Next Quarter: ENGR 7B

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- ENGER 7B, 3 Different Projects
  - Quadcopter with Autonomous Delivery
  - Fitness Tracker
  - Lab-on-a-Chip/Microfluidic Concentration Detector

- 1 Lecture + 1 Lab per week
- Choose Your Own Team
- Apply What Your Learned this Quarter
- Entrepreneurship
- Need ENGR 7B to complete the Technical Elective course units

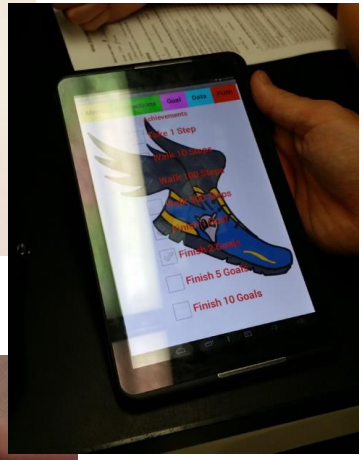
Next Quarter: ENGR 7B

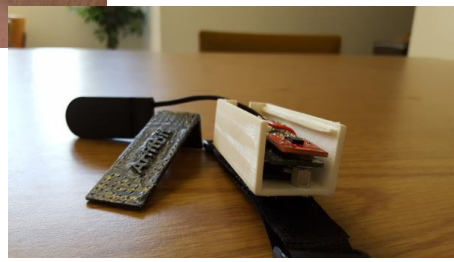
- Lec A, (1A to 10A)
  - Quadcopter with Autonomous Delivery – to autonomously deliver payloads by sensing a specific distance range using ultrasonic sensor and a specific color using a vision sensor. Teams will be re-grouped to re-design quadcopters with added sensors and microcontrollers, and mechanisms for payload release.

    - Sensors (Ultrasonic, IMU)
    - Vision Sensor/Camera
    - Arduino Microcontroller
    - Programming (Basic C)
    - 3D Printing
    - Entrepreneurship

Next Quarter: ENGR 7B

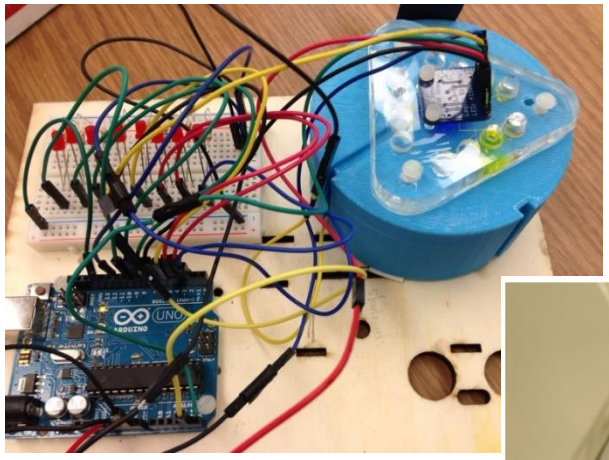
- Lec B (Lab B1 and B2)
  - Fitness Tracker – To build your own version of "Fitbit" for step and elevation counting by utilizing different sensors and using App Inventor to create your customized App. This project is under the Health section of Grand Challenges.
    - Sensors (Accelerometer, Pressure Sensors, etc.)
    - Microcontroller Arduino Pro Mini
    - Programming
    - 3D Printing
    - Battery Making
    - App Writing





Next Quarter: ENGR 7B

- Lec C (Lab C1 and C2)
  - Lab-on-a-Chip/Microfluidics – A portable hand-held detector that can diagnose the unknown concentration of fluorescein solution via a microfluidic device. Such devices can be applied to medical diagnosis or detection of toxins in remote areas. This project is under the Health and Environment section of Grand Challenges.
    - Sensors (RGB)
    - Nanotechnology
    - Microfabrication
    - Microcontroller Arduino
    - 3D Printing
    - Concentration Detection



Design Portfolio

- The Purpose of a Design Portfolio/Report
  - Documentation is an importance practice in industry
  - Record of your project completion and accomplishment
  - Useful for an interview

Design Portfolio

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- The report must contain the following:

1. Cover Page – You have the freedom to design the cover page, e.g. insert your group and quadcopter pictures. Be creative.

