EE 494 Project Summary
Team Name: C.E.L.P. Gardens
Members: Cole Moore, Eric Messer, Luke Barber, Philip Entrekin (C.E.L.P)

Project Definition:

The aim of C.E.L.P. Gardens is to make plant care more convenient for people by providing real-time data on humidity, moisture, sunlight levels and also a possible self-watering system. The sensor can be placed in the soil of a plant and will measure the ambient humidity, soil moisture and sunlight levels in the surrounding area. This data can be accessed through a desktop application, allowing users to easily monitor the conditions of their plants and make adjustments as needed. The sensor can also provide notifications when the humidity, moisture or sunlight levels fall outside of the desired range, alerting the user to potential issues. The self-watering system can be triggered when the sensor detects low moisture levels. The overall goal of the project is to help people keep their plants healthy and thriving with minimal effort.

Project Justification:

The C.E.L.P Gardens project addresses a complex engineering problem, according to ABET criteria, for several reasons. First, the device must be able to accurately measure humidity, soil moisture, and sunlight levels. This requires the use of sensors, such as humidity, moisture, and light sensors. These sensors need to be calibrated and integrated into the overall design of the device. Additionally, the device should be connected to a refillable self-watering system that can be triggered by low moisture levels. This will require the integration of a pump or valve to allow the flow of water to the plant. The device must be able to communicate the data it collects to the user using wireless communication technologies, such as Bluetooth or Wi-Fi, to transmit the data to a mobile application. The device must also be able to operate for long periods of time without maintenance, which will require an optimized power system. Overall, developing a plant sensor that can accurately measure humidity, soil moisture, sunlight levels, and communicate the data to the user is a complex problem that involves multiple sub-disciplines of engineering, such as power, communications, embedded, and software engineering.

Project Objectives:
➢ Monitor and report humidity, moisture, and light exposure data for optimal growth
➢ Allow wireless and autonomous watering protocols
➢ Provide a user-friendly interface with an app
➢ Synergize sensor data and hardware applications

Design Concept:
- ➢ Compact and robust design
- ➢ Capacitive sensor for measuring soil moisture
- ➢ Light sensor for determining sunlight exposure
- ➢ Humidity sensor
- ➢ Water delivery system and reservoir tank capable of sustaining plants for at least a week
- ➢ Bluetooth connectivity, enabling wireless data transmission to a desktop application
- ➢ Power management system that is optimized to ensure prolonged operation without frequent battery replacement

Team Members/Roles:
- ● Philip Entrekin - Software Lead
    - ○ As the software lead for the plant sensor project, Mr. Entrekin's main responsibilities include overseeing the development and implementation of the desktop application and wireless communication technologies used to transmit data from the sensors to the user. He will also ensure that the mobile application is user-friendly and easy to understand.
- ● Cole Moore - Research Lead
    - ○ As Research Lead, Mr. Moore will organize any research data pertinent to the project such as hardware component specifications and software requirements. He will also ensure that the project does not violate any existing patents and identify the nature of the differences in design between our project and any existing ideas. Additionally, he will collect and quantize any necessary market research.
- ● Eric Messer - Hardware Lead
    - ○ As the Hardware Lead, Mr. Messer will be responsible for overseeing the design and implementation of the physical components required for the project. This includes tasks such as sourcing, assembling, and storing components.

- Luke Barber - Project Lead
  - As Project Lead, Mr. Barber will manage the design and scheduling necessary to complete the project correctly and on time. He will oversee all areas to make sure components of the project are assembled and operate according to design specifications.