1. Course Overview and Objectives

Physics 2211 is a calculus based study of mechanics and waves. The objective of the course is to introduce physics ideas and concepts which will enable you to describe motion of objects, what causes changes in an object's motion, and how conservation laws (both momentum and energy) help to understand motion from a new and different perspective. In the process the concepts of momentum, kinetic energy, and potential energy will be introduced. The course will then discuss how you use energy and how it transforms from one form to another. The course will also introduce motion that repeats itself (periodic motion) and explain the physics of simple harmonic motion. In addition to the traditional labs that are typically part of an introductory physics course, you will also learn how to use numerical computation to simulate motion. The codes (programs) used to simulate motion will be written in Visual Python.

Prerequisite(s): MATH 2012 concurrently.

2. Course Instructor

Professor and Lab Instructor: Dr. Trinanjan Datta, Office: Science Hall, C3018 (in the Atrium)
Phone: 706-667-4516, Email: tdatta@gru.edu

Lecture, Laboratory, and Visual Python Laboratory session hours:

<table>
<thead>
<tr>
<th>Time</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWF</td>
<td>PHYS2211A</td>
</tr>
<tr>
<td>11:00 – 11:50 AM</td>
<td>E1051</td>
</tr>
<tr>
<td>R, 13:00 – 14:45 PM</td>
<td>W3007</td>
</tr>
<tr>
<td>W, 14:30 – 15:20 PM</td>
<td>N344</td>
</tr>
</tbody>
</table>

Office hours: Monday 2:00 – 5:00 PM or as arranged
Visual Python office hours: Monday 12:00 – 1:00 PM and Tuesday 2:30 – 3:30 PM

3. Required Materials

Textbook - “Physics for scientists and engineers: a strategic approach”, Randall Knight, 3rd edition (Pearson-Addison Wesley) and the accompanying student workbook. Please bring your textbook and the accompanying student workbook for each and every lecture.

Calculator – A scientific calculator capable of performing mathematical functions (addition, subtraction, division, multiplication, square root, sine, cosine, tangent, etc.).

Lab Manual – Not required. Lab handout to be provided during the laboratory session.

Visual Python: Visual Python will be available in the computer labs - Science Hall rooms W3001 & E1056 and Allgood Hall N344. However, I strongly recommend downloading the software to your home PC/ laptop so that you may be able to work on your projects from home. Instructions on how to download and install VPython are included in the weekly schedule.
4. Syllabus

The plan is to cover fourteen chapters from Randall Knight’s Physics for scientists and engineers’ textbook spread out over forty-two lectures. For your convenience, attached with this course handout is the tentative schedule for the lectures. The schedule is not binding and subject to changes during the semester. The course syllabus is:

1. Chapter 1: Concepts of Motion
2. Chapter 2: Kinematics in One Dimension (Calculus)
3. Chapter 3: Vectors and Coordinate Systems
4. Chapter 4: Kinematics in Two dimensions
5. Chapter 5: Force and Motion
6. Chapter 6: Dynamics I: Motion Along a Line
7. Chapter 7: Newton’s Third Law
8. Chapter 8: Dynamics II: Motion in a Plane
9. Chapter 9: Impulse and Momentum (Calculus)
10. Chapter 10: Energy (Calculus)
11. Chapter 11: Work (Calculus)
12. Chapter 12: Rotation of a Rigid Body (Calculus)
13. Chapter 13: Newton’s Theory of Gravity (Calculus)
14. Chapter 14: Oscillations

(Calculus) indicates that you will require calculus knowledge for these chapters.

5. Course Components

A. Lecture – We will meet three days a week for an hour on Monday, Wednesday, and Friday from 11:00 am – 11:50 am in Science Hall, Room E1051. During the lecture I will introduce new ideas and concepts. The emphasis will be to explain the basic concepts and ideas with the help of examples, workbook problems, and questions that I will ask you during the class. This will be your chance to ask me questions. I prefer that the class be interactive. At the beginning of every week I will hand out a weekly schedule (green sheet) which will include the list of reading assignments for that week, the homework problems, and the important course announcements.

