

# ECE 376 - Term Project

Due Friday, December 13th

You may work in groups of 1 or 2 for this project

## Your choice for what kind of term project:

- Hypothesis Testing (front of page)
- Embedded System Design (back of page)

## Option 1: Hypothesis Testing

- Use your PIC board to collect data
- Use statistics to answer that question
- Use at least one interrupt in a meaningful way
  - *Limitations: No alcohol, stimulent drinks, or other drugs (these need IRB approval)*
  - *No experiments which could do harm to you or others*
  - *If you base your code on homework sets or sample code, add features to show off your programming skills.*

## 1) Hypothesis / Question

- Ask a question which can be answered by collecting data with a PIC microprocessor
- Pose a hypothesis that can be tested with a PIC processor.

Some suggestions from previous semesters...

- What is the smallest change in frequency I can hear?
- What is the thermal time constant for an NDSU coffee cup? Does adding a spoon change that?
- Other

## 2) Design of experiment.

- What data you will collect?
- How you will collect your data (experiment procedure)?
- How much data you need (how many samples)?
- How you will analyze that data?

## 3) C Code and hardware.

- What you used to collect your data

## 4) Data.

- What was your raw data.

## 5) Statistical Analysis

- t-test, chi-squared test, other...

## 6) Conclusion. What is the answer to your question.

**Bonus:** 5 point bonus if you present your experiment during dead week on Zoom

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## Option 2: Embedded System

- Design an embedded system using your PIC board
- Must include at least two interrupts in a meaningful way
- Must incorporate knowledge from at least 3 different lectures
- If based upon existing homework or sample code, add features to show off your programming skills

### 1) Requirements

- Inputs
- Outputs
- Relationship
- What interrupts you're using and what they do

### 2) Hardware and Software

- Hardware design
- Software C code and flow chart

### 3) Testing

- Collect data to verify the hardware works
- Collect data to verify each interrupt is working

### 4) Validation

- Collect data to verify you met (or did not meet) each of your requirements

### 5) Demo

- Video or in person

### Bonus

- 5 point bonus if you present during dead week
- (note: videos work best for live demos - less to haul around and set up)