Engineering Physics I – Fall 2015
Midterm 2 information

Midterm 2 will cover the material presented in lectures 8 through 14 and labs 4 and 5. This corresponds to Chapters 4-7 in your textbook. Midterm 2 will not focus on the material covered in earlier lectures, though some of the equations we have used previously (i.e. the position and velocity as a function of time under constant acceleration) may be applicable to the problems in midterm 2.

You will need to memorize the following equations. They will not be provided for you on the midterm. You should also know how to apply these equations and under what circumstances they are applicable (for example, Newton's laws are only applicable in an inertial reference frame, and the kinematic equations only apply under constant acceleration).

$x(t) = x_0 + v_{0,x}t + \frac{1}{2}a_x t^2$ $\quad$ $y(t) = y_0 + v_{0,y}t + \frac{1}{2}a_y t^2$

$v_x(t) = v_{0,x} + a_x t$ $\quad$ $v_y(t) = v_{0,y} + a_y t$

$\mathbf{F} = m\mathbf{a}$ (Newton's second law)

Force due to kinetic friction $\quad$ $\mathbf{F} = \mu_k \mathbf{N}$

Force due to static friction $\quad$ $\mathbf{F} \leq \mu_s \mathbf{N}$

$$a = \frac{v^2}{R}$$

$$W = \int \boldsymbol{F} \cdot d\boldsymbol{s}$$

$W = \mathbf{F} \cdot \mathbf{s}$ (if force is constant)

$W = \Delta KE$ (work-energy theorem)

$\mathbf{F} = k\mathbf{x}$ (force required to stretch a spring a distance x)

$KE = \frac{1}{2} mv^2$

$\frac{1}{2} mv_1^2 + mgy_1 = \frac{1}{2} mv_2^2 + mgy_2$ (conservation of mechanical energy if there are no other forces than gravity)

$KE_1 + U_1 + W_{other} = KE_2 + U_2$ (if other forces act on an object)