B. Reading Assignments – The weekly handout will have in it listed a set of chapter section reading assignments. The suggested readings are meant to prepare you for the lectures.

C. Homework – Several homework problems will be assigned every week from your textbook. I will not collect these homework problems and grade them for you. However, I strongly recommend that you attempt these questions. If you have difficulty solving the homework questions please drop by my office during the office hours and I will be glad to help you.

D. Quizzes – During the course I will give several quizzes (eight in total) which will be graded and returned to you. Each quiz will be ten minutes in duration and will carry 12.5 points. In total the quizzes will be worth 8x12.5 = 100 grade points (14.3% of the total course points).

E. Review questions – The review questions will be handed out each week. You will have a week to complete the assignment. Late submissions will NOT be accepted. There will be in total eight review questions each worth 12.5 points. The review questions will be worth a total of 8x12.5 = 100 grade points (14.3% of the total course points).

F. Exams - There will be three exams in total - Exam 1, Exam 2, and a Final exam. Each exam will be worth 100 grade points (each 14.3% of the total course points). The final exam will count as two exams.
So you will have the following exam grades - Exam 1, Exam 2, Final Exam, and Final Exam. Your exam average will be the average of the best three of these grades. In addition to the regular exams there will be an exam on Visual Python. The venue, date, and time for the examinations are tabulated below:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Venue, Date, Time</th>
<th>Points</th>
<th>% of Total Course points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>Section A: During Lab, 02/12</td>
<td>100</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Section B: During Lab, 02/10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exam 2</td>
<td>Section A: During Lab, 04/02</td>
<td>100</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Section B: During Lab, 03/31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual Python Exam</td>
<td>Section A: During VP Lab, 04/15</td>
<td>25</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>Section B: During VP Lab, 03/15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The date for the final exam will be announced later during the semester. You are required to bring a pencil, calculator, and your Georgia Regents University Student ID card to all the exams. If you do not have your ID card, your exam may not be accepted.

G. Laboratory session – We will meet either on Tuesday (Section A: Thurs., 13:00 – 14:45 PM Science Hall W3007) or Thursday (Section B: Tues., 15:30 – 17:15 PM Science Hall E3001) for laboratory sessions. There will be nine labs in total. I will drop the one with the lowest score. Each lab will be worth 12.5 grade points. The total points for all the labs will be 8x12.5=100 grade points. Lab reports are expected. I will discuss how to write a lab report during the lab session. (14.3% of the total course points).

H. Visual Python Labs – We will meet on Wednesday (Section A: Wed., 14:30 – 15:20 PM Allgood Hall N344, Section B: Wed., 15:30 – 16:20 PM Allgood Hall N344) for the Visual Python labs. These computational physics based labs are meant to provide you with an exposure to scientific simulation and its ability to predict motion (for e.g.: http://en.wikipedia.org/wiki/Curiosity_rover, landing simulation of Curiosity rover on planet Mars, http://www.youtube.com/watch?v=h2I8AoB1xgU). Our goals will be modest, but you will learn the basic algorithms required for predicting motion. There will be eleven labs, seven homework, and one exam in total. Each VPython lab will be worth 5 points (for attendance and lab activity) and each homework will be worth 5 grade points. Out of the eleven labs I will drop one lab with the lowest score and out of the seven VPython homework set I will drop the lowest two scores. The VPython exam will be worth 25 points. The total points for the VPython labs, homework, and exam will be 10x5 + 5x5 + 25= 100 grade points (14.3% of the total course points).

