

Announcements – 11 Dec 2014

1. Prayer
2. Tutorial lab: Open during reading days and finals, but the TAs have their own exams to worry about, so staffing may vary significantly from normal.
3. Rate the tutors: <http://gardner.byu.edu/tas/tutorrating.php>
4. Upcoming dates:
 - a. Thu Dec 11, 5:30 – 7 pm - Jerika final exam review, C295 ESC
 - b. Fri Dec 12, 6 – 7:30 pm - Jerika final exam review, C295 ESC
 - c. Fri Dec 12 - All extra credit & late HW must be turned in by midnight; this includes all TA-graded stuff as well as all computer-graded stuff
 - d. Sun Dec 14 - BYU Instructor/course ratings due <http://studentratings.byu.edu> (2 pts extra credit)
 - e. Tue Dec 16 - Final exam in class (7-10 am or 8-11 pm)
 - f. Wed or Thu Dec 17-18 - Final exams graded, uploaded
 - g. Mon Dec 22 (?) - Grades finalized

“Which of the problems from last night's HW assignment would you most like me to discuss in class today?”

Quick Semester Review

aka “What was this class all about?”

1. The universe makes sense!
 - a. To me: the order in the universe reflects the order of God
 - b. The job of a scientist is to discover and analyze this order, and use knowledge gained to make additional predictions

2. Mathematics is the “language” of the universe
 - a. Algebra. Example: Kinematics equations
 - i. Position
 - ii. Velocity
 - iii. Acceleration
 - b. Geometry. Example: Area/volume of sphere
 - c. Trigonometry. Examples: Vectors, oscillations
 - d. Logarithms. Example: decibel scale, work in isothermal process
 - e. Calculus. Examples: slope of position graph = velocity (that’s a “derivative”); area under curve of P-V diagram = work done by gas (that’s an “integral”)

3. Most predictions follow from very basic natural laws, or “blueprints”.

Examples:

a. Newton’s Laws of Motion

i. Newton 1: Inertia

ii. Newton 2: Forces

1. Bag of tricks: Weight, normal, tension, friction, etc.

2. Torques & rotational quantities

iii. Newton 3: Partner forces

b. Newton’s Law of Gravity

i. Kepler’s Laws

c. Conservation of work & energy

i. kinetic energy

ii. potential energy

iii. rotational kinetic energy

iv. random kinetic energy: “internal energy”

1. heat transfer / thermal expansion / calorimetry

2. laws of thermodynamics, Carnot theorem

d. Conservation of momentum (if no outside net force)

e. Conservation of angular momentum (if no outside net torque)

4. Fluids: the behavior of large numbers of objects (e.g. molecules) can be described using overall/average properties
 - a. Basics
 - i. Static: Archimedes (buoyancy)
 - ii. Dynamic: Bernoulli (cons. of energy; pressure vs. speed)
 - b. Kinetic theory to connect microscopic to macroscopic
 - c. Gases
 - i. ideal gas law
 - ii. PV diagrams
 - iii. laws of thermodynamics

5. Waves: transferring energy via oscillations
 - a. Mechanical waves
 - b. Light waves (including heat transfer via radiation)
 - c. Sound waves

Requested Problems from Past Exams...