2. Table of Contents – List the chapter/section titles with page number

3. Executive Summary – Write a statement to summarize your project, e.g., specific design task you aim to accomplish. The summary should be in plain language and free from technical jargon as much as possible.

Design Portfolio

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- The report must contain the following:

4. Problem Definition

(a) Introduction – Introduce your objective and goal of the project in writing.
(b) Technical Review/historical overview – A brief history of quadcopter and current technology. Plagiarism is PROHIBITED. Please summarize your findings. Show references if necessary
(c) Design Requirements – List all design requirements that were given to you and other derived requirements e.g. anything you interpreted from these requirements

Design Portfolio

- The report must contain the following:

5. Design Description
   a) Summary of Design-Brief summary with words and illustration including how various parts will come together as an assembly
   b) Detail Description
      I. Sequential CAD illustrations with notes and final assembly.
      II. Overview Drawing-Solidworks drawings of parts and assemble
      III. Wiring- diagram of entire wiring network neatly done (No hand sketch)

6. Action item Report
   a) Task Assignment - summary of management of action items
   b) Gantt Chart

Design Portfolio

- The report must contain the following:

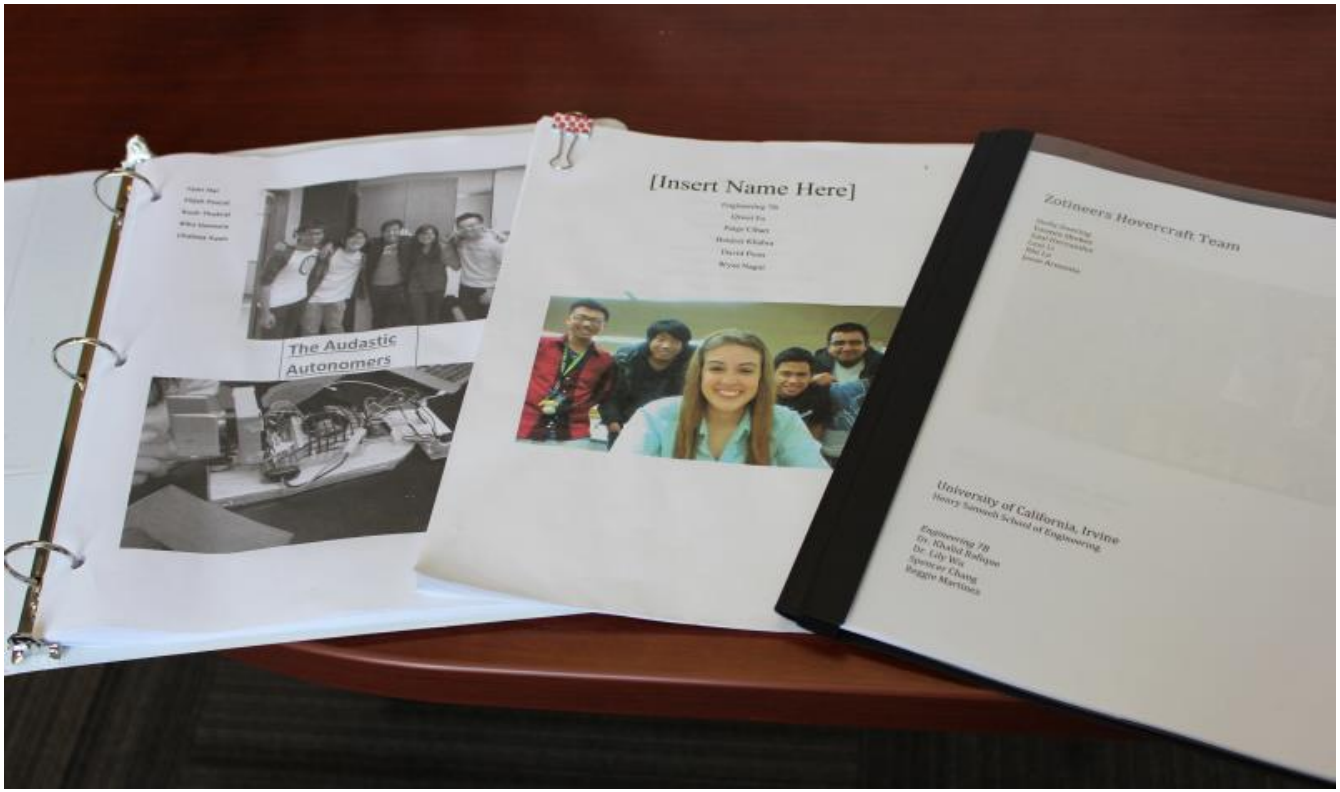
7. Evaluation
   a) Calculations – Thrust to weight ratio, Power consumption, etc.
   b) Test Plan-detail plan on how the quadcopter parts and assembly were tested
   c) Results and Discussion - Brief narrative of evaluation and results

