

PHYS 1416, GENERAL PHYSICS I

Fall Semester, 2014

Physics Department, Dr. Evelyn Potter, Department Chair

COURSE DESCRIPTION

A precalculus-based introduction to Newton's laws of motion, gravitation, fluids, and sound. This course includes one semester hour credit for laboratory sessions.

COURSE SEQUENCE IN CURRICULUM

General Physics I is the required first course in physics for physics majors and other students requiring courses in physics.

PRE-REQUISITE INFORMATION

MATH 1434 or MATH 1451 or a satisfactory score on a departmental placement exam.

INSTRUCTOR INFORMATION

Name: Dr. Gardo Blado
E-mail: gblado@hbu.edu
Office Phone: 281-649-3187
Office Location: S217
Office Hours: To be announced in class
Web Page Address, Web Board, ListServ: See Blackboard

LEARNING RESOURCES

Course Text: College Physics, 9th ed., by R.A. Serway and J. S. Faughn
Supplementary Text: NONE
Other Required Materials: NONE

COURSE OBJECTIVES

Purpose of the course:

This precalculus-based course provides the student with the knowledge of physical fundamentals necessary to study and understand more advanced subjects in physics and other sciences. The course deals specifically with mechanics and vibrations. The major emphasis is on problem solving through an understanding of physical principles.

Aims for the course:

This course is designed to equip students with the basic physics knowledge they need to solve problems in mechanics, waves and vibrations.

On completion of this course, students should be able to:

1. understand dimensional analysis and order of magnitude estimations as applied to the physical world
2. have a proficiency in the use of elementary vector analysis.
3. understand kinematics and dynamics as applied to motion in one and two dimensions and rotational motion.
4. understand and be able to apply Newton's three laws of motion in solving physics problems.
5. understand and be able to apply the concepts of work and energy.

6. understand the principle of conservation of energy with respect to potential energy and kinetic energy.
7. understand the concept of conservation of linear and angular momentum.
8. understand oscillatory and wave motion and the superposition of waves with specific applications to sound waves.
9. understand the principles of fluid mechanics.

RELATION TO DEPARTMENTAL GOALS AND PURPOSES

The Mathematics/Physics Department "...will offer an academically rigorous, undergraduate curriculum in classical and modern mathematics. The curriculum will prepare students majoring in mathematics and mathematical studies for careers and further education in mathematics and will encourage a lifetime of learning."

"...will provide academically rigorous and modern courses in mathematics to support other programs at the University."

"...will offer courses to enable all graduates of the University to become mathematically literate and develop useful skills in mathematics."

"...will provide the appropriate administrative processes, facilities, research experiences, and faculty to achieve the goals stated above."

RELATION TO COLLEGE GOALS AND PURPOSES

"...to prepare students for careers and further education in the natural sciences and mathematics in a nurturing Christian environment. The College will also serve the HBU community by providing science and mathematics classes that empower HBU students to meet the goals and requirements of their field of study and enrich their liberal arts education."

RELATION TO THE PURPOSE STATEMENT OF THE UNIVERSITY

University mission and purpose statement from the Houston Baptist University Catalog, 2009-2010: "...to provide a learning experience that instills in students a passion for academic, spiritual, and professional excellence as a result of our central confession, "Jesus Christ is Lord"

"...Committed to providing a responsible and intellectually stimulating environment that:

- fosters spiritual maturity, strength of character, and moral virtue as the foundation for successful living
- develops professional behaviors and personal characteristics for life-long learning and service to God and to the community
- meets the changing needs of the community and society
- remains faithful to the '**Nature of the Institution**' statement"

"...Promotes learning, scholarship, creative endeavor, and service".

ATTENDANCE

Please see the official Attendance Policy in the HBU Classroom Policy on Blackboard. Students missing more than 25% of the class will be given a failing grade.

For this class, after 12 absences, the student will get automatically a grade of "F".

ACADEMIC ACCOMODATIONS

Students needing learning accommodations should inform the professor immediately and consult the Academic Accommodations section of the HBU Classroom Policy posted on Blackboard.

COURSE REQUIREMENTS & GRADE SCALE

Course requirements:

Note for Seniors: If you are graduating this semester, **PLEASE IDENTIFY YOURSELF TO ME AS SOON AS POSSIBLE!**

Calculators: During tests, **GRAPHING CALCULATORS ARE NOT ALLOWED!** Make sure you have a scientific calculator that can calculate trigonometric functions.

