

95.141

PHYSICS I

Professor Chowdhury

Course Website

<http://faculty.uml.edu/pchowdhury/95.141/>

Today's Agenda

Course details

Website

Organization

Textbook

Homework

Mastering Physics

Grading

Tutoring

Exams

Philosophy

Chapter 1

Measurement

Uncertainty

Significant figures

Units

Conversions

Estimations

Clickers !!

Course Website

University of Massachusetts Lowell

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95.141 Physics I

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[Textbook and Supplemental Materials](#)

[Course Policy \(pdf file\)](#)

[Schedule and Homework Assignments \(pdf file\)](#)

[Recitation Sections and Instructors \(pdf file\)](#)

[Mastering Physics \(Registration How-to and Help\) \(pdf file\)](#)

Lectures

Course Organization

Physics I meets 4 times a week

Lectures : 9:00-9:50 MW, Olney 150

Recitation Sections

Various times (MW or TuFr) and
locations

FOURTH EDITION
PHYSICS
for
SCIENTISTS & ENGINEERS
with Modern Physics



GIANCOLI

Know your instructor and section number !

RECITATIONS MEET THIS WEEK Wed and Fri !

Text: Giancoli: Physics for Scientists and Engineers, 4th Ed.

LABS MEET NEXT WEEK!

Lectures

New topics ahead of recitations

Clicker questions

Example problems

Movie clips

Demonstrations

LECTURES MOVE FAST !

Lecture slides will be posted on-line

Lecture recording (video and audio) will be posted

Recitations

Lecture review

Example problems from textbook

Quizzes

Written HW collected and graded

Course Grading

<u>Item</u>	<u>Points</u>	<u>Range</u>	<u>Grade</u>
Class Participation	40	>80%	A
Weekly HW	80	75-80%	A-
Lecture Prep HW	20	70-75%	B+
Quizzes	100	65-70%	B
Math Quiz	10	60-65%	B-
Exam 1	100	55-60%	C+
Exam 2	100	50-55%	C
Exam 3	100	45-50%	C-
Final Exam	200	40-45%	D+
		35-40%	D
		<35%	F
Total	750		

Clickers

Participation = Lecture + Section

You must have your own clicker!!

You cannot borrow a friend's clicker for class

You may not have more than 1 clicker in class: this is academic fraud.

Clickers will be used to determine class participation

Clickers will be used from next week!!

Weekly Homeworks

ALL HW is on www.masteringphysics.com
Course “UML95141SPRING2013”

The online HW is typically due on Saturday at noon.
(You are penalized 25% for each day late)

Weekly HWs count for 80% of your HW grade
(60% online, 20% written).

Lecture Prep HW (due before each lecture) counts for 20% of
your HW grade.

Recitation instructors will collect written homework weekly.

Homework assignments are also available at course website

Physics I Resources

Get help early and often.

Use all available resources.

The first person to contact with problems in Physics I is your **Recitation Instructor**!!

Recitation Instructors will have office hours each week during which they can meet.

Physics Department Tutoring Center

UML tutoring center: info on course website

Pre-exam review sessions

www.masteringphysics.com



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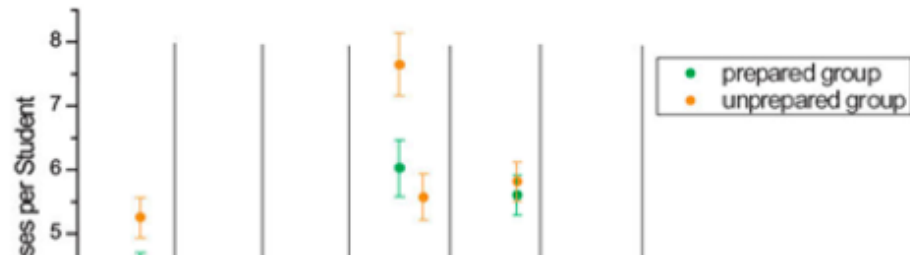


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- >> [What is MasteringPhysics?](#)
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Recitation Quizzes

Given by recitation instructor, during recitation.
100/750 of Final Grade.

Typically covers material from previous week's
class/recitation and homework.

EXAMS

3 Mid-Term (in-class) Exams
Each worth 100 pts.

Covers incremental material from previous exam
No rescheduling
(Extra time available for students with note from
Student Disability Services)

Final Exam 200 pts.
Date/Time/Location To Be Announced

MATH DIAGNOSTIC QUIZ

Given in your first recitation.

This is a check of very basic math skills.

Meant to be a diagnostic tool for you & us.

See where your quantitative skills stand.

See if you are prepared for this very
challenging course.

10 points for all for just taking it.

Introductory Physics

Measurement and Uncertainty

No measurement is perfectly precise

It is important to provide the uncertainty in the measurement

either in absolute numbers: e.g. 0.1g or 0.2mm

Or as a percentage: 10m \pm 2%, or 3.2kg \pm 10%

Measurement and Uncertainty

- If uncertainty is not explicitly mentioned, we assume it to be 1, or a few units in the last digit specified
 - “The speed of the car was 51.2 mph”
Means...
 - “The speed of the car was 51.2 mph +/- ~0.1mph”

Significant Figures

number of reliably known digits in a value

– 45.21 kg → 4 significant figures

– 0.00495m → 3 significant figures

Be careful about how many digits you use!!

– i.e. I am 6 ft 4.23457 inches

Scientific Notation

– 4,560,000,000 → 4.56×10^9

Units

- Units are important !
 - “I weigh 150!”Could mean:
 - “I weigh 150lbs”Or.....
 - “I weigh 150kgs”
- In Physics we try to use same set of units:
SI: Système Internationale

SI Units

- Length: meters [m]
- Time: seconds [s]
- Mass: kilogram [kg]
- Temperature [K]

For very small or very large numbers, use prefixes:

G → giga → 10^9

M → mega → 10^6

K → kilo → 10^3

m → milli → 10^{-3}

μ → micro → 10^{-6}

n → nano → 10^{-9}

- 100,000m can also be written as 100 kilometers (km)
- 0.0001s could be written as 100 microseconds (μ s)

Mixed Units

Sometimes we have to convert units

Two cars traveling on the highway, car 1 at 55mph, car 2 travels 200m in 10s. Which is going faster?

– Need to convert between mph and m/s →
conversion factor

– Car 1 24.81 m/s

– Car 2 20 m/s

Mixed-up Units

Mars Climate Orbiter

From Wikipedia, the free encyclopedia

The ***Mars Climate Orbiter*** (formerly the **Mars Surveyor '98 Orbiter**) was a 338 kilogram (750 [lb](#)) [robotic space probe](#) launched by [NASA](#) on December 11, 1998 to study the [Martian climate](#), [atmosphere](#), [surface changes](#) and to act as the communications relay in the [Mars Surveyor '98 program](#), for [Mars Polar Lander](#). However, on September 23, 1999, communication with the spacecraft was lost as the spacecraft went into orbital insertion, due to ground based computer software which produced output in Imperial units of pound-seconds (lbf-s) instead of the specified metric units of newton-seconds (N-s). The spacecraft encountered Mars at an improperly low altitude, causing it to incorrectly enter the upper atmosphere and disintegrate.

The cost of the mission was \$327.6 million total for both orbiter and lander, \$193.1 million for spacecraft development, \$91.7 million for launching it, and \$42.8 million for mission operations.

This error has since been known as the *metric mixup* and has been carefully avoided in all missions since by [NASA](#)

Estimating

Why is estimating important?



Estimating (Fermi problems)

What is the thickness of a page in our Physics textbook?

What is the weight of the earth?

Order of magnitude estimate