

# What is Engineering – ESE Session

## INTRODUCTION TO ELECTRICAL & ELECTRONICS

### ENGINEERING FUNDAMENTALS



#### OBJECTIVES

- To be introduced to what it's like to be a second year engineering student!
- To become familiar with the operation of everyday electronics components and use these devices, and the principles of electrical engineering, to solve a simple, yet meaningful, every day task.

#### SAFETY

While the equipment that we are working with, we must recognize safety in our surroundings at all times. Discussion regarding the safety in the ESE lab environment will take place. As an Engineering student, it would be required for you to note these risks and the ways we can reduce these risks in your lab book which we call **Risk Assessment and Mitigation Strategy (RAMS)**.

#### EQUIPMENT

- +/- 12VDC Power Supply
- ESE Board Kit complete with:
  - Terminal Block assembly
  - (3) Lights
  - Bi-directional motor
  - Relays (double pole, double throw)
  - Pushbuttons and toggle switch
- Wires and wire stripper/cutter
- Banana leads/connector cables

#### TASKS

Our goal today is to complete the wiring for a motor start/stop system. As an undergrad, you would get a pre-lab lecture which would explain the tasks, show how they relate the material you're studying in the lectures, and go over any new components we're introducing. You, on the other hand, get pictures :)

[Construction Guide](#)

[Terminal Names](#)

[Prep Task](#)

#### PROCEDURE

**PART 1** – You'll need wires. Open the [Prep Task](#) and get your wires ready.

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**PART 2 –** Now you need to make some connections and do some testing

Refer to the [construction guide](#) and [terminal names](#) as needed

Step 1 : **Connect** the 30 cm black wire from terminal 14 (BLACK) of the relay to the BLACK distribution block.

Step 2: **Connect** one (1) 20 cm black wire from terminal 2 (WHITE) of Light 1 to the BLACK distribution block.

Step 3: **Connect** one (1) 20 cm black wire from terminal 2 (WHITE) of the DC motor to the BLACK distribution block.

Step 4: **Connect** one (1) 20 cm black wire from the BLACK distribution block to the BLACK power feed block.

Step 5: **Connect** two (2) 20 cm red wires to terminal 2 (WHITE) of the START button.

**Connect** one of the wires to terminal 13 (RED) of the relay.

**Connect** the other wire to terminal 9 (WHITE) of the relay.

Step 6: **Connect** one (1) 10 cm red wire and one (1) 20 cm red wire to terminal 1 (ORANGE) of the START button.

**Connect** the 10 cm wire to terminal 2 (WHITE) of the STOP button.

**Connect** the 20 cm wire to terminal 5 (WHITE) of the relay.

Step 7: **Connect** one (1) 20 cm red wire from terminal 1 (ORANGE) of the STOP button to the RED distribution block.

Step 8: **Connect** one (1) 20 cm red wire from the RED distribution block to the RED power feed block.

**Ask a lab demonstrator to help you test the circuit at this point. See the [Construction Guide](#) for details**

Step 9: **Connect** one (1) 30 cm red wire from terminal 12 (WHITE) of the relay to the RED distribution block.

Step 10: **Connect** two (2) 20 cm red wires to terminal 8 (ORANGE) of the relay.

**Connect** one of the wires to terminal 1 (ORANGE) of Light 1.

**Connect** the other wire to terminal 1 (ORANGE) of the DC motor.

**Ask a lab demonstrator to help you test the circuit at this point. See the [Construction Guide](#) for details**

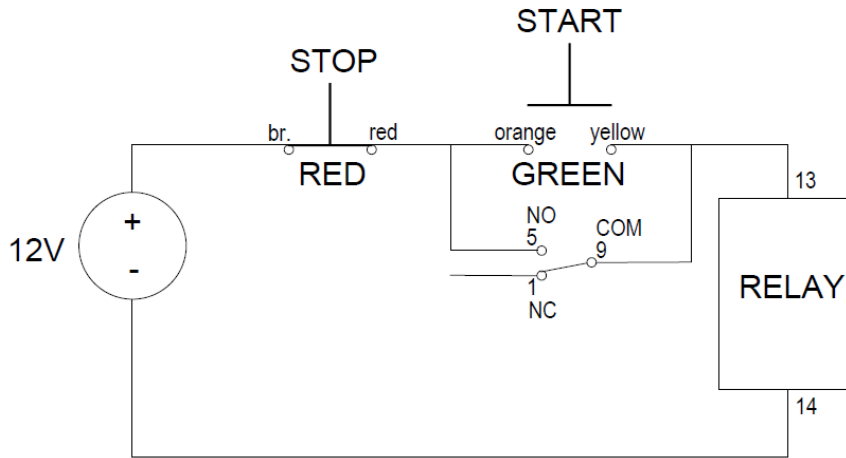


FIGURE 1 – Relay Circuit with seal-in contact (wired in parallel)

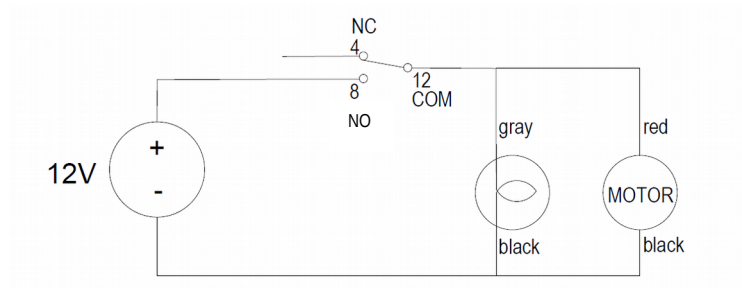


FIGURE 2 – Relay Load Circuit