

Our Promise

We will teach you physics that matters to you.

We will treat you with respect.

We will help you.

Physics

- How do we walk, breath, ...
- What causes geologic erosion?
- Why don't clouds fall?
- Who shot JFK?
- Why don't woodpeckers knock themselves silly?

Physics 2207 Fall 2011

Lecturer: Matthias Liepe

Senior Staff: Kathy Selby, Bert Fulbright

Course Web Site:

www.blackboard.cornell.edu

- **Lecture notes**
- **Homework assignments and solutions**
- **Videos of most demonstrations shown in lecture**
- **...**

Please sign Sign-up Sheet if you can not access the page and need to be added to Blackboard

Texts:

- *Fundamentals of Physics*, 9th ed., Vol. 1, by Halliday, Resnick, and Walker
- P2207 Lab Manual 2010

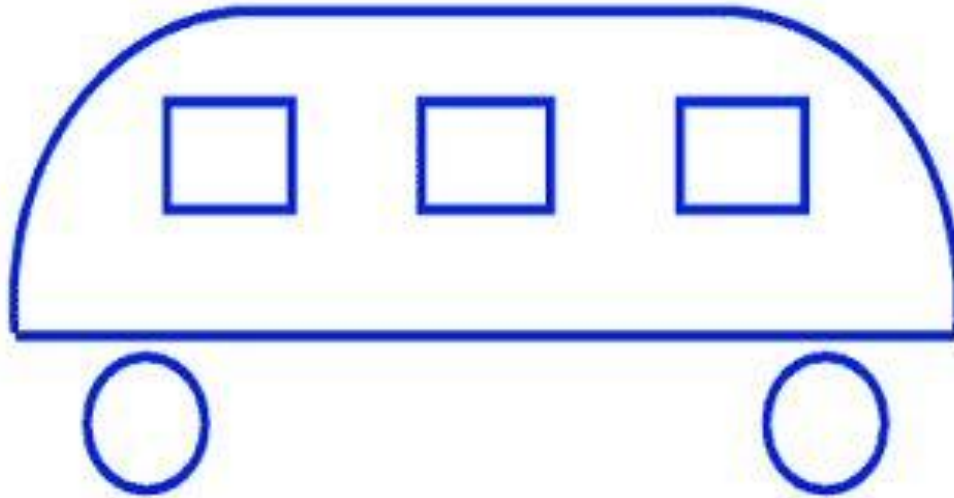
I-Clicker:

- Please register your I-Clicker for this semester at <http://fit.cit.cornell.edu/atcsupport/pollsrvcl/> .

Academic Integrity:

- We take issues of academic integrity extremely seriously.
- No violations last year in P2207.

"In which direction is the bus pictured below traveling?"



Look carefully at the picture. Do you know the answer?

- A. Left
- B. Right
- C. Can't tell

What is your major or indented major?

- A. Biology
- B. Chemistry
- C. Human Ecology
- D. Other Science/Math
- E. Non-Science

Homework assignments:

- Handed out/due every Wednesday. HW 1 due next Wednesday. Grading based on effort.

Cooperative Learning Problems:

- Assigned in section. You'll work on them in teams.

Labs

- One each week. Pre-Lab questions must be turned in to your TA as the beginning of each lab! No lab book is required. Turn in the completed lab manual pages. Labs start next week, in Rock B54. **You must attend all labs!**
You must attend the lab section you are signed up for!
There will be no make-up labs!

Quizzes:

- One each week, in recitation. Based on previous week's lectures, recitation and lab work. Start week of Sept. 5.

Participation:

- Lecture participation, recitation participation, lab part.

Exams:

- Prelim 1: Tuesday, October 4
- Prelim 2: Tuesday, November 8
- Final: Tuesday, December 13

Grading:

Exams: 65% (20% P1, P2, 25% Final)
Recitation, HW, Lab, part.: 35%

Exams will not be curved (unless we goof). Section grades will be adjusted for differences between TAs.

Help each other to learn, and no one will lose!

We will try our best to accommodate everyone who wants to take Physics 2207, but this class is very full.

Please see Rosemary French (121 Clark Hall) for help signing up.

