**ECE 2323: Electrical Engineering Science II**

# Laboratory No. 9: Motor Mania

The goal of this laboratory is to introduce you to a simple DC motor. You will be provided with the following DC motor: <https://www.sparkfun.com/products/10171>. This lab is going to be very open-ended. It is a chance for you to apply many of the things you have learned thus far. Remember that MATLAB and Multisim must be used to verify your circuits.

**Task 1: Data Sheets**

Locate the datasheet online for this motor and write a summary of the electrical properties of this device. How does it respond to electrical inputs? What types of input signals do you need to supply? How fast does it spin? How can you control its movements? Explain these things in your lab report as though you were writing a Wiki page on this motor.

Measure the properties of the motor in the lab and show that it obeys what is described in the data sheet. Describe the pinout for the motor. Explain what is inside the metal can that houses the motor (hint: Google searching will tell you everything you need to know.) Ignore the motor’s torque for now.

Develop a model for the motor in Multisim and demonstrate that it matches what you measured in the lab.

**Task 2: The Sands of Time**

Imagine the motor is driving the hour hand of a clock. Develop a program in MATLAB that interfaces to your hardware and allows you to do the following:

(1) Type the hour of the day as an integer (e.g, 1 - 12).

(2) When you hit return, the motor should move from its rest position to the “hour of the day” according to an analog clock. For example, if you enter “3”, the motor should move ¼ of a rotation, which would correspond to the 3 position on the face of an analog clock.

(3) You should be able to type any hour next, and the clock should move to that position without resetting to its initial position.

To complete this task, you will need to design and build some circuitry that interfaces your laptop to the motor. Use the Digilent board.

**Task 3: Extra Credit**

Your TA will give you 100% extra credit for this lab (which means a full lab grade) if you can demonstrate some interesting application with this motor. No lab report is needed for this task. You just need to be able to demonstrate your application and answer a few questions about your system. You have an additional week to complete this task.

**Summary:**

Motors can be thought of as a transducer because a motor converts electrical energy to mechanical energy. Needless to say, they are used in many real applications (e.g., printers, robots, cars, power systems). The DC motor you are experimenting with is the simplest type of motor you can interface to. Eventually you will learn about many different types of motors and generators, and how you can design electrical systems that make use of them.