Physics 211
Elementary Physics
Fall 2012

Instructor: Dr. Geoffrey Lovelace
Sections 1 & 70

Lecture 1 — 8/28/12

I. Introduction

      A. A little bit about me

      B. Syllabus

      C. What is physics?

II. Orders of magnitude

      A. Powers of 10

      B. Order of magnitude estimate

      C. Length scales

      D. Powers of 10 video

III. Assignments

      A. No homework today

      B. Class participation: 1 thing you look forward to, 1 question/concern/dislike

Physics 211
Elementary Physics
Fall 2012

Instructor: Dr. Geoffrey Lovelace
Sections 1 & 70

Lecture 2 — 8/30/12

I. Survey results

    A. Looking forward to…

    B. Questions & concerns

II. Measurement

    A. Units & unit conversion

    B. Uncertainty & significant figures

III. Assignments

    A. Homework #1 posted on Mastering Physics website (due Sept. 6, 11:59PM)

    B. Next week: chapter 2 of Wilson, Buffa, & Lou

    C. Class participation: math survey

Physics 211
Elementary Physics
Fall 2012

Instructor: Dr. Geoffrey Lovelace
Sections 1 & 70

Lecture 3 — 9/4/12

I. Introduction to Kinematics = How Things Move

    A. Scalars: Distance, average speed, instantaneous speed

    B. Vectors: Displacement, average velocity, instantaneous velocity

    C. Problem solving strategy & worked example: was I speeding?

    D. Vector: average, instantaneous acceleration

II. Plotting position, velocity and acceleration

    A. Position vs. time

    B. Velocity = slope of position vs. time

    C. Acceleration = slope of velocity vs. time

    D. Demo: motion sensor: student walking, running, basketball

III. Assignments

    A. Reminder: Homework #1 due Thursday, September 6 at 11:59PM

    B. Next class: remainder of chapter 2: free fall, more motion

    C. Class participation: position graph clicker question

Physics 211
Elementary Physics
Fall 2012

Instructor: Dr. Geoffrey Lovelace
Sections 1 & 70

Lecture 4 — 9/6/12

I. Constant acceleration motion & freefall

    A. Freefall demo: feather & penny drop (http://physics.fullerton.edu/department/lecture-demos/96)

    B. Kinematic equations for constant acceleration

    C. Worked example: Mario Kart

II. Math review: trig

    A. sin, cos, tan, and "SOH-CAH-TOA"

    B. Pythagorean theorem

III. Assignments

    A. Reminder: Homework #1 due Thursday, September 6 at 11:59PM

    B. Homework #2: assigned today, due in 1 week, September 13 at 11:59PM

    C. Next week: more kinematics, start 2D motion (chapter 3)

    D. Class participation: a trig identity

Physics 211
Elementary Physics
Fall 2012

Instructor: Dr. Geoffrey Lovelace
Sections 1 & 70

Lecture 5 — 9/11/12

I. Trigonometry review

    A. SOH-CAH-TOA

    B. Pythagorean theorem & a trig identity

II. More constant acceleration in 1D

    A. Example: Ball toss

    B. Group problem: stopping distance

III. Intro to 2D motion

    A. Geometric vector addition ("tip to tail")

    B. 2D motion reduces to 2 independent 1D problems

    C. Projectile demo: ball toss on a train (http://physics.fullerton.edu/department/lecture-demos/96)

IV. Assignments

    A. Reminder: homework #2 due Thursday at 11:59PM

    B. Exam #1: in 2 weeks, covers chapters 1-3. (We are now going through Ch. 3.)

    C. Class participation: ranking vector sums

Physics 211
Elementary Physics
Fall 2012

Instructor: Dr. Geoffrey Lovelace
Sections 1 & 70

Lecture 6 — 9/13/12

I. "Speed" bus jump

II. Vector components & addition by components

    A. Components <===> magnitude, direction: the trig you will need

    B. Addition by components

    C. Worked example: vector addition

III. Projectiles

    A. When velocity, acceleration not parallel, motion is along a curve

    B. Projectile: horizontal: uniform motion, vertical: freefall

    C. Demo: monkey shoot

IV. Assignments

    A. Reminder: homework #2 due today at 11:59PM

    B. Homework #3 assigned today: due in 1 week

    C. Exam #1: 2 more classes remain before first exam

    D. Class participation: opinion survey #2

    E. Reading: to end of chapter 3

Physics 211
Elementary Physics
Fall 2012

Instructor: Dr. Geoffrey Lovelace
Sections 1 & 70

Lecture 7 — 9/18/12

I. Survey results

II. More projectiles

    A. Demo: simultaneous fall

    B. More examples: shot-put, archer fish

    C. Features of projectile motion

        1. Visualize position, velocity, acceleration

        2. Hang time

        3. Worked example: range vs. angle

III. Assignments

    A. Reminder: homework #3 due Thursday at 11:59PM

    B. Exam #1: 1 more class remains before first exam

    C. Class participation: Concept you are feeling most confident about, least confident about; do you like whiteboard or slides better for examples?

Physics 211
Elementary Physics
Fall 2012

Instructor: Dr. Geoffrey Lovelace
Sections 1 & 70

Lecture 8 — 9/20/12

I. Relative velocity

    A. Example: "Star Wars" bike chase showing different frames of reference

    B. Calculating relative velocities: application of vector addition

II. Introduction to the laws of motion

    A. Force = vector = something capable of giving an object acceleration

    B. Net force = vector sum of all forces acting on an object

    C. Mass = resistance to acceleration

    C. Newton's first law: if net force is zero, velocity constant & acceleration zero

    D. Newton's second law: a=Fnet/m

    E. Example: projectile motion

III. Assignments

    A. Exam #1: Tuesday (next class period)

    B. Homework #3: due 11:59PM tonight

    C. Homework #4: assigned today

    D. Class participation: make a wish for what you would like on the formula sheet

    E. Reading: continue chapter 4