Lectures on the same day are identical and you can attend either one, no matter which one you signed up for.

You must attend the section and labs you are signed up for! See Rosemary French if you need to change sections /labs because of direct conflicts.

Registration issues should be settled in the first two weeks.

Course Objective:

- To introduce you to the ideas and tools of physics relevant to careers in medicine, biology, and other science-related areas.

Syllabus:

- Motion along a Line
- Motion in a Plane
- Forces, Newton's Laws
- Solid and Fluid Friction
- Circular Motion
- Energy and Power
- Oscillations
- Momentum, Collisions
- Static Equilibrium & Elasticity
- Heat, Thermodynamics
- Static and Moving Fluids
- Waves and Sound

Concepts will be illustrated with applications.

Math Skills for Physics 2207

- See handout for required skills.
- Unlike **1101**, **2207** is officially **calculus-based**.
- However, **you need only understand the basic notions of a derivative and an integral**. You won't have to do formal integration and differentiation.

Getting Help in P2207

1. Study room/ Office Hours

All office hours will be held in Clark Hall, second floor, next to room 282.

- **The study room is open:**

- **Mondays: 1 – 6 PM**
- **Tuesdays: 1 – 9 PM**
- **Wednesdays: 1 – 6 PM**
- **Thursdays: study room closed**
- **Fridays: 1 – 6 PM**
- **Saturdays: 1 – 6 PM**
- **Sundays: 1 – 6 PM**

- **Phys2207 staff will be present during most of the time the study room is open (see detailed schedule on study room door)**

Getting Help in P2207

2. Prof. Liepe's "Help me!" Office Hours

Wednesdays, 2- 4 PM in
302 PSB.

***See me if you feel
overwhelmed by the
material, need study tips,
are concerned about your
performance...***



Getting Help in P2207

3. The Learning Strategies Center - B14 Rock

- **Focused on those students needing remedial help in math and physics**

LSC office hours:

Mon-Thurs: 2:30-5:30 pm and 6:30-9:30 pm

Friday: 2:30-5:30 pm

Saturday: noon - 6 pm

Sunday: noon - 9 pm

Getting Help in P2207

4. Counseling and Psychological Services (CAPS) - Gannett Health Center

- Where to go if you are feeling unusually anxious, stressed or depressed, and especially if these feelings are interfering with your ability to perform in the course.
- **Don't dismiss this option:** Psychological issues are one of the most important **controllable** factors affecting student performance in challenging courses.

Keys to Success in Physics 2207

1. You can't learn how to do physics by reading the text or the solutions manual!

Do lots and lots of problems, both on your own and in groups.

Your ability to solve problems on your own is the gold standard against which to assess your understanding.

