ECE 412/13  
Title: Gas Shutoff Sensor  
Project Manager: Wesam Khalil Project Adviser: Dr. Melinda Holtzman  
Team Members: Noah Harvey, Kam Robertson, Alec Wiese, and Arsalan Sabet   
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1. **Problem Statement and Objective:**

* Natural Gas (methane) leaks from home appliances and hidden gas lines present dangerous and potentially deadly environments to the inhabitants of the home.
* The objective of the project is to create a device that turns off the flow of Natural Gas to the home when a leak is detected.

1. **Methodology for Implementation of Project**

* There are 4 phases within our project: Design, Implementation, Testing, and Evaluation.
  + *Design Phase:*
    - We will design a recessed wall mounted detection system that will include an actuator to stop the flow of gas. The detection system will be sized to fit into a standard single gang in-wall junction box, allowing retrofit into pre-existing electrical junction boxes. The system will include a gas sensor for detection, a microcontroller to direct commands, a wireless transmitter to send commands to the receiver at the actuator, and an actuator to control the flow of gas. We will begin by implementing the gas detection system and then to sending signals in a two unit simplex wireless transmission.

Detector

Actuator

* + *Implementation Phase:*
    - This phase contains prototype assembly, bill of material generation and component ordering. Once we are confident in our prototype device we will generate a refined set of schematics and a BOM, from which we will order parts. Once the components are received, we will start the assembly process for our prototype/debug board.
  + *Testing Phase:*
    - Although testing will be occurring throughout the entirety of the project, there are some critical aspects of the design that will need to be verified in more depth once we have completed multiple prototypes. These include: DC characteristics, power supply stability, processor programming capability and validation, digital data rates and so forth.
  + *Evaluations Phase:*
    - In this phase, we will make sure we not only have a working product, but a quality system that can be easily reproduced. We will evaluate our product by functionality, reliability, and ease of installation of the system.

1. **Rough Project Schedule Plan**

* Researching established market options One Week
* Designing prototype Two Weeks
* Purchasing prototype materials One Week
* Analyzing component datasheets One Week
* Writing functional code Two Weeks
* Testing & debugging prototype Two Weeks
* Creating schematic and PCB layout One Week
* Purchasing PCB components One Week
* Assembling PCB One Week
* Testing code with PCB Two Weeks
* Final Write-up One Week