**Union College Spring 2021**

**Physics 120 Lab 4: Conical Pendulum**

Work in groups of 3.

In this lab, you will theoretically derive your own equation and then test it with measurements.

Gather your equipment: plastic pig with wings, magnetic hook, one- and two-meter sticks and stopwatch.

Use the hook’s magnet to stick it to the ceiling. Unwind the string on the pig and hang the loop over the hook. Open the pig’s wings (so that it clicks into place), turn on the switch on the pig’s side, give the pig a start, and then watch it fly!

Note the pig’s motion. What kind of motion is this?

What parameters of this motion are measurable?

Theoretical Analysis:

Draw a free-body diagram of the pig at a moment during its motion.

Considering the type of motion of the pig, what is the net force of the pig equal to?

Based on the forces acting and the net force derive an expression for the period of the motion based on the measurable parameters.

What parameters should the period depend on?

Test your theory by measuring the quantities in your equation and the period. Compare your “theoretical value” of the period (that based on your derived equation) to your measured value. If there is a significant disagreement, re-examine your theory. See if you can reconcile the results and your theoretical model. You may also confer with other lab groups and see if their data lead to a calculated period that agrees with their measured value.