Winter 2013  
Physics &222A (7483) – Physics for Scientists and Engineers  
Credits: 5  
M,T, W Th, F: 7:30am – 8:50pm, SC 117

Instructor: Chitra Solomonson  
Office: SC 220  
Phone: (253) 833 9111 x 4868  
Email: csolomonson@greenriver.edu  
Web: http://www.instruction.greenriver.edu/csolomon/

Office Hours: M: 2:30pm – 3:30pm, Tu, W, Th: 1:30pm – 2:30pm

Materials

- **Required Textbook: SmartPhysics:** - "Classical Mechanics" and "Electricity and Magnetism" by Tim Stelzer, Gary Gladding and Mats Selen.
  - **Optional Textbook:** If you need a detailed hardback book with problems, you can purchase a copy of Physics for Scientists and Engineers by Serway and Jewett (Thomson, Brooks/Cole, any edition).

- **Online access to SmartPhysics:** The publisher of the SmartPhysics book will also be providing you with access to pre-lectures, Checkpoint Questions and Homework. These will form an integral part of your grade. The access card containing the access code for the online resources will be included with a new book. If you are buying a used book, you will have to purchase the access code online. Please see the SmartPhysics handout for additional information.

A **Three Ring Binder:** This is absolutely essential to organize your materials for this course. You will be completing many weekly homework, quizzes and class worksheets for this course. Make sure all worksheets is filed away in your binder. This valuable resource will help you to consolidate all your study material for the final exam. You need not bring the binder to class everyday. However, I may ask to see the binder at the end of the quarter.

- **A Scientific Calculator:** A TI-83 or equivalent should be more than sufficient for this course and should be part of your ‘classroom kit’.

- **Miscellaneous:** A ruler, a sharp pencil, graph paper and other small items may be specified as the need arises in the course.

- **Student email account:** You can now setup your own Green River email account. This is a complimentary service provided by the Associate Students of Green River Community College (ASGRCC). Please use the link below to set up an email account for yourself. I will be posting course announcements on the website. However, if I need to
contact you by email, I will be using this account. You can also get these messages forwarded to another personal email account.

http://www.greenriver.edu/studentemail/

Description

Phys &222 is the second of a three course sequence of Physics courses for students in the science and engineering track. It picks up from the point where we stopped at the end of Phys &221. It would be a good idea for you to review uniform circular motion (Chapters 4 and 6 in Cummings and Unit 3 in Smart Physics - Classical Mechanics ) from Phys &221. This will set the stage for the study of rotational motion (units 14 through 20). If time permits, we will do a quick study of fluids (units 25 and 26). After studying rotations, we will switch gears and move to the study of electromagnetic phenomena aiming to cover selected sections of units 1 through 10 (unit 4 if time permits) from Smart Physics (Electricity and Magnetism).

Physics is an experimental science. Laboratory is an integral part of the course but some topics will lend themselves better to experiments that can be performed in an hour more so than others. So labs will not be evenly distributed during this course. Finally, this course satisfies math/science or lab science requirement for AA and AS degrees.

Prerequisites: Grades of 2.0 or higher in Phys &221 and in MATH &151 and at least concurrent enrollment in MATH &152.

Instructional Method
Physics is a contact sport – you learn by doing it. In that spirit, this course is intended to be an extremely hands-on and minds-on course. The instructor will be merely a facilitator of the learning process. You, as the student, are on centerstage. It is your responsibility to participate fully in the laboratory activities and problem-solving sessions. The more you jump in to participate by asking questions, participating fully in the lab activities and analyzing what you observe, the better your learning experience will be. You are responsible for your own learning in this course. The instructor will be the facilitator.