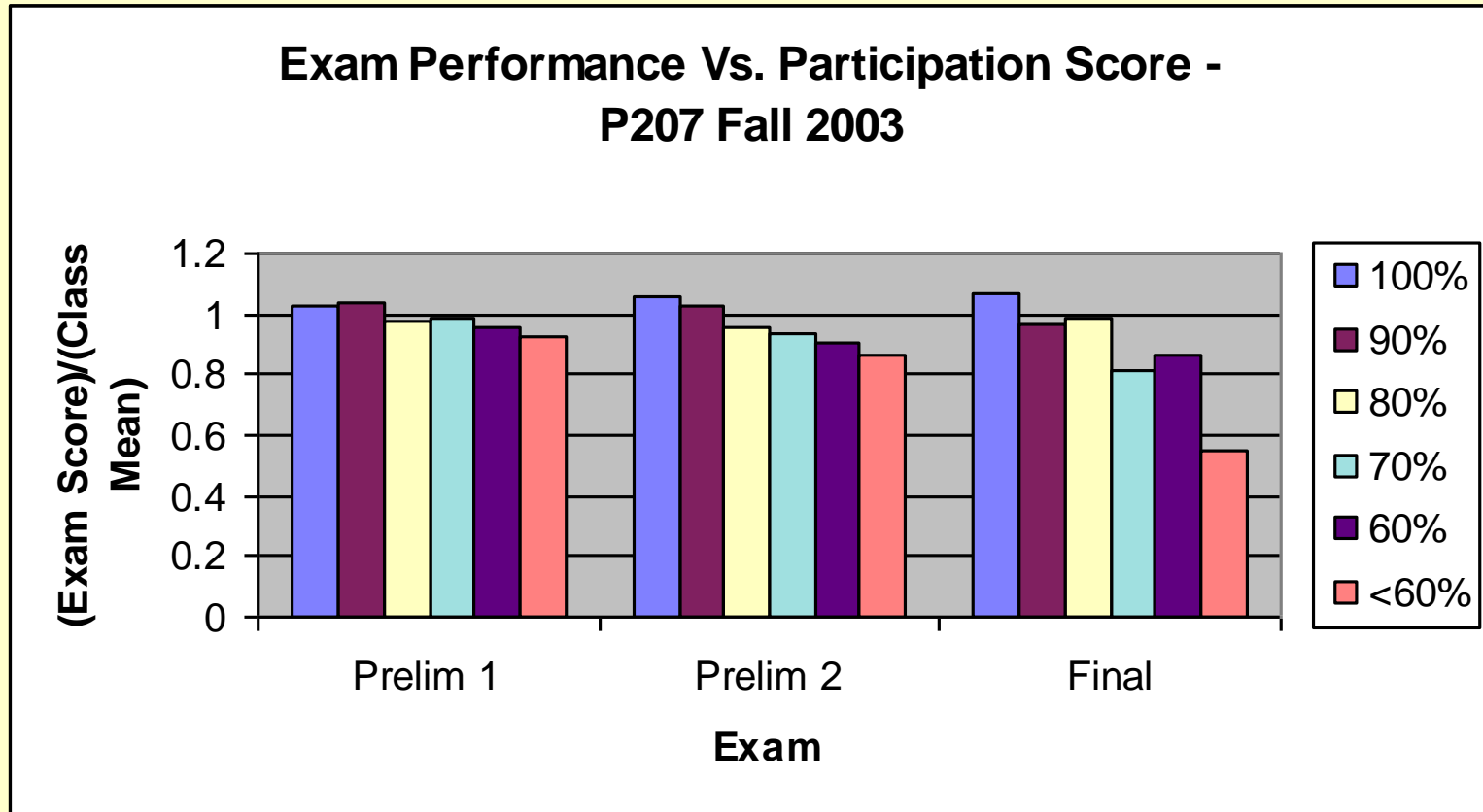
Keys to Success in Physics 2207

2. You get most of the points in recitation, lab and HW for showing up and making a good effort. **Don't throw these points away!** Missed work carries a huge grade penalty: missing half the homework is roughly equivalent to the difference between getting an "A" and a "C" on a prelim!

Do all the assigned work.

Keys to Success in Physics 2207

3. Maintain a consistent effort.



Attend lectures, recitations and labs throughout the semester.

Describing Motion



A Squirrel runs from a tree to a peanut on the ground and back to the tree. During this trip, the average velocity of the squirrel is...

$$\bar{v} = \frac{\Delta x}{\Delta t} = 0 \quad \leftarrow \Delta x = 0 \text{ here}$$

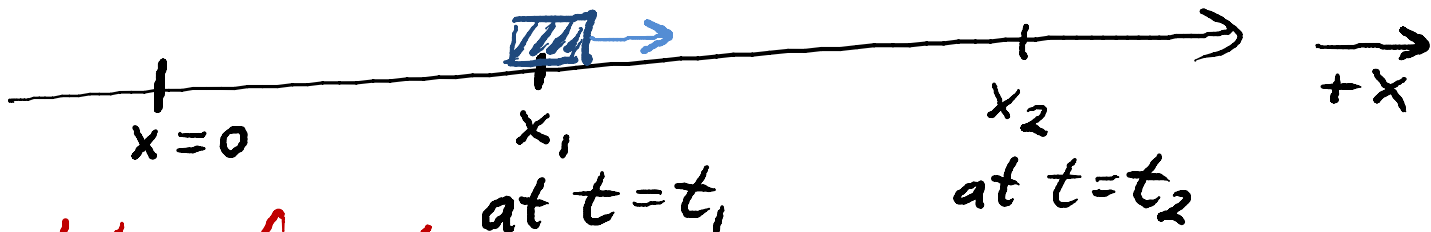
A. non-zero

B. 0

D. Need to learn more about describing motions

Describing Motion

① Along a straight line (1-D Motion)



