

PHY125 – Physics for the Life Sciences

Fall 2017 - Syllabus

ver 9/7/17
[corrected typos in times]

Lecture meets in Cowley 100 on **Tu Th 11:00a-12:25p**

Instructor: **Dr. Rob Salgado**, Cowley 116

Office Hours: M 3:20-4:10p, Tu 12:35-1:25p [*after Tuesday's lecture*], W 11:00a-11:50a

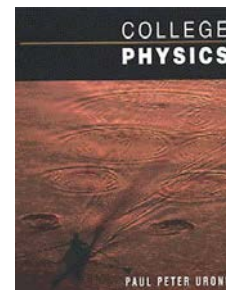
or, by appointment, or drop by my office [my schedule will also be posted there]

Email: rsalgado@uwlax.edu (the best way to reach me)

sent from *your* uwlax.edu email account, with **125** included in the subject line

Required Materials (available at the bookstore):

- **Urone, *College Physics*** (1st ed) [ISBN 0534351905]
- A **scientific calculator** will be needed for homework problems, for quizzes and examinations, and for the lab. Please label the calculator with your name. (Note: The use of smartphones, laptops, tablets, etc... is NOT PERMITTED during exams.)
- **D2L**: I will maintain a D2L website that links to announcements, homework assignments and solutions, electronic-whiteboard notes, and handouts. D2L is also where **daily online pre-class-quizzes** are given, only open during specified time-windows. Consult D2L frequently. (These materials are not a substitute for regular attendance, participation, and problem-solving. The whiteboard notes are a substantial but incomplete record of what was discussed and done during class. They should supplement—not replace—your own notes. Generally, they will be posted within 24 hours after the class meeting. Revised versions may be posted in response to any errors brought to my attention.)



Course Description (based on catalog):

(PHY 125 Cr.4) *Physics for the Life Sciences*—An introductory study of physics concepts using algebra and trigonometry, primarily for life science and allied health students. In this course, the following topics are covered: descriptions of matter, motion, energy, waves, light, electricity, and topics in modern physics, with application to the life sciences. Lect. 3, Lab. 2. Prerequisite: MTH 150 strongly recommended.

Learning Objectives:

This class is part of the UWL vision to cultivate knowledge, skills, and habits of mind essential for independent learning and thinking.

When you complete this class, you will be able to:

- construct or use models to analyze, explain, or predict phenomena,
- identify and use methods of inquiry appropriate to solve physics problems,
- use mathematical and logical methods to solve problems
(in physics, and hopefully in other subjects!)
- analyze the motion of an object
- analyze the forces acting on an object and predict its acceleration
- describe the behavior of fluids and their effect on objects in contact with them
- describe the effect of electric forces due to electric charges
- analyze simple electric circuits (e.g. a set of holiday lights)
- analyze the behavior of light in a substance (like air or glass)

Responsibilities:

Please read the entire syllabus carefully. You are responsible for all of the requirements and procedures described here. You are also responsible for all announcements, assignments, changes, etc., whether or not you are in class.

As an instructor, my responsibility is to find ways to help you learn how to solve physics problems. This class is likely NOT like your high-school physics or other university science classes. Physics is not “a set of facts that need to be memorized”; it is a way of applying a few basic rules [principles of physics] in a variety of situations. Your responsibility is to be an engaged learner; you must actively participate in class and work to develop your problem-solving skills (and, yes, that means even outside of class).

Specifically, you must:

- **Come to class ready to engage in discussion.** In general, students take very little away from a pure lecture. So, we will normally have mini-lectures broken up by targeted classroom activities in which you will actively participate in the learning process. These activities will not only focus your thinking, they should also help you prepare for the exams by cementing correct ideas in your head, as well as point out areas in which you need more concentration. I will also give you online quizzes that will prepare you think carefully about the important concepts and techniques related to the class material.
- **Prepare for each class.** Bring your scientific-calculator, pens and/or pencils, paper, and your text to class. Careful study of the text is necessary for your active participation in class activities, as well as your understanding of basic facts, concepts, and their interrelationships. Since the focus of the lecture portions of class will be synthesizing concepts, you must familiarize yourself with any vocabulary and material. Each day, you must complete a brief **online D2L pre-class quiz** that pertains to the upcoming class material. [Detailed information ahead.]
- **Practice Problem Solving. Homework** will be assigned weekly for your benefit, but not collected. Homework is “*practice*” [like practicing playing a sport or a musical instrument], an opportunity for you to test your skills and see where you need to improve. Although I will provide online the solutions for all homework sets when an assignment is given, you should **first practice solving them on your own**, then use the solutions to **check** your answers. Use them as a guide to your learning of the content and methods—not merely a source for “answers”. In-class quizzes will periodically test your learning. [Detailed information ahead.]