Course Content Learning Outcomes

At the end of the course, you are expected to develop quantitative and qualitative understanding of Newtonian Mechanics.
As a successful student in this course, you will be able to:
• Provide detailed and accurate descriptions of Newtonian physical systems.
• Solve multi-step problems in physical analysis.
• Identify pertinent elements of physical systems and problems.
• Design meaningful experiments and clearly report their conclusions.
• Interpret scientific data including the results of experiments designed by others.
• Apply the tools of calculus to the solution of complex problems.
• Use electronic and numerical instruments as tools for investigation and analysis.
Assessment

The above learning outcomes will be assessed in the following ways:

- **Weekly Homework:** The homework consists of three parts - Prelectures, Checkpoints and homework problems. As the name suggests, prelectures are online powerpoint presentations that you view *before* you come to class. After viewing the prelectures, you will answer the checkpoint questions. Don't worry if you cannot understand everything that is talked about in the prelecture and the checkpoints! The idea behind completing this before you come to class is to start you thinking about these ideas. In this spirit, you will be given full credit for the prelectures and the checkpoints if you complete it before the due date. We will review the main points of the unit and the checkpoints in class after which you will do the homework on that unit. Prelectures, checkpoints will normally be due on Sunday and Wednesday and the corresponding homework will be due on Thursday and Monday. Once again, Smart Physics homework will be graded based on completeness. You will receive immediate feedback as you do the Smart Physics homework problems so by the time you finish it, you will understand the concepts involved in solving the problems. In addition, the instructor may assign additional problems every week. Solutions to these problems will be posted online.

  *You are strongly encouraged to work as a group on your homework!*

  The SmartPhysics book is simply the prelecture in print – carry it with you if you want to refer to something in the prelecture. However, if you feel you need a regular textbook, you can get a used version of Serway and Jewett for a reasonable price. This book is also available in the reference section of the library.

- **Weekly Quizzes:** There will be a quiz every Friday. The quiz will be based on the homework done that week. The lowest quiz will be dropped. There will be no make-up for quizzes.

- **Midterm Exam:** The midterm exam will be held in the fourth week of the quarter and will be announced at least a week in advance. The midterm exam is mandatory and will constitute 20% of your grade. If you need to make up a midterm exam because of a medical reason, you need to furnish a letter from your doctor.

- **Laboratory work:** This is an integral part of the course and is blended with the daily classes. Physics is an experimental science and you will learn to design and set up your experiments, record your observations, analyze your data and draw conclusions from it. You are encouraged to work in a group of not more than three students during the laboratory. Laboratory work may be done on any day – there is no specific laboratory session. Instructions for the lab will be given at the beginning of class along with a lab worksheet. You need not turn in the lab sheet unless I have specifically asked you to do so. The lab grade is based on participation in the lab, lab discussions and performance in a lab quiz. One of the labs will involve writing a report and will be graded. Laboratory work constitutes 20% of your grade. *Attendance is critical since it will not be possible to make up missed experiments due to the pace of the course.*
• **Class Participation:** A lot of key ideas in Physics can be understood only through building mental models and solving problems involving simple physical systems. Throughout the quarter, you may be working on worksheets either in class or as part of your homework. Points for worksheets will be added to laboratory points if done in class or to the homework points if they are part of homework.

• **Final Exam:** Last but not the least, comes the cumulative final exam. This is an opportunity for you to bring together all the skills and knowledge that you have acquired in the course. For this course the final exam will be held on Thursday, March 21, from 7am to 9am. There will be no “make-up” for the final exam. If you are an international student and need to plan your trip back home, please schedule your flight after your final exam. You will not be allowed to take the exam early because of your flight.

**Grades**

Your grades will be calculated as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>20% (lowest quiz will be dropped)</td>
</tr>
<tr>
<td>Midterm</td>
<td>20%</td>
</tr>
<tr>
<td>Laboratory</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

You are encouraged to keep track of your grade during the course by performing the following calculation:

- Add your homework points and convert to a percentage (HW)
- Add your Quiz points and convert to a percentage (Q)
- Add your laboratory and worksheet points and convert to a percentage (L)
- Add your Midterm points and convert to a percentage (M)

Then your percentage for the course at any point in the course is

\[(HW \times 0.2 + Q \times 0.2 + M \times 0.2 + L \times 0.3) \times 1.25\]

Remember, your percentage for the course as calculated above could **decrease** as the course progresses since there will be more variables in place (more homework, quizzes, midterm and final). So stick with it until the end! The final percentage will be calculated as follows:

\[HW \times 0.2 + Q \times 0.2 + M \times 0.2 + L \times 0.2 + F \times 0.2\]

where ‘F’ stands for your final exam percentage.