      Please discuss lesson learned, and how you would incorporate the changes next quarter

Appendix A: SDW Drawings
Appendix B: Bill of Materials (Updated PO)

Design Portfolio (Example)

- Cover Page



Design Portfolio (Example)

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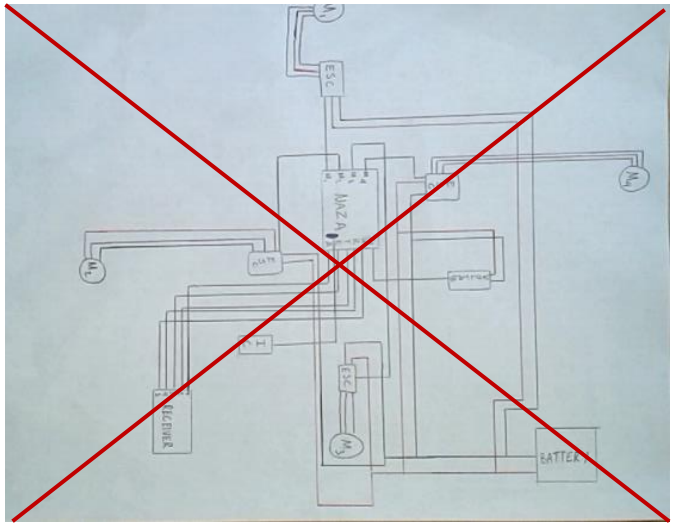
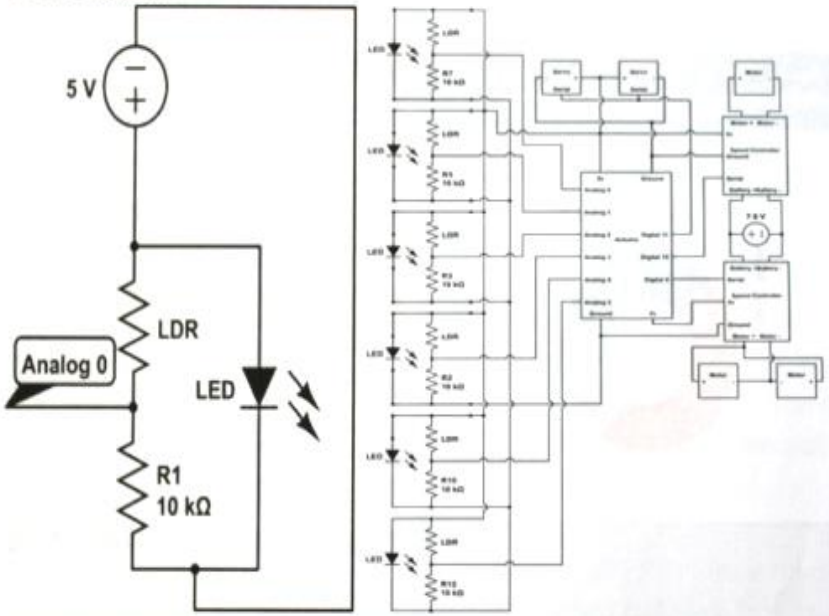
- Electrical Diagram Sample
  - Make it readable!
  - No Hand Sketch
  - Labeling



Circuit Diagram:



Our electronics are comprised of photoresistors, LEDs, speed controllers, servos, and fans. We have an array of 6 photoresistors and LEDs at the front of our hovercraft which all plug into the arduino uno unit. We have two 40mm fans connected in parallel to one speed controller. Our two servos are also in parallel and connected directly to the arduino uno. The 55mm lift fan is connected to a speed controller which plugs into the arduino.