ENGR 1121 – Project

March 10, 2014

The individual lab phase of the course will be complete this week with the close of the ultrasonic rangefinder lab. During the remainder of the course, you will be working in teams of four or five on a team project that will involve planning and executing an experiment that involves measurement, data acquisition, and data analysis. Each team will have a budget of up to $100 from the course to support their project. The components that we normally stock in the lab will continue to be available for your use and need not count against your team's budget. The first step in the process will be to form project teams around project topics. We will allow project teams to cross section boundaries; however, there should either be at least two team members from each section represented or an individual student must be able to make the section time of his/her teammates. Each project team will be assigned both a faculty mentor and a NINJA mentor. We will devote most of the remaining lecture times to team check-ins with the faculty mentor your team has been assigned. The NINJA mentors will be arranging to check in with their team(s) on a regular basis.

By no later than 5pm on Wednesday, March 12, each potential project team must submit a brief (i.e., one or two pages) project proposal that includes the names of all team members and describes your project topic, including the measurement(s) that you will attempt to perform. We will evaluate these for scope and appropriateness and respond to each team with quickly so that you can get started working together as a team when you return from Spring Break. The first activity that each team will undertake together is a team lab involving using the Arduino as an embedded data logging platform.

Example Project Topics

Listed below are some project ideas that have been successfully done by students in the course in past years. You are free to pick one of these and flesh it out or you may devise something completely novel. Your project must involve performing a measurement of some sort in which you collect and analyze some experimental data.

1. **Weather Balloon** – send a weather balloon up to 80,000 feet measuring atmospheric temperature and pressure, and snapping pictures every so often.

2. **Electroencephalography** – build an apparatus to measure someone's brain waves.

3. **Pulse Oximetry** – build an apparatus to measure the amount of dissolved oxygen in the blood.

4. **Polygraph** – build a multichannel polygraph to measure galvanic skin response, pulse rate, respiration rate, blood pressure, etc. to try and determine when a subject is lying.

5. **Instrument the flight of an X** – connect inertial sensors to X, where X could be a model rocket, a kite, a frisbee, a football, a boomerang, a paper airplane, etc., and measure various aspects of its trajectory in flight.

6. **Water Quality Sensor** – make a waterproof sensor package and measure various aspects of water quality in a local lake or river.