}$$

6. Coordinate directions are arbitrary for vector quantities. You may have selected a coordinate system different than WebAssign. For one-dimensional problems for example, if your answer is marked wrong try changing the sign on your answer and resubmitting.

## **Saving Unfinished Assignments:**

If you are unable to complete the assignment in one sitting, it is necessary that you save your work. Unlike a word document that can be saved through the file menu, a WebAssign is saved through the grading process. Before leaving your assignment, you must [Submit for Grading](#). This submission records your work, allowing you to return exactly where you left off. Upon returning to WebAssign, in order to retrieve that which was submitted in your previous session you must then go to [Review Last Submission](#) in order to retrieve your work to continue. If you do accidentally submit a blank WebAssign for grading, it is possible to retrieve previous submissions by going to [Review All Submissions](#). From this record, you can find the “most complete” last submission to get all your correct answers which would then have to be re-entered in a new submission.

## Physics Computers: First-time Log In

The Physics Laboratory (S-107) combined has several computers. They are all connected to a network under the Physics Domain.

When you log in for the first time to the network you should provide a **Username** and a **Password**. The Username will be your first initial of your first name followed by your last name, and the Password will be the last four digits of your Student ID number. You can keep the original password or change it to a new one after your first log in.

Because everyone's user profile resides on the Physics Server, each student has a unique profile (your desktop settings, your program configurations...etc.) regardless of which computer is used. Because your profile is unique, you can change it over time. However some items in your profile must be set and configured immediately. Please follow the instructions below the first time you log in. If you need assistance, see your instructor, a Physics Tutor, or Ms. Shang.

### 1. **Install network printers:**

Click "Start" on your desktop, and choose "Printers and faxes" → "Add a printer" → "A network printer". Select "Find a printer in the directory" and click "Next". Click "Find Now" button in "Find Printers" window, and select "HPLaserJ8000\_S105\_Students" for the print located in Tutor room (S-105), and "HPLaserJ2430\_S107\_Students" for the print located in Lab room (S-107), and then click "OK" and "Finish".

### 2. **Save your files on Physics Server:**

- Find your folder on Physics Server  
Click the shortcut "Student Folder on Physics 1" on your desktop, select your class folder (e.g. "Physics2A") → your folder with your username → create a shortcut (of your folder) on your desktop
- Save all your files into this folder

### 3. **Miscellaneous:**

- Change your desktop to "classic window"(if you prefer)  
Right click anywhere on the Task Bar (bottom of the desktop), and choose "Properties", click "Start Menu" button, and select "Classic Start menu", and click "OK".
- Screen Saver  
Right-click anywhere on the desktop, choose "Properties", click "Screen Saver", pick a screen you like, set waiting time to 10 minutes, and click "OK".
- Don't forget to save your file and log off  
Because computers will sometimes malfunction, we highly recommend that you save your work periodically. And be sure to log off the computer when you leave if you don't want other people to mess-up your settings or access your files.

## CLASSROOM EMERGENCY PROCEDURES – ROCKLIN CAMPUS

Faculty members are responsible for the safety and well-being of students during scheduled instructional activities. It is expected that each semester, faculty will notify their students of Sierra College emergency procedures both verbally and in the course syllabus.

If an emergency occurs in the immediate area, faculty should to contact Police Services at Extension 1111 from any on-campus phone or emergency phone or 624-3333 (and press 1 - 1111) from an outside line.

In the event of a campus emergency, lines of authority may change. Faculty will be expected to follow the direction of those who have been placed in charge of specific functions relating to the emergency. Faculty will be contacted as appropriate regarding the situation and given instructions on further actions needed.

### IMPORTANCE OF ATTENDANCE DOCUMENTATION

In the event of an emergency, it is vital to be able to account for the whereabouts of all students, faculty, and staff. Faculty who take attendance, should keep rosters with them and turn them over to the appropriate authority upon demand. Faculty who do not regularly take attendance, should work with students to develop a buddy system or some other method of accounting for all of the students in the section.

### FIRST CLASS MEETING

- 1) Review emergency exits for the room and building.
- 2) Review location of nearest emergency phone.
- 3) Identify building evacuation gathering point(s).
- 4) Notify students that if more than one building is being evacuated the primary gathering point is the theatre, with the gym as the backup location if the theatre is not available.
- 5) Develop a “buddy” system or other method for attendance accounting.
- 6) Review the actions to be taken in the event of an evacuation.
- 7) Review the actions to be taken in the event of a lockdown or shelter in place.
- 8) Notify students that backpacks and other personal belongings are to be kept with them at all times. Backpacks left unattended pose a risk and may be confiscated or destroyed.

