**Week 1**

Monday, June 19th, 2017 (4:00 - 6:45)

* Learned how Raspberry Pi works together with MATLAB
* Researched for IoT project ideas on Instructables that use Raspberry Pi and MATLAB
* Came up with a list of possible ideas

Ideas:

* Weather station
* Motion sensor: map maker, object detector, counting cars for parking garage
* Light detector
* Camera
* Alarm / Security System
* Traffic predictor using bus location
* Car detector to see if parking garage is full
  + Each floor detects car motion and counts cars parked there in relation to the total amount of parking spots. This will determine if there is availability on any of the floors

Tuesday, June 20th, 2017 (9:00 - 12:45)

* Met with Rich to discuss ideas for IoT projects using MATLAB
* Created ThingSpeak accounts and looked at tutorials to connect MATLAB, Raspberry Pi, Arduino to ThingSpeak
* Went to the parking garage on broadway to examine the layout of the space and further the “parking detector” idea.
* Started planning the project for pre-engineering major.

<https://udst.github.io/urbanaccess/index.html>

Wednesday, June 21st, 2017 (3:13 - 6:23)

* Found the equipments, ran Raspberry Pi and tested the smart light project
* Recreated the project and made it work with an LED
* Wrote a rough draft of the instruction for the first part of the project:
  + Building the hardware:
    - You need: Raspberry Pi, an ethernet cable, an HDMI cable, a USB power cable, 4 male to female wires, a photoresistor, a 1uF capacitor, a 1000Ω resistor, a 100Ω resistor, a 12V MOSFET, and a LED.
    - Connect male to female wires to power, ground (GND), gpio 4, and gpio 27 on the raspberry pi (insert diagram of the Raspberry Pi)
    - On the breadboard, connect the power wire to the high voltage line (red, +) and connect the ground wire to the low voltage (blue, -) line. Then use a wire to connect the 2 low voltage (blue, -) lines together
    - Next, put the capacitor (1uF) on the breadboard and then place the photoresistor and the wire connected to gpio 4 one terminal of the capacitor. On the other terminal, connect a small wire to ground (blue,-) as shown (place picture here).
    - The 12V MOSFET will come next. Place this on the opposite half of the breadboard that the capacitor is on. On the right most terminal, place the gpio 27 wire and the anode (long, + side) of the LED. The cathode (short, - side) of the LED will be connected to a 100Ω resistor and then connect the resistor to ground.
    - The left terminal of the MOSFET will be connected to power (red, +) using a small wire.
    - Finally, place a 1kΩ resistor going from the left terminal to the right terminal of the MOSFET.
    - Set up the Raspberry Pi by plugging in the HDMI cable, the ethernet cable, and the power source
  + Once the Raspberry Pi display appears, go to Terminal on the upper left corner, type in the command *ifconfig*
  + At the *wlan0,* get the *inet addr* number
  + On your mobile device, connect to the SU-ECE-Lab wifi network, then type in the *inet addr* number on your phone’s browser. The IoT Smart Light Control page will appear and you will be able to control the LED from your phone.

Thursday, June 22nd, 2017 (9:00 - 1:00)

* Made the Smart Light Project work with the lamp and a normal light bulb
* Attempted to understand the schematic and the functions of the MOSFET
* Started a code in Python to set up a push button on Raspberry Pi

Friday, June 23rd, 2017 (11:00 - 5:00)

* Set up a push button on Raspberry Pi and make it send data to Thingspeak
* Emailed Rich to ask about potential project ideas
* Attempted to set up a joystick on Raspberry Pi
* Tried to learn more about MOSFET and how the overall circuit of the smart light work

**End of week 1 :)**

**Week 2**

Monday, June 26th, 2017 (3:30 - 6:00)

* Discovered Raspberry Pi doesn’t have any analog pin. We need an extra chip
* Learned how the MOSFET worked as a switch in the smart light project
* Started learning more on how to code in Python

Tuesday, June 27th, 2017 (9:00 - 1:00)

