

PHY 103 (sections 1 and 3)

Fundamental Physics I

University of Wisconsin-La Crosse – Fall 2013

(Although this course is similar to Dr. Sallmen's section 2,

our sections are not necessarily in lock-step---so, they are distinct and are not interchangeable.)

Version 9/4/2013
This document may be revised.

Some portions are drawn from
Dr. Sallmen's syllabus.

Meeting Times:

(LECTURE 3cr) **100 Cowley Hall, MWF: (sec 1) 8:50a – 9:45a, (sec 3) 2:15p-3:10p** (LABs 2cr) **fourteen sections (10L-23L) on Tu, W, Th**

Instructor: Rob Salgado Office: 116 Cowley Hall [shared, *unreliable* phone]: (608)-785-6684 Physics Dept main: 2005 Cowley Hall, (608)-785-8429	Office hours: **times and location to be announced** <i>Feel free to drop by my office desk [but you may wish to first check if I am there].</i>
Email (the <u>best</u> way to contact me): rsalgado@uwlax.edu 1) using your UW-L email address only... 2) with "103" somewhere on the Subject Line. Email satisfying these two conditions will receive a reply within 24 hours (though usually earlier). On occasion, the reply may arrive much sooner and may even arrive at 2:00a. Please feel free to send an email at any time.	If you email a question about homework, I expect you to have formulated your question with details of where you think you are stuck <u>and</u> with details of what you have already tried. If continuing the conversation via email turns out to be not-so-effective, I may suggest moving the conversation to some possibly useful feature on D2L (Discussions? Chat? Dropbox? Online Room [with Whiteboard]?) or else meeting at Office Hours.

Catalog Description:

A broad theoretical and experimental introduction to the study of physics using the techniques of algebra and trigonometry. Topics covered are kinematics with constant acceleration, vectors, Newton's laws of motion, circular motion, work, energy, momentum, rigid body motion, angular momentum, torque, oscillatory motion, gravitation, fluid mechanics, waves, resonance and sound. Additional topics may be selected from the area of thermodynamics. Wherever possible, applications to other fields of science such as chemistry, biology, and medicine will be discussed. Prerequisite: MTH 150 [College Algebra] recommended.

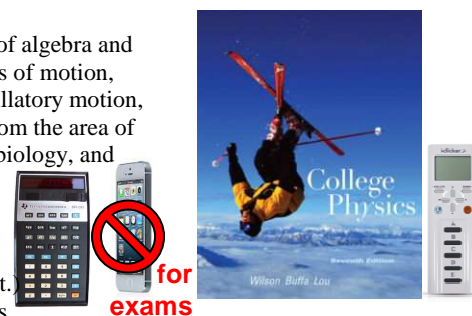
Required Materials:

Wilson, Buffa, & Lou **College Physics (7th edition)** [from Textbook Rental].

An i>clicker or i>clicker2 [purchase]. (Follow directions in the "Using your I-Clicker" handout.

A **scientific calculator** will be needed for homework problems, in the lab, and for examinations.

Please label the calculator with your name. (Note: The use of smartphones, laptops, tablets, etc... is NOT PERMITTED during exams.)



Electronic Materials:

I will maintain a D2L website (<https://uwlax.courses.wisconsin.edu/d2l/home/2276728>) that links to announcements, homework assignments, electronic-whiteboard notes, and handouts. Consult this 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.)



Learning Objectives:

This class is part of the UW-L 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.

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 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).

- **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 make you think carefully about the important concepts and techniques related to the class material.
- **Prepare for each class.** Bring your clicker, 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.
- **Practice Problem Solving.** Homework will be assigned weekly for your benefit. Homework is practice, an opportunity for you to test your skills and see where you need to improve. I will provide on-line the solutions for all homework sets when an assignment is given. Online Homework-Quizzes for each homework assignment will test your learning (see below for more details).

Note that 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 try to provide methodical approaches 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.)

COURSE POLICIES AND PROCEDURES:

Special Needs:

Any student with a documented disability (e.g., physical, learning, psychiatric, vision, hearing) who needs to arrange reasonable accommodations must contact the instructor and the Disability Resource Services office (165 Murphy Library, 785-6900) at the beginning of the semester. Students currently using the Disability Resource Services office will have a copy of a contract that verifies they are qualified students with disabilities who have documentation on file in the Disability Resource Services office. It is your responsibility to communicate your needs with the instructor in a timely manner.

Religious Observances:

Students may complete exams or other requirements that are missed because of a religious observance provided arrangements are made within the first two weeks of class.

Academic Standards:

The academic conduct and discipline procedures outlined in Chapter 14 of the University of Wisconsin-La Crosse Student Handbook will be followed. You are responsible for being familiar with these. Students are welcome to work together, exchange ideas, etc. However, **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.

Other Electronic Devices:

Use of [smart]phones, messaging PDAs, or other wireless communication devices (including laptops for e-mail, web-browsing etc.) is not permitted during exams. If a laptop or tablet is used during class, it must be for PHY 103 purposes (conduct your e-business elsewhere). Please do not be disruptive or distracting to others. Be considerate of the class (the instructor and your fellow students).