### IN THE EVENT OF AN EVACUATION ALARM OR COMMAND:

- 1) Instruct students to gather personal belongings.
- 2) Proceed with class to the established gathering point.
- 3) Report to the emergency staff assigned to supervise the gathering point.
- 4) Wait with class at the gathering point until given further instructions by the appropriate emergency personnel.

### IN THE EVENT OF A COMMAND TO LOCK DOWN:

- 1) Close all doors and lock, if possible.
- 2) Close all blinds and drapes.
- 3) Turn off any unnecessary equipment.
- 4) Keep everyone away from all windows.
- 5) Instruct students to remain as quiet as possible.
- 6) Do not allow anyone to leave until notified by emergency personnel.
- 7) Ask students to turn cell phones off to free up frequencies for emergency personnel.

### IN THE EVENT OF A COMMAND TO CREATE SHELTER IN PLACE:

**Follow all steps identified for a lock down. Additionally, ensure that all ventilation is either closed or shut down.**

# Physics 2B Lab Guidelines

## Introduction

The laboratory serves two purposes. First, it is used to integrate abstract physical concepts discussed in class with its applications in the real world. This is an important way to help students to better understand concepts such as Newton's Second Law, conservation of energy and momentum, and Faraday's law. Moreover, it gives the student a well-rounded understanding of physics.

The second purpose of the laboratory is to introduce the student to scientific investigation. As a result, scientific investigations provide the student an opportunity to handle laboratory equipment, and help her or him develop an appreciation for the care, tedium, and persistence required to make precise and accurate measurements of physical quantities in the real world. Scientific investigations also help each student develop or improve analytical and critical thinking skills. I do hope the analytical and critical thinking skills gained in the course will become an asset in your future endeavors.

## Lab Expectations

### Rules of Conduct:

For your safety, the safety of others and for common courtesy there are several rules you must adhere to when working in the lab. They are:

1. **Come to lab at the time you sign up for on the sheet posted in S-107.**
2. **Keep noise level low.**
3. **No open food or drink is allowed in the lab or lab discussions.**
4. **Use equipment in a safe and careful manner. Always be informed of any danger before beginning. If in doubt, "ask" before proceeding. Please leave equipment in good order.**
5. **Inform your instructor immediately if you have any problems with procedure or equipment.**
6. Computers and printers are to be used for assigned physics projects only.
7. Reports (complete and stapled) are due at the beginning of discussion section on due date, even if you cannot attend that session. You can always turn it in before the due date, in my office, by email, or by fax.
8. The sizes of the lab groups are to be determined by the instructor. "Observing" other lab groups is in general not allowed.
9. You must attend your assigned discussion section. Any changes must be pre-approved by your instructor.

**Students that miss three lab meetings will be automatically dropped from the course.**

10. Lab reports must reflect your individual efforts. Any evidence to the contrary could result in the loss of credit for all reports.
11. Do not touch any equipment that is not directly related to your equipment. Unauthorized experiments are strictly forbidden.
12. Analyze your data as soon as possible to allow time to repeat data collection if unsatisfactory results are obtained.

## Lab Quizzes

Pre-lab and post-lab quizzes will be administered as the need arises. The pre-lab and post-lab quizzes are worth 10 points.

## Lab Reports

All lab reports are due at the beginning of class on the due date!!!!

Each lab report will be worth 20 points. There will be an automatic 5 point deduction if the lab is turned in by 5:00 PM on the due date and a 5 point deduction per day thereafter. For example, if a report is turned in one week late, the maximum number of points possible is **negative 10 points!!**

Each report up is self-contained. For the most part, you will be filling in the blanks or data tables, answering pertinent questions, and in some cases writing a summary of your experimental results in the lab handout. You are free to change the format of the report as long as you include an introductory paragraph and other pertinent materials (data, tables, graphs, calculations, answers to questions, and sometimes a summary). Lab reports can be handwritten (please write legibly), typed on a word processor or the computer based laboratory software. **Do not turn** in a report that is partly typed and partly handwritten (three points will be automatically deducted). **Do not change** format in the middle of your report (three points will be automatically deducted).

