Statement of the Problem

- A new, modern electrical trainer for ASM 104
- Introduce basic sensor demonstration, current students have no experience with sensors in a classroom setting
- Updated lesson plan and lab manual for students to understand
- Current students have trouble understanding the basic principles that the current electrical trainers teach them

Background

- 2 hour lab period split in half
  - 1 hour for wiring lab
  - 1 hour for sensor demonstration
- ASM students need a basic understanding of wiring and sensors due to the prevalence in modern industry

Alternative Solutions

- **Power Source**
  - AC – DC power source
  - 6V lantern Battery
  - 12V mini Automotive battery
- **Temperature sensor**
  - Negative Temp. Coefficient Thermistor
  - Resistance Temp. Detector
  - Thermocouple
  - Semiconductor-Based
- **RPM Sensor**
  - Laser
  - Hall Affect
- **Storage/Organization**
  - Storage tray with organized board
  - Loose items in storage box

Final Design & Qualification Analysis

- **Lights and wiring setup**
  - This configuration of lights allow circuits of parallel, series and combination to be shown
  - These lights allow the bulb to be removed and show how power will flow through these different circuits
  - Alligator clips for convenience of connection, focus on concept not physical wiring
- **Power Source**
  - AC-DC power converter
  - Allows for variability when making circuits and setting up sensors
- **Temperature Sensor**
  - Resistance Temperature Detector for the best accuracy at the best price
  - Use of body heat and ice water to give different readable temperatures
- **RPM Sensor**
  - Hall effect is used for the prevalence of its use in industry today
  - Shaft speed created by a small electrical motor
- **Storage/Organization**
  - Storage Tray with circuit parts mounted on board
  - Allows trainers to be stored easily
  - Mounted pieces allows the circuits to be made easier

Impact & Sustainability

- Will give ASM students a basic understanding of wiring and circuitry that can be applied when moving forward real world application
- Demonstrate sensors and sensor technology that will be used in industry with the increase on reliance on sensors

Economics

- Preliminary budget of $150 per set

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<th>Description</th>
<th>Quantity</th>
<th>Cost</th>
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Design and Project Assessment

- Shows the basic principles of wiring and sensors.
- Good for students with limited knowledge on subject

Recommendation

- More time should be spent on sensors then the time allotted for this demonstration
- ASM students have a lack of knowledge when using sensors and sensor technology