Note that my aspects of my very-detailed solutions are *not intended to be “typical solutions to be expected from students”*.

They are written to address numerous questions that various students may have in approaching the problem. They also try to provide methodical problem-solving approaches, starting from basic principles, that can be applied to many problems (not just to these specific problems). The hope is that you learn to apply some of these approaches from reading the solutions—even if you got the problem numerically correct. Physics is more than just learning to solve a specific set of problems and getting “the right number”... it is about developing a logical way of thinking and a set of skills to solve *new* problems (in physics and outside of physics.)

Concerns or Complaints

If you have a concern or a complaint about the course, or me, I encourage you to bring that to my attention. My hope would be that by communicating your concern we would be able to come to a resolution. If you are uncomfortable speaking with me, or you feel your concern hasn't been resolved after bringing it to my attention, you can contact my department chair: Prof. Eric Barnes (608-785-8437, 2012 Cowley Hall, ebarnes@uwlax.edu).

Student Evaluation of Instruction (SEI)

UWL conducts student evaluations electronically. Approximately 2 weeks prior to the conclusion of a course, you will receive an email at your UWL email address directing you to complete an evaluation for each of your courses. In-class time will be provided for students to complete the evaluation in class. Electronic reminders will be sent if you do not complete the evaluation. The evaluation will include numerical ratings and, depending on the department, may provide options for comments. The university takes student feedback very seriously and the information gathered from student evaluations is more valuable when a larger percentage of students complete the evaluation. Please be especially mindful to complete the surveys.

Our Legal Obligations to You [<https://www.uwlax.edu/info/syllabus/>]

Sexual Misconduct

As an employee of the University of Wisconsin-La Crosse, I am a mandated reporter of sexual harassment and sexual violence that takes place on campus or otherwise affects the campus community. This means that if I receive detailed or specific information about an incident such as the date, time, location, or identity of the people involved, I am obligated to share this with UWL's Title IX Coordinator <http://www.uwlax.edu/affirmative-action/> in order to enable the university to take appropriate action to ensure the safety and rights of all involved. For students not wishing to make an official report, there are confidential resources available to provide support and discuss the available options. The contact in Student Life is Ingrid Peterson, Violence Prevention Specialist, (608) 785-8062, ipeterson@uwlax.edu. Please see <http://www.uwlax.edu/sexual-misconduct> for more resources or to file a report.

Religious Accommodations

Per the UWL Undergraduate and Graduate Catalogs <http://catalog.uwlax.edu/undergraduate/aboutuwlax/#accommodation-religious-beliefs> “any student with a conflict between an academic requirement and any religious observance must be given an alternative means of meeting the academic requirement. The student must notify the instructor within the first three weeks of class (within the first week of summer session and short courses) of specific days/dates for which the student will request an accommodation. Instructors may schedule a make-up examination or other academic requirement before or after the regularly scheduled examination or other academic requirement.”

Students with Disabilities

Any student with a documented disability (e.g. ADHD, Autism Spectrum Disorder, Acquired Brain Injury, PTSD, Physical, Sensory, Psychological, or Learning Disability) who needs to arrange academic accommodations must contact The ACCESS Center (165 Murphy Library, 608-785-6900, ACCESSCenter@uwlax.edu) and meet with an advisor to register and develop an accommodation plan. In addition to registering with The ACCESS Center, it is the student's responsibility to discuss their academic needs with their instructors.