Quantities of interest: position, displacement, velocity, speed, acceleration

• position: where something is

$x(t)$

↑ function of time

units of $x = [x] = m$

• displacement: how far something has moved

$$\Delta x = x_2 - x_1 = x(t_2) - x(t_1)$$

↑
change

= (later) - (earlier)

also units of meters

• velocity:

average:

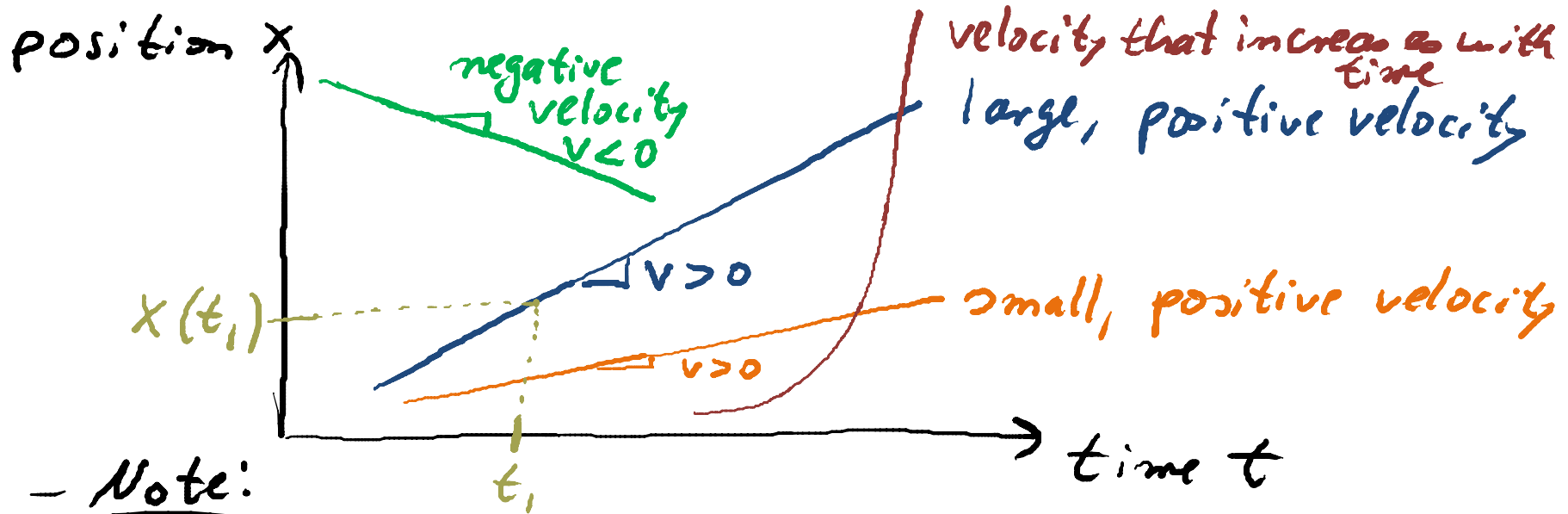
$$v_{avg} = \overline{v} = \frac{\text{how far you travel (displacement)}}{\text{how long it takes}}$$
$$= \frac{\Delta x}{\Delta t} = \frac{x_2 - x_1}{t_2 - t_1} \quad [v] = \frac{m}{s}$$

time interval

instantaneous:

$$v(t) = \lim_{\Delta t \rightarrow 0} \frac{\Delta x}{\Delta t} = \frac{dx}{dt}$$

- derivative of position wrt. time
- rate at which position changes
- $v(t) = \frac{dx}{dt} = \underline{\text{slope of the position vs. time graph}}$



- Note:

- velocity and displacement are vector magnitude and direction
 \Rightarrow in 1-D motion: \pm sign for direction
- speed = $|v| \geq$ always
- point at $x-t$ graph at time t_1 gives position at that instant of time
- inst. speed at time t_1 = magnitude of slope at that point
- direction of motion \leftrightarrow sign of slope