Senior Design Project Description

Company Name	*Electrolux Major Appliances*	Date Submitted	*11/12/2018*
Project Title	*Design and Prototype of a Smart Plug with Cycle Recognition* **(ELEC_PLUG)**	**Planned Starting Semester**	*Spring 2019*

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	1	Electrical	2
Computer	1	Systems	
Other ( )			

Company and Project Overview:

Electrolux is an international leader in household appliances, headquartered in Stockholm, Sweden. We operate under different brands in different locations, and in the US, we are best known for our Frigidaire brand.

Research and Development within Electrolux is split by product line, but there is one global team with an office in Charlotte, NC: the Global Connectivity & Technology group (GC&T). This project is a proof of concept sponsored by GC&T which may be used in a future global product.

Project Requirements:

The goal of the project is to develop a "Smart Plug" which will be installed in a user's home, directly between the appliance power plug and the residential power source. This Smart Plug will measure the voltage and current on the line to determine power consumption of the appliance and report that to the user via a mobile application. In addition, the Smart Plug should also employ pattern recognition to determine what cycle the appliance is currently running.

The Mobile Application can be either Android or iOS, and should communicate with the Smart Plug to report to the user.

To be consistent with other Linux based solutions developed by GC&T, the microcontroller driving the Smart Plug should be a Raspberry Pi.

This demonstration will be limited in scope to a single appliance (to be provided by Electrolux).

Expected Deliverables/Results:

- The Smart Plug itself
- Mobile application which communicates with the Smart Plug. Should display:
    - Current power consumption
    - Total Energy usage
    - Current cycle or mode the appliance is running in

Disposition of Deliverables at the End of the Project:

Hardware developed is the property of the Electrolux. The Smart Plug will be collected after the last Expo. The appliance provided will similarly be picked up by Electrolux, or donated to the campus, to be determined at that time.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Knowledge of electrical systems
    - Electrical safety (possibly dealing with high voltage: 220 AC)
    - AC to DC conversion
    - Analog to Digital conversion
    - Voltage and Current monitoring
- Experience with pattern recognition
    - Digital Signal Processing
- Linux programming
    - Scripting in either Python or Bash
- Mobile App development