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.

Grades are weighted as follows:

- 20 % LAB (2 lab exams)
- 5 % in-class CLICKER PARTICIPATION
- 25 % online HOMEWORK QUIZZES (one lowest score will be dropped)
- 37.5% in-class MIDTERM EXAMS (12.5% x 3 midterm exams)
- 12.5% FINAL EXAM

Final letter-grades are based on a modification of the scale: **A[100-94] A/B[93-88] B[87-82] B/C[81-76] C[75-68] D[67-58] F[57 and below]**.

Depending on the final distribution of grades in your section, the grade boundaries may be lowered slightly.

Your final letter grade will not be lower than what would be indicated here.

Clicker Participation: **Bring your clicker to class!**

- During class, I will ask questions that monitor your understanding of the material
- Clicker questions will NOT be graded on how well you do, but on your participation (as long as you get 10% of the questions correct).
- Answer at least 80% of the questions asked during the semester to receive full clicker participation credit. Answering fewer questions will reduce your participation score proportionately. For more info about clickers, see the separate handout.

Homework-Quizzes: Required for **every** homework assignment

- 4 problems (similar to or slight-extensions of those in the assignment) will be posted in the D2L Quizzes section of the class page. You will choose the answer that best matches the result of your calculation.
- The on-line homework-quizzes will be accessible from the day the assignment is given to 8:00a on the due date.
- Answers will be available on D2L after the last time for submission.
- Your lowest homework-quiz score will be dropped from your grade

Examinations: All exams will be in Cowley 100.

- You **must** take the exam during the time assigned for YOUR class section
- Bring two pencils and a scientific calculator to all exams!
- [Smart]phones, computers, iPods, and all similar electronic devices are **not acceptable as calculators** for an exam.
- Exams will consist of (a) multiple-choice conceptual problems, (b) calculation problems that will be similar to those assigned for homework and taken on quizzes, (c) problems similar to in-class examples, and (d) problems similar to those encountered in lab.
- **Mid-Term 1:** Wednesday, September 25, 2013 (exam duration: 50 min)
- **Mid-Term 2:** Wednesday, October 23, 2013 (exam duration: 50 min)
- **Mid-Term 3:** Monday, November 18, 2013 (exam duration: 50 min)
- **Final:** (for section 1) Tuesday, December 17, 7:45a-9:45a
(for section 3) Saturday, December 14, 10:00a-12:00p. **[Be sure your travel plans agree with this!!!!]**
- It is my plan to return your mid-term exams no later than 2 weeks after the exam date. *(I hope it is closer to 1 week after.)*

Excused Absences & Makeup Information:

- On-line Homework-Quizzes must be completed by the appointed deadlines. Late quizzes **will not** be accepted.
- **Written documentation [email preferred]** is required to evaluate the possibility of being excused from an exam.
 - Examples of acceptable absences: death in your immediate family, car accident, serious or highly contagious illness, student athletics participation
 - Unacceptable absences: leaving campus early to go to your friend's wedding rehearsal, because your ride is leaving early, etc.
 - An exam missed because of an excused absence will be replaced with the average of the other 3 semester exams.
- For any prescheduled absence (i.e. University athletic team competition, concert, etc.) exams **MUST** be taken before the date of the absence. The instructor must be **notified in writing [email preferred]** of all such absences at least 2 weeks before the exam in question. **NO EXCEPTIONS!**
- 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.

Getting HELP!

You are **strongly** encouraged to discuss the homework with other students. (That is, you are strongly encouraged NOT to always work alone.) Try out the collaborative D2L-features that I am exploring. 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."

Proposed Sequence and Pace of PHY 103 topics (subject to adjustments, as needed):

Su	Mo	Tu	We	Th	Fr	Sa			
			4		6		SEP	Ch 1 [6]	Introduction, Measurement, Units, Math
	9		11		13			Ch 2 [9, 11, 13]	Kinematics (how it moves) 1-D motion
	16		18		20			Ch 3 [16, 18, 20]	2-D motion
	23	25x			27*			Ch 4 [23, 27, 30, 2]	Forces (why it moves) *possible substitute if I go out of town
	30		2		4		OCT	Ch 5 [4, 7, 9]	Work and Energy
			7		9			Ch 6 [11, 14, 16, 18]	Momentum and Collisions
	14		16		18				
	21		23x		25			Ch 7 [21, 25, 28]	Circular Motion
	28		30		1		NOV	Ch 8 [30, 1, 4, 6, 8]	Rotational Motion and Equilibrium
		4		6	8				
	11		13		15			Ch 13 [11, 13]	Vibrations
	18x		20		22			Ch 13 [15, 20]	Waves
	25		27	TURKEY				Ch 9 [22, 25, 27]	Solids and Fluids
		2		4	6		DEC	Ch 14 [2, 4]	Sound
	9		11			14x		Ch 10 [6, 9]	Temperature, Thermal Expansion, Kinetic Theory
		17x							

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 **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.