*Handwritten reports must be typed or neatly written in **blue or black ink**. The maximum point total for a typed report is 20 points, while the maximum point total for a handwritten report is 16. Do not make any unnecessary marks or scratch outs on your reports. If required use Whiteout™. Ten points will be deducted for any report written in pencil. Five points will be deducted if any part of the report is written in pencil.*

You must treat your report as if you were to giving it to your supervisor at work. Remember your supervisor will only accept a report that looks professional. Please do not make any unnecessary marks in the margins or on the backside of your reports. The longer it takes the instructor to read/decipher what you have written, the lower the score you will receive.

You must adhere to several guidelines when writing a lab report. Your lab report grade will in part be based on adherence of these guidelines. All reports must be representative of your own work. The graphs, drawings, the Theory section, the Analysis section, answers to questions, and the conclusion must reflect the student's individual effort; otherwise points will be deducted!

**The penalty for a plagiarized lab report is a grade of zero points. Students caught “fudging” data will receive zero points for their lab report! Please refer to the Sierra College Student Handbook.**

## Data

If a data run yields very bad results, please write a summary at the end of your report to explain these errors (less points will be deducted if you do this). **Never, ever, ever**, ascribe poor results to human error (automatic 2 point deduction), since you have the experimental procedure on paper. The term “human error” implies you don't know what you are doing.

Do not use “see attached sheets” unless you need additional space to present data to the instructor. If additional sheets are required, the additional sheets must have the same format (which means that if it is written on a word processor, the attached sheets must be typed on a word processor) as the laboratory report, and must be attached with the data section (do not attach additional data sheets at the end of the report).

## Summary

In some lab reports, you will be asked to write a summary or conclusion of your results. All summaries

must include an explanation of each new concept pertaining to the experiment; a statement of the experimental procedure; and the corresponding results. Some experiments will require you to compare an accepted or theoretical value to your result. In such cases, indicate possible reasons for any discrepancies. Please indicate and discuss any curious or interesting observations you made. Also one needs to answer and discuss the question, “were the goals of the experiment achieved”? or “did the results agree with the hypothesis?” Your summary should be at least 50 words in length.

## Graphs

In some lab reports, you will be required to plot data on a graph by hand. In others, you will plot data using computer software. **In either case, all graphs must have a your name, a title (centered at the top of the graph) and labels (including proper units) for the horizontal (abscissa) and vertical (ordinate) axes.**

If data is plotted by hand on graph paper observe the following rules.

1. Use ruled mm graph paper (graph paper type #12188 is available in the bookstore)
2. Always use separate sheets of graph paper for each graph.
3. Use a ruler to draw the horizontal and vertical axes for the graph. I prefer the use of pencils to pen on graphs.
4. Since we will generally be interested in evaluating linear relationships ( $y=mx+b$ ) between variables calibrate each axis so that the range of data covers the entire length of the axis. Use a convenient and (of course) uniform scale such as 1.0 unit per division, not 1.03 units per division.
5. Plot each data point as precisely as possible. Each data point should be plotted as a dot surrounded by a circle, square or triangle that shows where the point is located even if the dot is obscured by the curve drawn through it.
6. Draw a line that best fits your data (**do not connect the dots**). As a rule of thumb, a good fit to data that has some scatter it should have as many points above the line as below it. If the data has little or no scatter your best fit to your data should go through the data points. If the relationship between the variables is not linear, do not draw a line between the point until a relationship between them is determined. In such case a procedure to determine the relationship will be outlined in class.
7. To find the slope of the line when the relationship between two variables is linear, pick two points (and identify their coordinates on the graph) at the extremes of the line draw a light vertical line through one point and a light horizontal line through the other. The intersection between the two lines will be at right angles. The slope of the line,  $m$ , is the difference in the vertical coordinates of the chosen data points divided by the difference in the horizontal coordinates of the chosen points. The  $y$ -intercept  $b$  is the point in which the “best fit” line crosses the vertical axis. You are allowed to show your slope calculation on the graph.
8. All of the data we will analyze will have a consistent relationship between the variables (linear, parabola, log *etc.*). If your data is not consistent, determine a possible reason why the data was bad and record it in your lab report. In such cases, you will need to collect additional data. Remember graphs are not only used to observe systematic trends, but they also serve to reduce the inherent error in your data.

