PHY 2004: Applied Physics in our world today

Neil S. Sullivan  Fall 2010

NPB  Rm 2235

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Class meets:  M W F (Period 8) 3:00 -3:50 PM

NPB 1001

Office Hours:  M W F (Period 4) 10:40 – 11:30 AM

NPB 2235

Textbook:

Technical Physics

F. Bueche & D. Wallach
PHY 2004

GENERAL POINTS

Reference materials, important dates:  CHECK course web site

Course Goals

General introduction to use of physics in everyday life
Simple applications, useful in professional careers
Emphasis on principles (not lengthy calculations)

Exams:

Some problems in exams will be from problems discussed in class and in in-class quizzes (clicker responses)
Make-up exams (date TBD) Need SIGNED documentation from Dr. coach teacher etc.

HITT:

Have remotes by September 7 (to have in-class quizzes recorded)
PHY 2004 Exams  Fall 2010

All here in NPB 1001

Mid-term:  Best two 30 points each

1. Sept. 20    Pd 8 (3-3:50 PM)
2. Oct. 20    Pd 8 (3-3:50 PM)
3. Nov. 19    Pd 8 (3-3:50 PM)
4. 

Final    Dec. 13  (3-5 PM)  40 points

unless third midterm better than final in which case
final =30 points and other mid-term=10 points)

In class questions = bonus of 5 %
LECTURE 2  PHY 2004

MOTION

Speed (scalar)  distance per unit time  meters/sec

Velocity (vector)  speed + direction

Direction different at different points

Average velocity  = displacement vector AB/time
Acceleration (vector)

Rate of change of velocity

\[ a = \frac{(V_F - V_I)}{t} \quad \text{OR} \quad V_F = V_I + at \]

Uniform acceleration (typical in this class)

e.g. gravity, rockets

\[ X = V_{\text{avg}} \cdot t \quad \text{where} \quad V_{\text{avg}} \quad \text{is average velocity} \quad V_{\text{avg}} = \frac{(V_I + V_F)}{2} \]

\[ \text{THUS} \quad X = \frac{(V_F^2 - V_I^2)}{2a} \quad \text{OR} \quad V_F^2 = V_I^2 + 2aX \]

\[ \text{ALSO} \quad X = V_{\text{avg}} \cdot t \quad \text{OR} \quad X = V_I t + \frac{1}{2}at^2 \]
Gravity constant at Earth’s surface (always “down”)

Typical problem

Throw ball up at 20 m/s. How high will it go?

\[ V_F^2 = V_i^2 + 2aH \]

\[ a = -9.8 \text{ m/s}^2 \text{ (gravity DOWN deceleration)} \]

\[ V_F = 0 \]

\[ 0 = 20^2 - 2(9.8)H \]

\[ H = \frac{400}{19.6} = 20.4 \text{ m} \]
Projectile Motion

Initial velocity $V$ at angle $\theta$ to horizontal

Calculate $R$

Calculate $\theta$

More next time.