

Professor: Scott M. LaBrake, Ph.D. Course: Physics 220 - Spring 2016  
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Office Hours: Th: 9:00<sup>am</sup> - 12:00<sup>pm</sup> Office: S&E N331 & N008B  
MW: 9:30<sup>am</sup> - 12:30<sup>pm</sup>  
By Appointment  
Web: <http://minerva.union.edu/labrakes>  
Text: Introduction to Quantum Mechanics by D. Griffiths  
Suggested Texts/References:  
Quantum Mechanics: An Accessible Introduction by R. Scheerer  
Modern Physics from  $\alpha$  to  $Z^0$ , by W. Rohlf  
Schaum's Outline of Mathematical Handbook of Formulas and Tables

### Course:

This is a second course in modern physics covering relativistic energy and momentum, experiments that lead to the development of quantum mechanics and an introduction to quantum mechanics. Topics include blackbody radiation, the photoelectric and Compton effects, Schrödinger's equation and wave mechanics in 1- and 3-dimensions as well as the hydrogen atom. Mathematics, a powerful tool in the understanding of natural phenomena, assumes its natural role.

### Attendance:

While attendance is not mandatory, it is expected that you will attend class on a regular basis. Material will be covered in a rapid fashion over the spring term; covering about one chapter per week. Past experience dictates that your success in this class is directly proportional to your attending. Attendance at all scheduled exams is mandatory.

### Course Grade:

Your course grade will be determined based on a professional judgment of your work on the following scale:

Homework	30%
Two In-Class Exams	35%
Final Exam	35%

The overall class average at the end of the term will *generally* be set to a **B** letter grade. *No letter grades will be assigned to any individual work.* An attempt will be made after every exam to give you a *rough idea* of an *overall* grade based on all work completed to date. This does not mean that your grade is exactly what will be written in pencil on your exam; it could be higher or lower.

### Homework:

- The homework assigned is representative of the topics that will be highlighted throughout the term. It is strongly advised that you do the suggested homework as noted in class as well as other relevant problems, of your choosing, on the covered topics from the text. *Variations* of the assigned and unassigned homework are highly probable candidates for the exams.
- There should be diversity in the difficulty of the problems that are assigned. They will be combinations of plug-and-chug problems and derivations. The homework is essential to your learning and understanding of the material in upper level physics classes.

- We will be using Mathematica in class and this will be useful in completing some of the homework problems.
- In general, several homework problems will be assigned each night and the due date for the problem sets will be announced in class and posted on my website. When possible, a complete problem set will be assigned at the beginning of the week. Some of the problems may not be able to be solved immediately and you may have to wait a class or so to be able to solve them.
- The solutions to the problems assigned will be posted on my website.
- ***After the solutions to the homework have been posted, late homework will be accepted with a maximum of ½ of the points of the assignment being awarded.***
- For the homework, I would advise that you talk to me, your classmates, the Physics Crisis Center (which is open on Tuesday and Thursday evenings from 7<sup>pm</sup> – 10<sup>pm</sup> throughout the term), or just ponder the question for a day or so. ***Too often students' confuse reading the solution to the problem with their actual understanding of the problem.***

#### Exams:

- There will be two in-class exams. The in-class hour exams are scheduled for ***Friday, April 22*** (week #4), and ***Friday, May 20*** (week #8). Each hour exam will not be cumulative; however they will be based on your prior knowledge, which includes your familiarity with material covered in Phy120, Phy121, and/or Phy122. Each in-class exam is approximately one hour each.
- You may start the in-class exams at 7:45<sup>am</sup> on the day of the exam if you wish. This extra 15 minutes is completely optional.
- The hour exams will be given on the dates listed and will not be changed for any reason. Please plan accordingly in your other classes.
- ***Emphasis will be placed on demonstration of the ability to apply the concepts and techniques learned in class to new situations.***
- ***All problem types and/or examples tested on the exams may or may not be done explicitly in class.***
- ***Exams are mandatory and there are no makeup exams given.***
- The final exam will be cumulative and no make-up exam will be given for any reason. The date and time of the final is set by the Registrar and will be announced as soon as I know when it is scheduled. ***This is the only time that the final exam will be given.***