Cell Phones: During tests, **CELL PHONES ARE NOT ALLOWED!** No Exceptions!!!

Homework Problems: The assigned sample multiple-choice questions will be given in class. I will place the solutions to the sample multiple-choice questions in Blackboard, which I expect you to study. We will use an online homework system. You will use Web Assign to do and submit homework. The class key will be given in class. **You need to self-enroll. For instructions to self-enroll, read the handout in Blackboard "Self Enrollment Instructions". Please use your official HBU name when you enroll otherwise I will not consider your grades and you will get a zero for the HW!** **Assignments are due at midnight of the day in which it is due.** It is your responsibility to check the homework due everyday! I do not postpone the WebAssign for any reason except when we have not finished covering the sections included in the homework. Excuses like 'I forgot, my computer crashed, WebAssign was unavailable, I had a family/personal emergency, etc.' will not be considered as valid excuses. Your WebAssign grade will be normalized out of 100 pts. (like 1 exam grade).

Quizzes: As mentioned above, I will give 5 quizzes (worth 20 points each) on assigned homework problems (**or similar problems**), example problems discussed in class from sections covered (**or similar problems**) and conceptual questions. **I do not give make up quizzes.** However, you can talk to me about missed quizzes if you feel the need for it. You must talk to me about a missed quiz within three days from the time the quiz is given. Otherwise, I will not entertain any discussions on the missed quiz. If you know that you will miss the quiz beforehand, it is best to talk to me or contact me, before the quiz is given. Inability to contact me in time to talk about a missed quiz is not an excuse. You can go to me during my office hours, leave a note on my door, leave a message in my office voice mail, or e-mail me.

Exams: The instructor may check the students' HBU ID's before exams! Students are expected to bring their HBU ID's during every exam. NO ID NO EXAM (SO YOU GET A ZERO) NO EXCEPTIONS! I will give 3 exams (100 points each) and a final exam (worth 200 points). The **2 ½ -hour final exam** will be comprehensive. . PLEASE NOTE THAT I DO NOT RESCHEDULE FINAL EXAMS! PLAN TO TAKE THE FINALS DURING THE DESIGNATED TIME. **I do not give make up exams.** However, you can talk to me about missed exams if you feel the need for it. You must talk to me about a missed exam within three days from the time the exam is given. Otherwise, I will not entertain any discussions on the missed exam. If you know that you will miss the exam beforehand, it is best to talk to me or contact me, before the exam is given. Inability to contact me in time to talk about a missed exam is not an excuse. You can go to me during my office hours, leave a note on my door, leave a message in my office voice mail, or e-mail me.

Grading standards:

Course grading is as follows:

Homework		= 100 pts
Quizzes*	5 x 20	= 100 pts
Exams	3 x 100	= 300 pts
Finals	1 x 200	= 200 pts
<u>Lab Grade**</u>	<u>7 x 20</u>	<u>= 140 pts</u>
TOTAL***		= 840 pts

* # of quizzes subject to change

** The Lab Grade depends on the laboratory reports

*** The TOTAL is subject to change depending on the above grades

The grading scale is:

grade = 90% or above → A

grade = 75% to 89% → B

grade = 60% to 74% → C

grade = 50% to 59% → D

grade = below 50% → F

PROFICIENCIES:

Technology component:

The technology component of the course involves the use of micro-computer-based laboratory (MBL) in data acquisition and data analysis in some laboratory experiments, the use of the Classroom Performance System during lecture and the use of the online homework system called WebAssign.

Designated essay/writing component:

Students are required to write several laboratory reports that constitute a part of their final grade.

Reading component:

The students are expected to read and understand the textbook.

Oral communication component:

The students are encouraged to ask questions in class, and join in classroom discussions with other students during the laboratory and collaborative learning exercises.

Mathematics component:

The class assumes and fully utilizes a working knowledge of algebra, trigonometry, and precalculus.

Critical thinking component:

In quizzes and examinations, students are expected to apply the concepts learned in new situations by solving both quantitative and conceptual problems.

LATE WORK & TEST POLICY

Late work:

Late work is heavily penalized.

Missed tests:

No make up tests are given. The instructor will deal with missed tests on a case by case basis.

EVALUATION

Method of student appraisal of faculty:

Students will be given an opportunity to appraise the professor by completing the IDEA Faculty Evaluation Questionnaire, and/or the COSM course evaluation at the end of the semester. The instructor, the department chairman and dean will review the responses of the students after the completion of the course.

