Physics 2210: Physics for Scientists and Engineers I
Fall 2018

Instructor: Jacob Albretsen
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Office: TY306 (Enter Through TY302)
Hours: Tuesday / Thursday – 4:30 PM to 5:00 PM by Appointment
Class Time: Tuesday / Thursday – 5:30 PM to 7:45 PM
Location: Lind Lecture Hall 121

Introduction

Physics for Scientists and Engineers I and II is a two semester sequence of calculus-based physics. These two courses are primarily for students in science, math, computer science, and pre-engineering.

Physics for Scientists and Engineers I

Topics in this course will include measurements, SI units, vectors and scalars, kinematics in one and two dimensions, Newton’s Laws, conservation of energy, conservation of linear and angular momentum, fluid mechanics, wave motion, and thermodynamics.

Physics for Scientists and Engineers II

Topics in this course will include electricity and magnetism, electromagnetic waves, light and optics, relativity, quantum mechanics, atomic, and nuclear physics.

This is an evening course that only meets twice a week, whereas the day section meets five times a week. Please understand scheduling is going to be somewhat more challenging and different than a regular day class. Two and a half days of material for the day section is covered per evening class period. Do not get behind!

Textbook

The following textbook is recommended for homework and study:

Title: University Physics Volumes 1 – 3 (OpenStax)
URL (Download!!!): https://openstax.org/details/books/university-physics-volume-1
https://openstax.org/details/books/university-physics-volume-3

Policies and Procedures

Updates will be announced in class and shared via Canvas.

Homework

Problem sets will be assigned during non-exam weeks and are due in class on Thursdays before the quiz as indicated on the lecture schedule. Homework is designed to help students review and understand course content as well as practice their problem solving skills. It is highly encouraged that students work together in study groups, however each homework must be the student’s own handwritten work.

Most problems will not be graded on correctness, but rather on the demonstrated effort to do the work. Showing as much detail and explanation as possible is expected. Little or no credit will be given when student solutions contain little or no detail and explanation. Official solutions will be posted on Canvas for students to
download, study, and review. Each solution set will purposely contain at least one error to discourage outright copying. Part of the homework credit will be to show the error was found and to give students an opportunity to demonstrate effort to do the problems. Use these solutions when you are truly stuck on a problem, not as a crutch to do the homework.

**Quizzes**

Quizzes are designed to test a student’s knowledge and understanding of the lectures and homework. They are intended to help prepare for exams. There will be approximately a 15 to 30 minute period allotted before each quiz for students to ask questions about the homework or other review questions. Students will be given approximately 45 minutes to complete each quiz. **Showing as much detail and explanation as possible is expected.** Calculators will be allowed for basic arithmetic, but not storing notes. The lowest quiz score will be dropped from the quiz average.

**Hands-On Labs**

Hands-on labs are designed to give students actual experience with selected topics from lecture. Timing can be difficult, so please read ahead when needed. Depending on the student’s weekly schedule, sometimes the lecture will be ahead of the lab topic, and sometimes the lab topic will be ahead of lecture. The lowest lab score will be dropped from the lab average.

The instructor will allow a student to use their lab scores and practical lab exam score (all or nothing) from a previous attempt of the course **only if they received a grade for the course (A-E).** This means lab scores from a previous course attempt that resulted in a UW (unofficial withdrawal) will **not** be accepted.

**Exams**

Three midterm exams will be given during the semester. The first 15 – 30 minutes of exam day will be used for students to ask questions about the material, including homework, and quizzes. Students will be given approximately 1.5 hours to complete the exam.

The final exam will be similar to the midterm exams, but somewhat longer. The final exam **will be comprehensive.** Unless otherwise noted on the schedule, all exams (and quizzes) are taken in the classroom.

**Notes for Quizzes and Exams**

Each student will be allowed to have one page (front and back) of normal sized paper for **original handwritten** notes during each quiz / exam (two pages for the final exam), otherwise all quizzes and exams will be closed book and closed notes. An electronic translator is permitted during a quiz or exam when approved by the professor.

**IMPORTANT:** Your ultimate goal should be to become so familiar with the fundamental concepts of physics that the notes only serve as a reference and not as a crutch to do the problems. A student can have as many notes as possible written down, but they are useless in the hands of someone that does not understand what they mean or how to use them properly.

Handwritten notes should be general in nature, similar to study guides. Notes are not to contain copies of solutions to homework, quizzes, or exams (current or previous). Any student found violating this policy, or using any other unapproved study aids during a quiz or exam will be subject to sanctions for cheating. The professor reserves the right to ask students to turn in their notes with any quiz or exam.
Grades

Letter Grades will use the following scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>94.0% – 100%</td>
</tr>
<tr>
<td>A-</td>
<td>90.0% – 93.9%</td>
</tr>
<tr>
<td>B+</td>
<td>87.0% – 89.9%</td>
</tr>
<tr>
<td>B</td>
<td>83.0% – 86.9%</td>
</tr>
<tr>
<td>B-</td>
<td>80.0% – 82.9%</td>
</tr>
<tr>
<td>C+</td>
<td>77.0% – 79.9%</td>
</tr>
<tr>
<td>C</td>
<td>73.0% – 76.9%</td>
</tr>
<tr>
<td>C-</td>
<td>70.0% – 72.9%</td>
</tr>
<tr>
<td>D+</td>
<td>67.0% – 69.9%</td>
</tr>
<tr>
<td>D</td>
<td>63.0% – 66.9%</td>
</tr>
<tr>
<td>D-</td>
<td>60.0% – 62.9%</td>
</tr>
<tr>
<td>E</td>
<td>Below 60.0%</td>
</tr>
</tbody>
</table>

Grades will be determined by the following:

- Homework – 10%
- Quizzes - 20% - Drop lowest score
- Lab Reports - 15% - Drop lowest score
- Lab Exam – 5%
- Three Midterms - 30% (10% each)
- Final – 20%

It is YOUR responsibility to take ownership of your own education and make needed adjustments DURING the course which may need attention, not AFTER the class is over.