You can find out more about services available to students with disabilities at The ACCESS Center website: <http://www.uwlax.edu/access-center>

Veterans and Active Military Personnel

Veterans and active military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcome and encouraged to communicate these, in advance if possible, to me. For additional information and assistance, contact the Veterans Services Office. <http://www.uwlax.edu/veteran-services/>. Students who need to withdraw from class or from the university due to military orders should be aware of the military duty withdrawal policy <http://catalog.uwlax.edu/undergraduate/academicpolicies/withdrawal/#military-duty-withdrawal-university>.

Specific course policies for PHY 125.

Rough course schedule (Subject to Change)

Introduction Motion (Kinematics) Forces Exam #1 [Thu 10/5]	Torque and Stability Energy Fluids Exam #2 [Tue 11/7]	Electric Charge and Current Circuits Oscillations and Waves Exam #3 [Final: Fri 12/15]
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Important Dates

- **In-Class Quizzes:** Tue 9/19, Thu 9/28, Thu 10/19, Tue 10/31, Tue 11/21, Thu 12/7
- **Exams:** Thu 10/5 [85min], Tu 11/7 [85min], Fri 12/15 [Final 120min]

NOTE THE DATE/TIME OF ALL EXAMS! Arrange your travel and plans accordingly!

GRADING		
Aspect	Points Per Item	Total Points
24 Pre-class Quizzes (drop 4 lowest)	5	100
6 In-class Quizzes (drop 1 lowest)	30	150
3 Exams (2 In-term & Final)	150	450
Labs (2 Lab Exams)	...	200
<i>Total for Course</i>		900

Grading Scheme	
A	At least 846 points
AB	800-845 points
B	747-799 points
BC	702-746 points
C	630-701 points
D	495-629 points
F	Less than 495 points

The above grade boundaries may be lowered at the discretion of the instructor. (i.e. you may receive a higher grade than indicated above – you will not receive a lower grade than indicated above).

Online Pre-class Quizzes: Required before every lecture.

- Complete an online D2L quiz by 10am, based on readings assigned from textbook
- The lowest 4 pre-class quiz scores will be dropped from your grade

Homework / In-Class Quizzes:

- In-Class Quizzes given in the first 20 minutes of class on dates specified in schedule
 - If you come late, you still only have the remainder of the time.
 - No makeups. The single lowest score will be dropped (allows for “things that come up”)
- Quizzes based on material from Homework Assignments.
 - Practice solving these problems yourself. Do NOT hand in Answers to Homework.
 - Solutions will be posted at D2L so you can check your work! Try not to peek!

Examinations: All 3 exams will be in Cowley 100.

- You must take the exam during the assigned time.
- Bring two pencils and a calculator to all exams!
- Cellular phones, computers, iPods, and all similar electronic devices DO NOT constitute a scientific calculator, and will be temporary confiscated if seen during an examination period. Exams will consist of (a) conceptual multiple choice, (b) calculation problems similar to those assigned for homework and taken on quizzes, and (c) problems similar to in-class examples.

Expectations for Graded Work

I provide students feedback and/or scores on assignments that require individualized grading before a further assignment of a similar format is due. Generally, I return work that requires individual feedback within 2 weeks (for exams) and 1 week (for in-class quizzes) from the date the work was due. I will notify you if I am unable to grade the work by the specified timeframe, and I will identify a revised return date.

Your graded coursework will be returned in compliance with FERPA regulations, such as in-class, during my office hours, or via the course management system through which only you will have access to your grades. After you have completed the course, any copies or records of your graded material that I retain will be accessible up to 7 weeks into the next academic term.

Labs: See the separate Laboratory Syllabus. You **MUST** get a **55% or better in the Lab portion** of the course to pass (with D or better) this course. If you fail the lab (F) you will fail the course (F), regardless of your performance on the other course material.

Excused Absences & Makeup Information:

- Online quizzes must be completed by the appointed deadlines.
Late online quizzes will not be accepted. Lowest 4 online quiz scores will be dropped.
- **No makeups for in-class quizzes.** Single lowest in-class quiz score will be dropped.
- Exams: Written documentation [at least an email] is required to evaluate the possibility of being excused for an exam.
 - Examples of acceptable absences: death in your immediate family, car accident, serious or highly contagious illness.
 - Prescheduled university-related absences (e.g., University athletic team competition, concert, etc.), if the instructor is notified at least 1 week in advance.
 - Unacceptable absences: leaving campus early to go to your friend's wedding rehearsal, because your ride is leaving early, etc.
 - For an excused absence:
 - Make-up exams will contain different problems from the in-class exams and will be graded according to the instructor's prerogative. The instructor reserves the right to schedule specific times for make up exams.