Method of evaluating student response to course:

Students will be given an opportunity to describe their response to the course by completing the IDEA Faculty Evaluation Questionnaire and/or the COSM course Evaluation at the end of the course. The instructor, the department chairman and dean will review the responses of the students after the completion of the course.

LABORATORY DRESS CODE

Students may be asked in advance to wear closed-toed shoes and long pants during certain experimental procedures.

LABORATORY CONDUCT AND SAFETY

LABORATORY POLICIES:

1. A student **MUST PASS the laboratory part to pass the whole course.** To pass, a student must have at least half the total points for the laboratory reports (see Grading Standards below).
2. Laboratory attendance: During the laboratory class, I will give a 20-minute discussion about the experiment at the beginning of the class. After the discussion, I leave the class for the students to do the experiment. A TA will always be available for your questions. I will go in and out of the classroom to check on the class every about 15-20 minutes. Of course, you can ask my help by going to my office at anytime.
Students are expected to be in class on time! If you are late, you will get 5 points off your laboratory report or Problem Solving grade for that experiment or session! Students are not supposed to leave the classroom during the laboratory session before completing the experiment or before the end of the problem solving session. Students who need to leave must ask the instructor's permission. **Any student who leaves the classroom at any time before the completion of their experiment or before the end of the problem solving session without permission from the instructor will get 10 points off their laboratory report or Problem Solving grade for that experiment!**
3. If not enough set-ups are available, I will divide the class into two laboratory sessions.

4. The laboratory instructions will be posted in Blackboard before the experiment. **I expect you to read the instructions before coming to class.**
5. Laboratory Reports can be written legibly by hand or word-processed. You may use pad paper or regular bond paper for your reports
6. After each experiment, each student has to have his/her own data sheet signed by the instructor or TA. For the TA or instructor to sign your data sheet, **you should have at least filled out the value of all the quantities which are directly measurable.** The signed data sheet has to be submitted with the laboratory report. Otherwise, no grade on the laboratory report will be given.
7. Each laboratory report is worth 20 points.
8. Laboratory reports are due the next laboratory meeting after the experiment is performed. Late laboratory reports will be penalized!!! 20/7 points will be removed for each day that a laboratory report is late. This means that if you submit your lab report 7 days late (including Saturday and Sunday), you get a zero!
9. Students who are unable to perform an experiment (with a valid excuse) during their scheduled class, must perform the experiment during some other class period while the set-ups are available. The student must inform the instructor of the situation. Little consideration will be given to students unable to comply with this. **NOTE: The same rule will still be applied to late laboratory reports as discussed above!** For instance, if you missed your Wednesday laboratory class, YOU STILL HAVE TO SUBMIT YOUR LAB REPORT THE WEDNESDAY OF THE NEXT WEEK NO MATTER WHEN YOU PERFORM THE EXPERIMENT!!!
10. **NOTE!!! RETURN TO ME YOUR GRADED LABORATORY REPORTS as soon as you have looked at it in class!!! You will get ZERO for every laboratory report you do not turn back in!!!**
11. **Explanation of Laboratory Reports:** Some laboratory reports will involve only the presentation of the data, calculations and answers to questions. Others will involve writing complete laboratory reports with the following sections: OBJECTIVE, METHOD, DATA, SAMPLE CALCULATIONS, RESULTS, CONCLUSIONS and ANSWER TO QUESTIONS. These sections for the complete laboratory reports are described below.

OBJECTIVE: Never, never just copy, word for word, the OBJECTIVE/PURPOSE that is already in the laboratory instructions! Think for yourself and just use the laboratory instructions as a guide! It is advisable to write this after writing the whole laboratory report. At that time you already have a bigger picture of what the experiment was all about and hence you are in a better position to give an OBJECTIVE/PURPOSE. Perhaps, start the sentence with "*In this experiment, we...*". Good words to use are "test", "investigate", "measure", and "examine".

METHOD: Never, never just copy the Procedure in the laboratory instructions!!! Just summarize! If I were you, I will write it up after the experiment right away or read the procedure then just summarize in your own words what you did. Include **crucial equations** within your discussion. Just listing the equations at the end of your method is not acceptable! They must appear as you explain certain steps where the equations play a significant role! However, you **do not** need to show derivations! This section of the report should contain both procedure and theory woven into a concise but readable story.

