PHYS 1444 – Section 02
Lecture #2

Thursday Jan. 20, 2011
Dr. Andrew Brandt

- Chapter 21
  - Coulomb's Law
  - The Electric Field & Field Lines
  - Electric Fields and Conductors
  - Motion of a Charged Particle in an Electric Field

•Welcome HW is due Friday at 9pm
• Ch. 21Homework is due 9 pm, Thursday, Jan. 27.
It's long so start right away!
• Labs start week of 31st

Mastering Physics Grades

- **For grading purposes, some numeric answers to questions need to be exact**. For example, the answer to the question "How many days are in a week?" must be **7**.
- **The typical grading tolerance for most numeric answers in Mastering assignment questions is between 2%-3%.** For example, if the grading tolerance is 2% and the correct answer is 1043, both 1042 or 1045 are also graded as correct.
- **When an answer is within tolerance, but doesn't match the correct answer:** The officially correct answer displays in a purple box (provided that Show Whether Answer is Correct is set to Always). Students should use this answer if subsequent parts of an assignment item require calculations based on this answer.
- **Students should use at least three digits or significant figures in answers**, unless otherwise specified or unless the exact answer can be expressed using fewer than three significant figures. If higher precision is required, or lower precision is allowed, this is specified in the question or its instructions. When students must do multiple calculations to get an answer they should use more significant figures than required during each calculation and round off at the end
- **You are allowed 4 attempts at a question (with each attempt you lose some points). Reread problem, could you have made a sign error or a unit error or a round-off error?**

Coulomb's Law – The Formula

$$F \propto \frac{Q_1 \times Q_2}{r^2} \quad \text{Formula} \quad F = k\frac{Q_1 Q_2}{r^2}$$

- Is Coulomb force a scalar quantity or a vector quantity? Unit?
  - A vector quantity. Newtons
- Direction of electric (Coulomb) force is always along the line joining the two objects.
  - If two charges have the same sign: forces are directed away from each other.
  - If two charges are of opposite sign: forces are directed toward each other.
- Coulomb's Law is accurate to 1 part in 10^{16}.
- Unit of charge is called Coulomb, C, in SI.
- The value of the proportionality constant, k, in SI units is $k = 8.988 \times 10^9 \ \mathrm{N \cdot m^2/C^2}$
- Thus, if two 1C charges were placed 1m apart the force would be **9x10^{9}N**.