Academic Dishonesty

The Weber State University Student Code defines cheating and plagiarism:

https://www.weber.edu/ppm/Policies/6-22_StudentCode.html

The professor will impose sanctions on a student for any instance of academic dishonesty as he sees fit for the given circumstance. This includes, but is not limited to:

- “Awarding” the student a grade of zero on the assignment / quiz / exam.
- “Awarding” the student a failing grade for the course.

While students are encouraged to work together on their homework, the professor has little if any tolerance for cheating in any form on quizzes and exams, or any other activity that would be considered academically dishonest. If the evidence is solid, count on the last sanction as the one which will be imposed and do not plan on returning to class.

Physical Science Learning Outcomes

Please see the following website about learning outcomes for life and physical sciences:

https://www.weber.edu/GenEd/

Services for Students with Disabilities

Any student requiring accommodations or services due to a disability must contact Services for Students with Disabilities (SSD) in Room 181 of the Student Service Center. SSD can also arrange to provide materials (including this syllabus) in alternative formats if necessary.

Students working with SSD should contact the professor as soon as possible at the beginning of the semester so any needed arrangements can be promptly made.
Extenuating Circumstances

The professor is not without understanding when unexpected events occur such as: illness, birth of a child, accidents, or death in the family. He understands that Weber State related activities such as sports, ROTC, or the trombone section leader in the marching band will occasionally warrant the need to make special arrangements. In addition, the professor understands that many students taking an evening course are doing so while working a full time job or making family arrangements.

Should any of the preceding situations apply to you, it is your responsibility to inform the professor in a timely manner. Do not expect the professor to be very accommodating if you had issues some time during the semester and then decided to contact the professor about them after the final. No makeup homework / quizzes / exams will be given if the student does not communicate issues with the professor in a timely manner.

Make up quizzes and exams are given in the Tracy Hall Testing Center (bottom floor, room 101C) and WILL NOT be the same one as given in class.
Frequently Asked Questions

Is physics really that awesome?

Yes.

How do I learn how to do physics problems?

Practice. Practice, practice, practice. Homework is practice. Explaining how to solve a problem to a fellow student is practice. Doing problems other than the homework is practice. Practice, practice, practice.

How do I get an A?

There is no easy formula for getting an A. This will likely be one of the most challenging courses you will take. That said, it can also be one of the most rewarding experiences if you give the needed dedication to the course. Students who do well in the course typically have the following in common:

1. **Attending lectures.** Students should attend each and every lecture. The more exposure you have to the material, the sooner you will be able to master it. If you have a continuing conflict with the class schedule, find a way to work around it.

2. **Putting in a good faith effort toward doing the homework.** See above. Do not leave doing homework until the night before it is due. Do not just simply copy down the answer to get credit for the homework. You will not learn anything this way, and quiz and exam scores will show it.

3. **Asking for help when it is needed.** I’ve been told before that I have “pets” in class. In reality these are the people that ask me questions and get help when they need it. Therefore, everyone should be my pet. If you have questions, take advantage of any help available such as myself, physics tutors, or the internet (Google and Youtube for example).

If you come to me some time during (or after) the semester worried about your grade, I will ask you how closely you are following the above recommendations.

Is attendance mandatory?

It is in your best interest to treat attendance as mandatory. Don't say I didn't warn you. Consider the following:

This course is worth five credit hours, nearly half the credit hours for a minimum full time student. A significant portion of your time this semester will be spent for this course.

If you believe you will be able to get the grade you want by only attending Thursday, think again. Half of Thursday class is either spent taking a quiz OR for three times during the semester, all of Thursday class is spent on an exam. If you skip Tuesdays regularly, you are missing over 2 / 3 of the lecture material.

I did not make it to class last time. Did I miss anything important?

Yes.

I cannot make it to class today. Will I miss anything important?

Yes.
Note: In the event of a campus emergency (e.g., weather, utilities, infinity wars etc.) that results in the interruption of this class, please check Canvas for updates.

**If I just take and do well on the exams, can I pass the course?**

No. Exams constitute only 50% of the total participation in the class, and one needs at least 60% to pass. Participation in all parts of the course including homework, quizzes, exams, and labs is expected. If you just take exams and even get a perfect score on them, you cannot pass the course.

**Why do you keep deriving everything using calculus?**

This is a calculus-based physics course. Therefore, I will be using calculus. This goes back to my desire for the student to have a fundamental understanding of the core material. To gain that understanding, I need to use calculus and derive the physics from fundamental concepts so the student will learn. Writing down the final equation from a derivation or a homework problem and then telling the student to plug numbers into it is not learning.

**Physics, astronomy, and science are awesome! I want to learn more!**

There are plenty of other resources you can explore on your own time to learn more about the human journey of understanding the universe. Below are just some suggested resources.

**Television**

- *Cosmos: A Spacetime Odyssey*, hosted by Neil deGrasse Tyson. As I write this, it is available on Netflix. I cannot say enough good things about this series. Many topics in both semesters of the course are a part of this documentary.

**Books**

- *The Demon-Haunted World: Science as a Candle in the Dark* by Carl Sagan
- *The Elegant Universe* by Brian Greene
- *The Fabric of the Cosmos* by Brian Greene