DATA: Fill up **all** the blanks on the data sheet. If your original data sheet (with the TA's or the instructor's signature) is neat enough, you can submit it with the

laboratory report. **Make sure you clearly express the units and the uncertainties (i.e. \pm) of all data.**

SAMPLE CALCULATIONS: Exhibit one sample calculation **for each different equation** used in your analysis. Examples of important calculations (but are not confined to these) are calculations of quantities that depend on directly measured data, uncertainty calculations for quantities that depend on directly measured data, percentage errors, etc.

In a sample calculation, first, **show the equation in its symbolic form** (meaning in terms of variables). Next, **show it with numerical values** in place of the variables. Then **show the result**. Make sure you put the proper units in your resulting numerical value!!!

RESULTS: In the DATA sheet that is provided, there are basically **two types** of quantities, namely **directly measured** and **derived quantities**. Derived quantities are calculated using formulas (usually discussed in the theory section of the experiment write-up or in class) involving the directly measured data. The results of your calculations of the derived quantities **must be included** in the RESULTS section. Often, this will simply be a matter of copying the table of derived quantities that I have already included in the DATA sheet. Note to **always include the \pm (calculated uncertainties)** of the derived quantities. Graphs are also included in the RESULTS section. Put **one graph per sheet** of graph paper. Label the axis and put a meaningful title on the graph.

CONCLUSIONS: Discuss the interval $(X_{\text{expt}} - \Delta X) < X_{\text{actual}} < (X_{\text{expt}} + \Delta X)$ of important quantity or quantities that is or are being verified by the experiment. Do they fall on the above interval?

From the preceding paragraph, if a quantity falls within the interval then only random (or scale-limited) errors are present. Otherwise, systematic errors and blunders may also be present. Identify the types of errors and the sources of these errors in the experiment.

Discuss how to improve the experiment. Use your experience in doing the experiment as your guide. Talk about ways to make the results of the experiment better; make the performance of the experiment easier, or more convenient; make the instructions clearer. Is the sequencing of steps correct? Should there be additional steps that must have been included in the experiment to make it clearer, etc.

ANSWER TO QUESTIONS: Put your answer to all questions in this section. Put proper labels to your answers (like #1, #2, etc.)

12. For the complete laboratory report, read the Sample Lab Report that I placed in the reserve section of the library with the homework solutions or in Blackboard.
13. **Please Note!!! As shown in the Sample Laboratory Report, you have to indicate the names of your partners in your group!** Otherwise you will get points off! **You have to do this for every laboratory report, even the ones which are not complete laboratory reports (those which involve only the presentation of the data, calculations and answers to questions).**
14. Grading of the Laboratory Reports (this is subject to changes depending on the experiment)

OBJECTIVE: 1 point

METHOD: 2 points

DATA: 2 points

SAMPLE CALCULATIONS AND RESULTS: 12 points

CONCLUSIONS: 3 points

TOPICAL OUTLINE - include table, calendar, or topical outline with dates

Topics Covered:

Class Date or Meeting	Topic: Class Assignment
TBA	I. Measurement and Vectors
TBA	II. Motion in One Dimension
TBA	III. Motion in Two Dimensions
TBA	IV. The Laws of Motion
TBA	V. More Applications of Newton's Laws
TBA	VI. Energy and Energy Transfer
TBA	VII. Potential Energy and Conservation of Energy
TBA	VIII. Linear Momentum and Collisions
TBA	IX. Rotational Motion
TBA	X. Gravitation
TBA	XI. Oscillatory Motion
TBA	XII. Mechanical Waves and Sound
TBA	XIII. Superposition and Standing Waves
TBA	XIV. Fluid Mechanics

Tentative Schedule:

Tentative Schedule of Quizzes and Exams: Please refer to the "Tests Schedule" in Blackboard. Take note of the schedule to enable you to plan your preparation for the exams and quizzes:

LABORATORY SCHEDULE: Please refer to the "Laboratory Schedule" in Blackboard. Take note of the DAY in which we have **LECTURE** (for 2 hours) during the lab period. The schedule posted is subject to change. The students will be notified accordingly.

The content of this outline and the attached schedule are subject to change at the discretion of the professor.

Student Signature – I have read and understand the syllabus for this class. I understand that the content of this syllabus and the topical outline are subject to change at the discretion of the professor. I have read and understand the HBU Classroom Policy posted on Black Board. **I promise to uphold the Code of Academic Integrity at Houston Baptist University and will not tolerate its violation by others.**