**Angular Kinematics Lab**

Given: Round, cylindrical, or wheeled objects (bike?), photogates and time set (if needed)

Task: Determine the angular velocity required by the rotating components of the system to achieve a specific measured linear velocity. Determine the angular and linear acceleration required to make this happen in a specific amount of time.

Presentation: Produce a written lab report detailing your lab experience

**Torque and Angular Acceleration Lab**

Given: Meter stick (no metal ends), fulcrum, mass set, clamps, scale, photogates and timer set

Task: Create 2 scenarios of static equilibrium. Determine mathematically and experimentally the location of the fulcrum and masses. The fulcrum may not be at the center of mass of the meter stick for one of these 2 scenarios. Create 2 scenarios of angularly accelerated motion. Determine mathematically and experimentally the angular acceleration of the meter stick. The fulcrum may not be at the center of mass of the meter stick for one of these 2 scenarios.

Presentation: Scaled sketches of the 4 scenarios with all calculations. For the static equilibrium scenarios, calculate the percent error between the calculated and experimental location of the masses from the fulcrum and calculate the percent difference between the experimental values of torque on each side of the fulcrum. For the accelerated motion scenarios, calculate the percent error between the calculated and experimental values of angular acceleration. Explain sources of error.

% Difference = 100 (tcc - tcw) / [(tcc + tcw)/2]

% Error = 100 (xcalc – xmeas)/xmeas

Adapted from: <http://www.austincc.edu/mmcgraw/Labs_1401/14a%20Torque%20A%20RGC.pdf>

**Angular Momentum Video Analysis Lab**

Given: Video Analysis equipment (Vernier- Logger Pro), <http://serc.carleton.edu/student_videos/index.html#rotation> Slab on disk collision video and Ballistic Pendulum video

Task: Use video analysis to prove conservation of angular momentum in both of the videos above. Calculate the moment of inertia of the non-uniform rectangular slab in the slab on disk collision video.

Presentation: