**Experiment List For Robotics Section Of Into To Engineering.**

* Week 1: Learning python and how to connect to raspberry pi
  + Lab 1: My Change Please:
    - Design a program that generates a random number between 1-20, which then ask for a user input asking if for payment in one of three forms: $5, $10, or $20. Then the program should give the correct amount of change the user is owed.
      * Objective: for students to get comfortable using python and if cases.
  + Lab 2: Convert to Binary:
    - Design a program that converts decimal numbers into binary for a range of 1-20.
      * Objective: To provide more practice with coding in python.
  + Lab 3: Running 4 Motors.
    - Write a program that runs four Lego Motors simultaneously at different speeds.
      * Objective: To provide students practice using motors, and thus learning the BrickPi python library
* Week 2: Learning how to run motors, and gear ratios.
  + Lab 4: Put Them Up.
    - Design and build a ball shooter out of Legos.
      * Objective: To provide students research and design experience with the end result being tangible.
  + Lab 5: Exact Distance.
    - Build a car that goes first 2 feet forward then 1 foot back for a total of 10 feet. Once the 10 foot mark is reached, the car will turn around and travel 10 feet back to the starting line without pause.
      * Objective: for students to continue developing programing and research skills in a practical way that can be visible judged.
  + Lab 6: Speed Demon.
    - Design and build a car that goes as fast as possible in a straight line.
      * Objective: to reinforce lessons about gear ratios, as well as providing another opportunity to practice with python coding.
  + Lab 7. Tank.
    - Design and build a car that can pull as much weight as possible.
      * Objective: Again to reinforce gear ratios.
* Week 3: Learning how to use sensors.
  + Lab 8: Put Them Up, part 2:
    - Add an ultrasonic sensor to the ball shooter so that it will shoot when someone walks in front of it.
      * Objective: Provide students their first experience using sensors in their own program.
  + Lab 9: Clap on, Clap off.
    - Add touch and sound sensors to a car such that when the touch sensor is pressed the car stops and when you clap the car will go in reverse. Then when you clap again the car will revert back to going forward.
      * Objective: for students to gain experience using sensors in programs. Will provide more advance programing know how.
  + Lab 10: Follow me, or Escape.
    - Either follow a piece of paper, or escape form the box.
      * Objective: Provide students with a much tougher programing challenge.
  + Lab 11: Race Track.
    - Go around the track as fast as possible.
      * Objective: Provide students with a challenge that will require students to utilize both their programing and hardware experience.
* Remaining Weeks: Final Challenge TBA