If data is plotted using software (e.g. DataStudio, Graphical Analysis, Excel, or Quatro Pro)-

1. See item 7 and 8 above if you are told to determine the slope of the data by hand. Otherwise, use the statistical analysis options of the software.

## Drawings

All hand drawn figures, diagrams and sketches require a ruler, compass, French curve *etc.* You can hand draw figures even if you are writing your report on a word processor (this will not constitute a change of format), as long you use a ruler, compass, French curve *etc.* You can't use

a pencil for drawings. Pencil is only allowed for special circumstances to be determined by the instructor.

## Grading Criteria

Points will be deducted from your lab reports for infractions of the following:

- [ ] Significant figures (rules followed correctly throughout the report)- 2 points maximum.
  - [ ] Format (staple, no pencil, title page, organization, neatness, clarity, and spelling)-20 points maximum
  - [ ] Units (correct units)-4 points maximum
  - [ ] Data (correct and complete)- 20 points maximum
  - [ ] Calculations (correct and complete; show formulas used and include units)-10 points maximum
  - [ ] Individual effort-variable, for example **five points will be deducted** if you worked in groups of **four** or more without the instructor's consent. Points will be deducted, if the instructor believes the student has not read the lab before performing the experiment. **Mandatory 20 point deduction for cheating!!!**
  - [ ] On Time-1 to 20 point deduction (5 pts if you're 5 min late to class)
  - [ ] Accuracy of results-3 points maximum
  - [ ] Attachments (calculation sheet)-2 points maximum per attachment or sample calculation
  - [ ] Experiment Summary or Conclusion -4 points maximum, if applicable.
  - [ ] Graphs (labels, title, curve fit, sizing)- 4 points maximum per graph.
  - [ ] Others (mistakes not covered above)-questions, theory, completeness

You will be **guaranteed** a score of no less than 15 if **all** of the following conditions are met:

- a. You turn in the report on time at the **beginning of class on the due date**.
- b. All calculations and analysis are correct.
- c. Your sample calculations (when asked to show them) are turned in.
- d. Your report is typed with little or no format errors.
- e. You followed the experimental procedure correctly.
- f. Your report reflects your individual work.
- g. You do not change format in your report.
- h. Your report is complete.

The possibility to get a score of 20 will depend on your ability to write a neat report, correctly answer pertinent questions, obtain accurate results, and write a good summary. A perfect score of 20 implies that the instructor cannot find anything that requires correction.

## Syllabus Affidavit

Please place your initials after each statement.

1. I completely understand the grading policy for this course. I understand that the grade I receive is the grade I **earn!** Furthermore, I recognize that I should not embarrass myself by groveling for extra points at the end of the semester to get the grade I want instead of the grade I earned. \_\_\_\_\_
  2. I completely understand the grading policy for this course. \_\_\_\_\_
  3. I understand the homework policy. \_\_\_\_\_
  4. I understand that if I miss three lab meetings I will be automatically dropped from the course (students that leave lab meetings early are counted as absent).  
\_\_\_\_\_
  5. I have read and I understand the attendance policy described in the syllabus. I also understand that vacations should be planned around all exams. \_\_\_\_\_
  6. I have read and I understand the course requirements and exam policy listed in the syllabus. \_\_\_\_\_
  7. B if my lab average is below 50%. \_\_\_\_\_
  8. I understand that I will receive a “zero” grade for **academic misconduct** if I cheat on exams, quizzes, or laboratory reports. **Furthermore, I understand that “zero” grades on exams due academic misconduct cannot be replaced with the final exam score.**  
\_\_\_\_\_
  9. **I understand that there are no make-ups for the first missed exam, no matter how extreme the circumstance.** \_\_\_\_\_
  10. I have read and understand the topical content of this course. \_\_\_\_\_
  11. I understand that it is my responsibility to understand the terms described in this syllabus. \_\_\_\_\_
  12. I understand that if I disregard item 1 in this affidavit and grovel for points at the end of the semester, **I will lose the bonus the points I received by signing this form!!**  
\_\_\_\_\_
  13. Sign and Date: \_\_\_\_\_
  14. **Print Name Clearly:** \_\_\_\_\_
- You will receive five extra credit points toward your final grade if you have read the syllabus and have signed and returned this form.