Soil Moisture Sensor
Abstract
By: Sommer J. Allen, Martin L. Tanaka, Adam Harris

Indoor self-watering systems make it easy to have an indoor garden with low maintenance. The main goal of the self-watering system was broken into three parts: the moisture sensor, data processing, and triggering the water pump. The goal of the soil moisture sensor component of this research project was to design a working sensor to test soil humidity of an indoor house plant. The project was built using six jumper cables, a soil moisture sensor, a relay board, and an Arduino Uno. The soil moisture sensor was chosen after extensive research pertaining to soil moisture sensors and self-watering systems. Multiple professors were consulted to ensure that the Arduino was programmed correctly and to ensure that the soil moisture sensor was set up successfully. When the components from the original planned design were unavailable, the design team became innovative to acquire usable components and modify the design to still meet the goals of the project. Some of the testing that was done to see if the soil moisture sensor worked included comparing results when the soil moisture sensor is wrapped in a wet napkin versus when the soil moisture sensor is laying on top of a dry napkin. The moisture value of the soil is mapped to a scale of 0-100% based on the extremes recorded from the napkin tests. The sensor was also tested on a Jade plant, Moonstone plant, and a Curry Jade plant. When the sensor was first placed in the soil, it read between 27 and 28%. 50ml of water was placed in the soil and after 5 minutes the sensor read between 50 and 63% depending on where the sensor is placed in the soil. The device worked as expected and the subsystem is ready to integrate into the overall system design.