The following table gives the correlation between the % score you calculated and the decimal score.

<table>
<thead>
<tr>
<th>% Score</th>
<th>Decimal Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>86 - 95</td>
<td>3.1 - 4.0</td>
</tr>
<tr>
<td>76 - 85</td>
<td>2.1 - 3.0</td>
</tr>
<tr>
<td>66 - 75</td>
<td>1.1 - 2.0</td>
</tr>
<tr>
<td>56 - 65</td>
<td>0.1 - 1.0</td>
</tr>
</tbody>
</table>
Keep in mind, some aspects of grading are subjective, so the final grade you get in the course may not exactly match what you have calculated above. The instructor reserves the right to assign the final grade based on student performance in written assessments and participation in the class.

A grade of ‘I’ will only be given in emergency situations and only if at least 75% of the work is completed satisfactorily. Note that a grade of “I” cannot be given simply to save a grade point average! There must be a reason for requesting an incomplete grade.

A grade of “P” or “NC” can only be given if requested in writing at the registrar’s office before the deadline printed in the quarterly schedule. Students should know that completion of a course with a grade of “P” is usually not considered completion of a prerequisite for another class.

Students are NOT obligated to tell their instructors when a course is being taken for a P or NC grade!

You can obtain your final grade for the course via touchtone or by using the web. Instructions can be found in the Schedule of Classes.

**Course Objectives**

At a higher level, the course seeks to promote the following skills that are elements of any successful career and lifestyle:

**Critical Thinking:** This is usually described as the process of critically examining the merits of an intellectual endeavor such as a definition, an essay, a poem or a scientific work and arriving at a judgment regarding the merits of that endeavor. It also means using this mode of thought to arrive at a conclusion, or to create new knowledge that will stand up to critical assessment, including experiments, by others. A good critical thinker exhibits the following characteristics:

- He/She recognizes and uses essential components of effective reasoning to evaluate information and to improve the quality of his/her own thinking.
- He/She provides reasons for the conclusions they reach and assess the relevance and adequacy of those reasons. He/She demonstrates active listening and close reading skills.
- He/She connects past learning with current topics.

You will use one or all of these qualities in almost every activity: specifically in classwork, tests and laboratory sessions.

**Quantitative and Symbolic Reasoning:** This is the ability to understand and manipulate abstract mathematical representations. This includes the following specific skills:

- Value quantitative reasoning,
- Become confident in your ability to reason quantitatively,
- Use quantitative reasoning to solve problems, and
- Use quantitative reasoning to communicate.

This course will help you reach the above goals using general problem solving strategies in
mechanics to understand everyday phenomena.
A person with good quantitative and symbolic reasoning skills exhibits the following characteristics:

- He/She demonstrates the ability to acquire appropriate and accurate data, to analyze and summarize this data.
- He/She demonstrates effective case study analysis.
- He/She demonstrates meaningful participation in lecture, discussion, and seminars.

Quantitative reasoning is a campus-wide learning outcome. You will develop this skill throughout the quarter as you work through numerical and conceptual problems in this course.

Course Policies

**Attendance and Participation:** Although there are no points explicitly allocated for attendance, classwork done in class almost everyday will be assigned points. This may include class worksheets and/or laboratory work. Please make attending every class a top priority. If you do miss a class due to unavoidable circumstances, please contact me as soon as possible and ensure that you come up to speed with the missed material. **This is an intense, fast-paced course and it is very difficult to make up lost ground later in the course.**

**Be on time!** Class will start promptly at 7:30am with an “early bird quiz” – this is a short question to be answered in 5 minutes. Any reasonable answer will fetch you a point and a correct answer will fetch you 2 points. These points will be totaled, scaled and added to one of the grade “buckets” at the end of the course.

