Physics 1408-002
Principles of Physics

Lecture 2

– Chapter 2 –

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Announcement I

Lecture note is on the web

Handout (4 slides/page)

http://highenergy.phys.ttu.edu/~slee/1408/

1408 Lab News: on-going now!!

*** Class attendance is strongly encouraged and will be taken randomly. Also it will be used for extra credits.

HW Assignment #1 will be placed on MateringPHYSICS "today", and is due by 11:59pm on Tuesday, 1/20

Announcement II

SI session by

Reginald Tuvilla

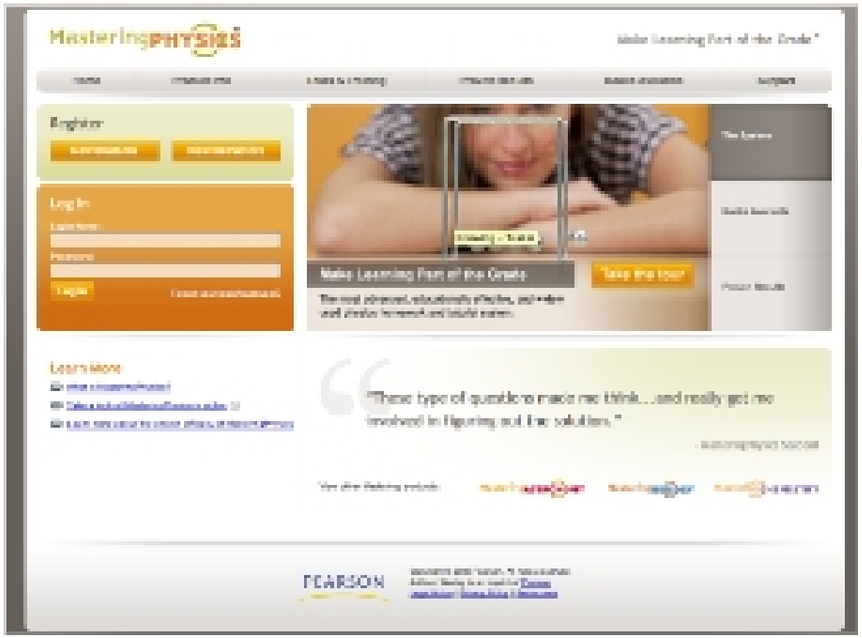
SI sessions will be at the following times and location starting this Thursday.

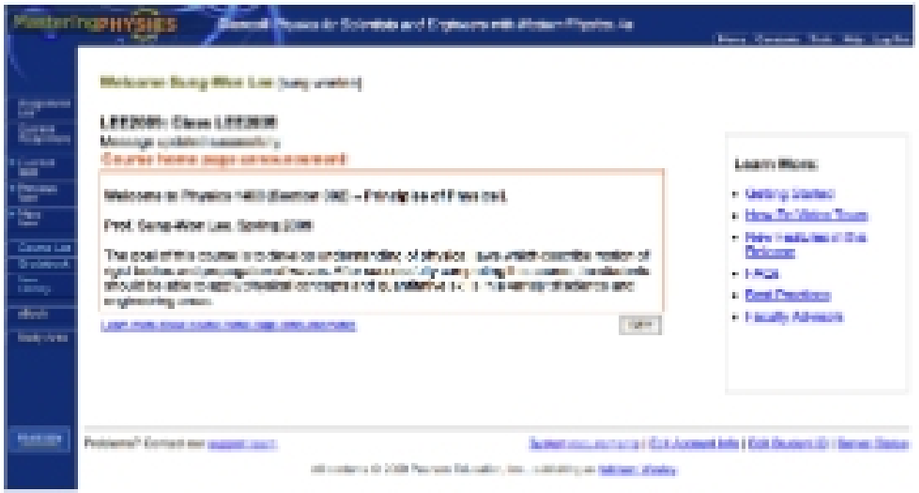
Monday 4:30 - 6:00pm - Holden Hall 106
Thursday 4:00 - 5:30pm - Holden Hall 106

On-lime Homework

- To access MateringPHYSICS, you must register at http://www.masteringphysics.com/
- Instructions are in the Student Access Kit.
- Your course ID is LEE2009

- Once you are registered, you will be able to download the HW assignment.
- 52 out of 198 registered so far (~26%)
- If you do not have the Student Access Kit which comes with a new textbook, you can purchase one on the MasteringPHYSICS site. Please do it ASAP.





