Welcome to

Physics 105
Section 006, 008!

Instructor: Ken Ahn

Today in this class...

1. Physics 105 Course information

2. Brief Introduction to Physics

3. Chapter 1. Introduction
What is Physics?

Branch of science that deals with the nature and properties of matter and energy

Physics 105: Classical Mechanics

Motion of objects that are NOT

- too small
  atoms and subatomic particles → Quantum Mechanics
- too fast
  objects near the speed of light → Special Relativity
- too dense
  black holes, the early Universe → General Relativity

Classical mechanics deals with a lot of our daily-life objects!

Classical mechanics

Oldest, most fundamental branch in Physics

Foundation of all science & engineering
Course objectives

1. Understanding the basic principles governing elementary mechanics (Example: Newton’s laws)

2. Applying the basic principles to explain commonly observed phenomena (Example: free fall motion of an apple)

3. Improvement of analytical reasoning and problem-solving skills (Example: think like Newton)

Chapter 1. Introduction

Fundamental quantities in Physics

Quantities in Physics: speed, acceleration, force, distance, time, area, energy, mass,…………….

→ Not independent, but related

Example: speed 60 mi/h

\[
\text{speed} = \frac{\text{distance}}{\text{time}}
\]

Fundamental quantities: Length, Mass, Time
**Units**
Length: mile, foot, inch, meter, kilometer, nanometer,…
Time: second, minute, hour, day, year, century,…
Mass: gram, kilogram, … (pound: unit for force, not mass)

**Standard system of unit**
SI (Système Internationale) unit or MKS unit
Meter(m), kilogram(kg), second(s) for length, mass, time

SI unit for other quantities
(example) \[ \text{speed} = \frac{\text{distance}}{\text{time}} : \text{m/s} \]

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**NASA’s Unit Confusion!**

- **$125 million** Mars climate orbiter approached Mars on September 23rd, 1999, but crushed or burned in Mars’ atmosphere.
- Built by Lockheed Martin astronautics engineers who used British system for navigational information.
- Spacecraft operators at NASA jet propulsion lab thought it was the SI (metric system) as was required.
- Spacecraft was supposedly directed to a safe orbit of 87 mi above Mars’ surface but instead it was only 35 mi.

→ Unit is important!
Quick Quiz

Example: What is Prof. Ken Ahn’s website address?

http://web.njit.edu/~kenahn
Quick Quiz

What are we going to learn in Physics 105?

a. Quantum mechanics
b. Special relativity
c. Classical mechanics
d. General relativity
e. Optics

Answer: c. Classical mechanics

Quick Quiz

What are the three basic units in the SI Unit system?

m (meter), kg (kilogram), s (second)
Assignment

Study Appendix A in B1, "Mathematical Review". Some Quiz problems next Friday will be from it.

Create UT EID, request enrollment for the course, download and start HW #1: Introduction (due 2/2, 1 am Central Time).

Announcement

Bring iClicker every class.
Lecture Quiz on every Friday