**Reading Assignments:** You will be assigned prelectures and checkpoints for every class. It is your responsibility to view the prelectures and read the corresponding sections in the textbook before you come to class. This will help you formulate questions to ask in class. Since this is a hands-on, minds-on course, lecturing will be kept to a minimum in this course. Class time will be utilized for discussions in which **students are expected to be active participants.** We will address topics you might have had difficulty in understanding in the course of viewing the prelectures, explore everyday applications of the concepts you learned, solve problems etc. The format of this course forces you to assume responsibility for your own learning and your final grade and knowledge will depend directly on your degree of participation.

**No Disruptive Behavior:** In accordance with GRCC policy, students who disrupt the academic atmosphere of the class will be asked to leave and will be referred to an academic dean for further action. Disruptions of academic atmosphere include
- Any behavior that interferes with the ability of faculty or other students to perform the work necessary for this class.
- Comments, discussions, or actions of a racist, sexist, or otherwise degrading nature will absolutely not be tolerated.
- No Food or Drinks in the Classroom: Please refrain from bringing food and drinks in the classroom. A few small spills can lead to a very messy classroom/laboratory. If you are starving and find that you cannot concentrate, by all means grab a bite from the snack machine but finish eating it before you enter the classroom.
- No cellphones or other electronic distractions: Please put your cellphone **away** in ‘silent’ mode while in the classroom as ringing cellphones can be extremely distracting to your classmates. No text messaging (reading or texting) allowed either! You will have to put your iPod, game away when you enter the classroom.

**Cheating:** **Students who are caught cheating will fail the class!**

Please keep in mind that you are in college to learn, and if you are cheating you are ultimately only cheating yourself out of learning and skills that you would otherwise take from this class. You don’t need to cheat to pass this class. **Don’t do it.**

You are encouraged to work in groups on all assignments. However, every piece of work that is submitted for grading must be individual work. For example, if you are asked to solve a problem for homework, you may discuss the strategies to solve the problem with your friends but you must present the solution with all its steps in your own handwriting. Sources must be acknowledged if you use material that is not your own. Failure to adhere to this standard may result in a lower or failing grade for an individual test, paper, or for the entire course.

**Special Needs:** Any student who needs special accommodations because of a disability, needs emergency medical information kept on hand, or requires any other special accommodations to be shared with me in the event of a building evacuation, please contact me at (253) 833-9111 extension 4868. If you need an alternative medium for communicating, or are particularly dependent on any one specific medium, please let me know before class so that appropriate accommodations can be made.

If you believe you qualify for course adaptations or special accommodations under the Americans with Disabilities Act (ADA), it is your responsibility to contact the Disabled Students Services Coordinator in the LSC and provide the appropriate documentation. If you have already documented a disability or other condition, which would qualify you for special accommodations, or if you have emergency medical information or special needs I should know about, please notify me during the first week of class. You can reach me by phone at 833-9111, extension 4868. Or, you can schedule an office appointment to meet me in the SC Building, office number 220 during my posted office hours or at another mutually determined time. If this location is not convenient for you, we will schedule an alternative place for the meeting. If you use an alternative medium for communicating, let me know well in advance of the meeting (at least one week) so that appropriate accommodations can be arranged.
Phys &222A

Self Assessment Sheet

Due Thursday, January 3, 2013

Name____________________

Points : 10

1) What Physics have you had before coming to this class? What topics do you remember studying in that class?

2) What Math course are you currently enrolled in? Please give the name of the course and the number.

3) What are you excited about in taking this course?

4) What part of the course are you not excited about?

5) When are Chitra’s Office hours?

7) What is the late policy on homework?

8) What is the policy for making up missed tests and labs?
9) Do you plan to transfer to a four year college? If so, when and to which program? If not, what are your plans after taking this Physics course?

Acknowledgement of the Syllabus

I received, read and clarified my questions regarding the syllabus for Phys &222A (Winter 2013). I understand that it is possible that some changes may be made to the syllabus at the instructor’s discretion to suit the pace of the course. I give permission to the instructor, Chitra Solomonson to post grades online using the PIN number ______________.

______________________________  ______________________________
Student’s Signature             Student’s Name