Chapter 2

Describing Motion:

Kinematics in

"One" Dimension

1. Reference Frames & Displacement
2. Average Velocity
3. Instantaneous Velocity
4. Acceleration
5. Motion at Constant Acceleration
6. Solving Problems
7. Freely Falling Objects

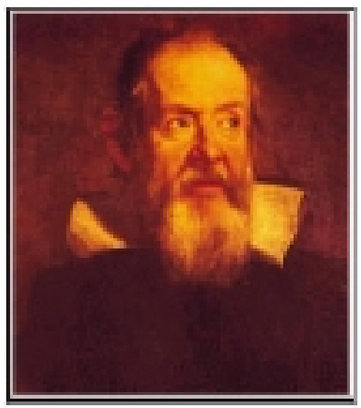
The directions of the car's velocity and acceleration are shown by the green (v) and gold (a) arrows.

Motion is described using the concepts of velocity and acceleration.

We examine in detail motion with constant acceleration, including the vertical motion of objects falling under gravity.

Equations of Constant Acceleration

Equations we need to solve constant-acceleration problems



$$v(t) = v_0 + at$$

$$x(t) = x_0 + v_0 t + \frac{1}{2}at^2$$

$$v^2(t) = v_0^2 + 2a(x - x_0)$$

$$\overline{v} = \frac{v(t) + v_0}{2}$$

Kinematics-Description of Motion

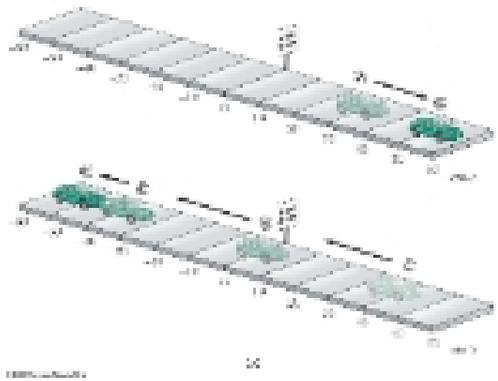
- Reference Frames and Displacement
- Average Velocity
- Instantaneous Velocity
- Acceleration
- Motion at Constant Acceleration
- Solving Problems
- Falling Objects
- Graphical Analysis of Linear Motion

Kinematics

- Describes motion while ignoring the agents that caused the motion
- For now, will consider motion in one dimension
  - Along a straight line

Position

- Defined in terms of a **frame of reference**
  - One dimensional, so generally the x- or y-axis
- The object's position is its location with respect to the reference frame (see next slide)



Reference Frames and Displacement

Any measurement of position, distance, or speed must be made with respect to a reference frame

e.g. If you are sitting on a train and someone walks down the aisle, their speed with respect to the train is a few miles per hour, at most.

Their speed with respect to the ground is much higher.

A person walks toward the front of a train at 5 km/h. The train is moving 80 km/h with respect to the ground, so the walking person's speed, relative to the ground, is 85 km/h.

Reference Frames and Displacement

Distinction between distance and displacement.

Displacement (blue line) is how far the object is from its starting point, regardless of how it got there.

Distance traveled (dashed line) is measured along the actual path.

A person walks 70m east, then 30m west. The total distance traveled is 100 m (path is shown dashed in black); but the displacement, shown as a solid blue arrow, is 40m to the east.