Extended Absences:

If you are going to be absent for an extended period of time, you should contact the Student Life Office at 149 Graff Main Hall, 785-8062 and notify them of your absence. Then contact me about making up missed material, and be prepared with appropriate documentation.

Electronic Devices: You may not use cell phones, pagers, laptops for e-mail or web-browsing etc. during class or exams. Be considerate of your fellow students and conduct your e-business elsewhere.

Academic Misconduct: Academic misconduct is an unacceptable violation of the UW-L Student Honor Code. All work handed in for this class must be the students' own individual work. Plagiarism or cheating in any form may result in failure of the assignment or exam, failure of the course, and may include harsher sanctions. **EACH STUDENT MUST MAKE HIS/HER OWN MEASUREMENTS AND OWN CALCULATIONS.** Copying someone else's measurements or calculations is cheating and will be handled accordingly. Refer to the Student Handbook at <http://www.uwlax.edu/student-life/student-resources/student-handbook/> for a detailed definition (esp. section 14.03).

Getting HELP!

You are strongly encouraged to discuss the homework with other students.

(That is, you are strongly encouraged **NOT** to always work alone.)

However, be sure that you can do the homework by yourself and that you always present your own work for Homework-Quizzes and Exams. You can always ask me or the tutors for help after you have made an honest effort. You are always welcome to send an email (see above) or stop by my Office Hours.

Don't wait until the last minute.

Tutor sessions: (to be arranged and schedule to be posted on D2L) The tutoring sessions are intended to help you with the process of solving the problems, not to give you or merely lead you to only the "right answer."

Some advice:

Physics is a **challenging** subject that requires your dedicated attention, but rewards you with skills that you can apply in any discipline!

Physics is **cumulative**: For example, understanding Ch 7 requires that you understand many of the chapters before it.

Do not fall behind! If you find yourself falling behind, you must get some help. Ask for help from your classmates! Tutors! Me!

Physics is written and spoken in a **Mathematical** language [which is a specialized version of the local language used: English]. *Review basic math! Get help if you need it!*

Physics is about “**understanding relationships between physical quantities**”, which we uncover by experiment and by logical and mathematical reasoning.

Physics is **NOT about formulas** and merely plugging-in numbers.

Formulas are often only “special cases of expressions of those relationships”.

“Knowing a formula without knowing when it applies” is generally useless.

The act of “plugging-in numbers” measures your ability to do Arithmetic or to use a calculator.

The resulting number is only useful when you can interpret it physically.

“The right number with the wrong physics” is just plain wrong.

Most of the learning you will do is done by **YOU working out numerous physics problems outside of class!** (I am merely a guide for you.) Your goal should be to do many physics problems so that you learn how to approach new problems by thinking critically and logically—*not to merely redo old problems with new numbers.*

Your textbook offers many sample-problems and end-of-the-chapter problems. I will try to make available access to additional problems with worked solutions. There are many other physics textbooks that also provide problems and worked-solutions.

While there are a lot of physics problems around, you should **focus on physics problems** that are: (1) example problems, (2) similar to the assigned homework problems, and (3) nearby problems in the same section of the assigned problems.

I choose problems to help illustrate various physical ideas and mathematical skills that I feel are important. ***You miss out on learning if you do not struggle, do not recognize, and do not reflect on what those ideas and skills are as you complete the problems.*** Please read my detailed solutions for elaborations of some of these key points. (There is more for you to learn by reading and reflecting on the homework solutions.)

You should be regularly reading ahead of the lecture.

You don't have to wait until I discuss a topic or wait until the end of the chapter before attempting the homework problems.

Note the usual rule of thumb: for every (1) contact hour in class on the material, you should be spending three (3) hours on it out of class.