

# PHYS 210 - General Physics I

## Introductory Calculus-Based Physics

Dr. Gregory W. Clark



GP I – 28 Aug 19

- Who are you? Why are you here?
- A few syllabus bits
- Laboratory: notebook!
- Scale – scientific notation
- SI units
- Unit conversion - “chain link conversion”
- Motion diagrams

# Who are you?

## A few syllabus bits ...

**PHYS 210 - General Physics I**  
Course Information - Fall Semester 2019

**General Information:**

Instructor:	Dr. Gregory W. Clark	Office:	SCIC 112, in the Science Center
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Phones:	962-5521 (office) 962-7565 (home - please, no calls after 9:00 PM)		

**The Course:**

General Physics I is a calculus-based physics course designed to meet the needs of majors in the Natural Science Division as well as those seeking General Education science credit. It is the first part of a two-course sequence. This semester we will study motion in one and two dimensions, rotational motion, energy, gravitation, oscillations, and, if time permits, waves. The overall goal of the course is that you become skilled in problem solving in these areas by applying Newton's laws of motion and the law of conservation of energy. The course requirements include regular attendance, class participation, timely completion of reading assignments and homework, laboratory participation, and three examinations. I will assume that you are very comfortable with college level algebra and trigonometry for this course (we will rely heavily upon their use) and have either taken or are enrolled in the first semester of a course in calculus.

**Text and Other Resources:**

The text is **Physics for Scientists and Engineers: A Strategic Approach** by R. D. Knight, third edition (Pearson, 2013). We will be covering the major topics from the first half of this text. Below is a tentative weekly schedule that we will strive to follow. Your first exposure to the material will be before we discuss it in class, so you are **expected** to read the appropriate reading assignment **before** class. To help encourage you to keep up with the readings, we will have brief Reading Quizzes after each weekly class Group meeting (see below). In class we will process what you have read about. Bring questions about the material you have read to class!

Several texts are available in the library that can provide different perspectives on some topics. There is also an excellent collection of resources in the Mathematics & Physics Study Room (SCIC 113). Another resource will be the weekly Physics Study Table, staffed by upper level Physics students, which will begin after the first few weeks of classes (time to be announced). There is a GP I Web Page accessible through the Manchester University Home Page (via the Department of Physics Home Page); I will use it to post information relevant to what we are doing in class. Course is another web-based resource that we will use for lab details will be discussed in class.

**Class Meetings:**

The class meeting time is 100 - 1:50 PM, MWF in room SCIC 202. Class attendance & participation are essential and expected; they are course requirements. I will assume that you have read the assignments for each day. In class meetings, I not simply regurgitate the reading material. Come prepared with questions about the material & be sure to ask when anything is unclear. Questions are indispensable for learning physics! We will spend a bit of time working in groups during class. Please arrive at class prepared to work with others and to contribute to discussions.

You will need a scientific calculator for this course; bring one to all class & lab meetings. You may use a cell phone for a calculator, but I encourage, rather, to obtain a dedicated calculator. I also encourage you to NOT use your phone or other electronic device for browsing, texting, etc., during class, unless asked to for a specific assignment. If you habitually spend time texting/browsing during class I reserve the right to consider you absent for that day's work. Cell phone or computer use during exams or quizzes will result in failure of the examination.

Please report any anticipated absences to me in a timely fashion; it is **your responsibility** to see that missed class work is properly made up for excused absences. If you expect to miss class because of a Manchester University required function (e.g., field trip, athletic event), make plans to have a classmate turn in your work for you for that day (or turn it in early!). Absences from exams will be excused only under extreme circumstances.

**Homework:**

Homework will be assigned daily - usually a combination of questions and problems from the textbook. Homework will be due by 5 PM on the first class meeting day after it was assigned. Late homework will not be accepted. Your best two homework scores will be dropped. The purpose of homework is to develop your problem-solving skills. Problem-solving is a skill that is acquired and honed only by lots and lots of practice. Expert problem-solvers do not wait until the last minute to begin attacking a problem! Start early while material from the class meeting is still fresh and while you have plenty of time to ask questions of classmates or of me. Working together is encouraged in order

## Scientific Notation



- Used to express large and small numbers in convenient form
- Often speak of the “**order of magnitude**” of a number (*i.e.*, the power of ten)

For example

$$\left\{ \begin{array}{l} x = 2.46 \times 10^{-10} \text{ m} \\ v = 3.0 \times 10^8 \text{ m/s} \end{array} \right.$$

## Significant Figures

- Read all about it!
  - There is a summary sheet on the course webpage
  - The **precision** of a **measurement** is related to the number its of significant figures

# Units are important!

Los Angeles Times

## Mars Probe Lost Due to Simple Math Error

October 01, 1999 | ROBERT LEE HOTZ | TIMES SCIENCE WRITER

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NASA lost its \$125-million Mars Climate Orbiter because spacecraft engineers failed to convert from English to metric measurements when exchanging vital data before the craft was launched, space agency officials said Thursday.

A navigation team at the Jet Propulsion Laboratory used the metric system of millimeters and meters in its calculations, while Lockheed Martin Astronautics in Denver, which designed and built the spacecraft, provided crucial acceleration data in the English system of inches, feet and pounds.

Story 2: On January 26, 2004 at Tokyo Disneyland's Space Mountain, an axle broke on a roller coaster train mid-ride, causing it to derail. The cause was a part being the wrong size due to a conversion of the master plans in 1995 from English units to Metric units. In 2002, new axles were mistakenly ordered using the pre-1995 English specifications instead of the current Metric specifications.

# Welcome to a great term of practicing physics!