6. Grades

Your overall letter grade for the course will be based on 700 points distributed as shown below:

<table>
<thead>
<tr>
<th>Course Components</th>
<th>Points</th>
<th>% of Total Course points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz (Total)</td>
<td>100</td>
<td>14.3</td>
</tr>
<tr>
<td>Review Questions (Total)</td>
<td>100</td>
<td>14.3</td>
</tr>
<tr>
<td>Exam 1</td>
<td>100</td>
<td>14.3</td>
</tr>
<tr>
<td>Exam 2</td>
<td>100</td>
<td>14.3</td>
</tr>
<tr>
<td>Final</td>
<td>100</td>
<td>14.3</td>
</tr>
<tr>
<td>Laboratory session</td>
<td>100</td>
<td>14.3</td>
</tr>
<tr>
<td>Visual Python Lab + homeworks+ Exam</td>
<td>100</td>
<td>14.3</td>
</tr>
<tr>
<td>Total Course Points</td>
<td>700</td>
<td>100</td>
</tr>
</tbody>
</table>

A fixed grading scale will be used. This class isn’t curved, and thus you are not competing with each other. I do not wish to give a certain percentage of D’s, a certain percentage of C’s, etc. I sincerely hope everybody does well! The cutoffs are as follows

A ≥ 90 %   B ≥ 80 %   C ≥ 70 %   D ≥ 60 %   F < 60 %
7. Absences, course withdrawal, desired course etiquettes and expectations

A. Absences - Missing class will result in receiving a zero grade on any corresponding activities (quiz, lab, exam, midterm etc.) unless the absence is excused. An absence is excused if there is a documented circumstance preventing you from attending class. Examples include personal injury or illness, family emergency, personal crisis, or required attendance at official school activities (athletic activity, band concert, etc.). Students who repeatedly miss class will be withdrawn from the course by the instructor after midterm (see attendance guidelines). This will result in a grade of WF. It is the responsibility of the student to withdraw before midterm (March 3, 2015) to avoid this grade.

B. Course Etiquettes – First of all please be on time. Late comers to class are a distraction to both the lecturer and to the students who are trying to learn. I will start the class at 11:00 AM sharp. Please do not disturb others during class. The list includes (and is not exhaustive) talking during class, ringing cell phones (turn them off before you enter), whining or huffing in class. Please be courteous of other students in class. ANY STUDENT MISBEHAVING IN CLASS OR DISTRACTING THE LECTURE WILL BE EXPELLED FROM THE COURSE IMMEDIATELY.

C. Expectations – The most important criteria is to work hard (but do not stress yourself!). If you try to enjoy the course you will see your performance and your grades will automatically improve. Set aside some time every day for physics. Try to solve the examples in the book and try to connect them with the concepts you learned in class. The student workbook problems and the assigned homework problems are something that you should definitely try.

8. Academic Honesty

Any effort to represent somebody else’s work as your own, or allowing your work to be represented as somebody else’s, is cheating. Working with another student on your homework is not cheating and, in fact, is encouraged. However, having somebody else solve assigned problems for you IS cheating. If a student is found cheating, he or she will receive an F for the course.

9. Additional Course Resources

PHYS 2211 D2L – Here you will find the course handouts, weekly schedule handouts (which includes the reading and homework assignments), review questions, lecture notes, VPython programs, and other materials as I find appropriate. D2L can be accessed through your Jagnet account. If you CANNOT access your D2L account please contact the ITS (http://www.aug.edu/its/) student helpdesk located at University Hall Room 130. The student help desk can also be reached at 706-737-1676.

Administrative Questions
If you can’t find an answer in the syllabus, either contact me in my office Science Hall C3018 or email me at tdatta@gru.edu. Please do not leave a message in my office phone voicemail.

Physics help and Physics Tutor Center
Sometimes the best resource are your peers. I strongly recommend that you form study groups and get to know other people in the class. Working in groups is a great way to learn. Also, the physics tutor center has friendly and knowledgeable tutors who will be glad to assist you with physics questions and problems. The physics tutor center is located in the third floor of the Science Hall in the atrium.

GOOD LUCK AND ENJOY!