#### Notes:

1. This course is heavily dependent on differential and integral vector calculus, geometry, as well as some algebra and trigonometry. It is expected that the student is familiar with these mathematical topics. You will need to bring a calculator (one that does basic mathematics, like trigonometry and logarithms, is fine) and your homework to class everyday. ***I don't in general have any extra calculators and you will not be allowed to share calculators during quizzes or exams.***
2. Please realize that the instructor is human, just as you the student and I will occasionally make mistakes. To that end, on exams & quizzes if I have made a mistake, please bring it to my attention and I will correct it. However, if you are just seeking to get more points back without any substantive argument as to why you deserve the points, I will be happy to re-grade the entire quiz/exam which may result in raising or lowering the present grade on the quiz/exam.

3. All grading must be contested within twenty-four (24) hours after the original assignment was returned, whether or not you were in class to receive the assignment back. ***Contestations should be accompanied by a written explanation of how your solution was incorrectly penalized.*** I will not look in general at anyone's appeal without a written explanation. I will return the appeal and the decision of points after 24 hours. I will only consider grade changes during this twenty-four hour period. This does not apply to arithmetic errors.
4. This course is going to be very demanding on you. It will be one of the most challenging courses you will take at Union College. You cannot sit idly by and assume that you know or will learn the material the night before the quiz/exam. It will require a lot of work on your part, as well as mine. If we work together, I hope, by the end of the term the beauty and applicability of physics will be evident in your everyday lives.
5. For ***exams and quizzes only***, you will not be allowed to use personal phones for any reason. Please shut them off and/or hide them away in your bags. Quizzes and exams may be removed from you for using a phone.
6. Please know that I am aware that my homework solutions and homework solutions to the book do exist out in the universe and you can get copies of them should you choose. I would strongly advise you not use ill-gotten homework solutions as this will not prepare you for the exams and will leave you with a feeling of why can I not do the exam problems.

**Students with Disabilities:** If you have a specific disability that qualifies you for academic accommodations, please provide appropriate documentation from Disability Services within the first week of the term and then we can meet to discuss any necessary special arrangements or needs. Providing documentation at the start or conclusion of any exam does not guarantee you access to specific accommodations.

**Academic Honesty Issues:** Union College recognizes the need to create an environment of mutual trust as part of its educational mission. Responsible participation in an academic community requires respect for and acknowledgment of the thoughts and work of others, whether expressed in the present or in some distant time and place.

Matriculation at the College is taken to signify implicit agreement with the Academic Honor Code, available at [honorcode.union.edu](http://honorcode.union.edu). It is each student's responsibility to ensure that submitted work is his or her own and does not involve any form of academic misconduct. Students are expected to ask their course instructors for clarification regarding, but not limited to, collaboration, citations, and plagiarism. Ignorance is not an excuse for breaching academic integrity.

Students are also required *by the College*, to affix the full Honor Code Affirmation, or the following shortened version, on each item of coursework submitted for grading: “*I affirm that I have carried out my academic endeavors with full academic honesty.*” [Signed, Jane Doe]

***Some general honor code comments:***

1. For homework I assume that you will be working together on the homework problems. I consider the homework assignments as a pedagogical tool – one for you to learn, apply, and expand upon the techniques studied in class. The effort of learning the material from the homework is your own responsibility. Thus, you can work together with others in the class on the homework, you can ask tutors or other instructors for help, but should write up your own solutions so that you can learn it better and so that you will know how to approach the problems on the exams. You should indicate on the assignment which problems you had help with and from whom (instructor, tutor, etc.)
2. For in-class and final exams, you are not allowed to work together. The in-class and final exams are “closed book” and you are only allowed to use a calculator (specifically one that is not associated with any type of portable communication device), Mathematica if necessary, and the instructor provided equation sheet.