* For next week, since Jeremiah has a doctor appointment on Friday, we will work extra hours on Monday. Our work time for next week will be as follow:
  + Monday hours: 11:00 - 4:00
  + Friday hours: 11:00 - 2:30
  + Picked up equipment
  + Tried to connect the light bulb to the circuit
  + Had difficulties because of the power outage and the internet was down

Wednesday, June 28th, 2017 (3:30 - 6:00)

* The smart light wasn’t working and we think it might be because of the school’s internet being down
* Learned more on how to code Python

Thursday, June 29th, 2017 (9:00 - 1:00)

* The smart light still doesn’t work
* Tried to set up a new Raspberry Pi but we couldn’t connect it to the wifi
* Checked with if he had the analog-to-digital converter for the Raspberry Pi 3 but he doesn’t have it so Jeremiah emailed Dr. Abraham about it

Friday, June 30th, 2017 (11:00 - 5:00)

* **Questions:** 
  + What should we have the students do for the smart light project? (What does ‘make the project simpler’ mean? Will each student/group get a Pi and breadboard?)
  + What does Rich want his students to be able to do with MATLAB? (What will be given to them? What should we work on?)
  + Discovered the problem with the smart light project and we got it working
  + Found a new idea for Rich’s class. We investigated having the Raspberry Pi do facial recognition
  + Researched on how to write Python code to send sensor data to Thingspeak

**End of week 2**

**Week 3**

Monday, July 3rd, 2017 (11:00 - 4:00)

* Spent time to learn more about how the internet works
* Tried to make the smart light project reproducible by making it work on another RPi and another micro SD card.

Tuesday, July 4th, 2017 (9:00 - 3:00)

* Successfully copy and set up the smart light project to make it work on another Raspberry Pi and SD card
* Figured out how to setup the wifi for another Raspberry Pi and got it connected to the internet
* Reached out to Rich about further specifications on the MATLAB project
* Researched more on how to make the project ideas for Rich’s class to work with MATLAB

Wednesday, July 5th, 2017 (11:00 - 1:00)

* Met with Dr. Abraham to discuss the progress of the projects. The smart light project is mostly finished. We only need to document instructions for freshmen to understand and follow
* Received an A/D converter from Dr. Abraham and wired the joystick and the A/D converter to the Raspberry Pi
* Tried to code a Python program on the Raspberry Pi to test the joystick

Thursday, July 6th, 2017 (9:00 - 1:00)

* Started writing the tutorial for how to set up the smartlight project
* Worked on getting the analog input from a potentiometer to thingspeak.

Friday, July 7th, 2017 (11:00 - 1:00)

* Got the A-D converter working with the potentiometer. It is displaying values in the terminal, however, we are still trying to understand the workings of it and some of the values that it displays.
* Continued working on the tutorial for the smartlight project

**End of week 3**

**Week 4**

Monday, July 10th, 2017 (3:30-7:00)

* We got the potentiometer to read up and down or left and right but not both simultaneously.
* Nearly finished with writing the guide for the smart light project.

Tuesday, July 11th, 2017 (9:00 - 1:00)

* Talked to Rich on more project ideas, sent him what we have worked on so far
* Developed a deeper understanding on how the AD converter
* Still can’t separate the up-down and left-right analog data on the joystick
* Ordered some mpc3008 chips for converting analog signal to digital signal

Wednesday, July 12th, 2017 (3:30 - 7:00)

* Completed the first complete draft of the smart light project tutorial.
* Worked on separating X and Y axis directions of the joystick and ended with little success.
* Tested the partially working program with thingspeak to see if we could push that analog data to thingspeak. This ended successfully.

Thursday, July 13th, 2017 (9:00 - 3:30)

* Tested the smart light curriculum and sent a completed draft to Dr. Abraham.
* Continued with trying to get the joystick working using I2C SMbus and resorted to working with wiringPi.
* Spoke to Dr. Abraham about getting new lamps for the smart light project and updating her on our progress.

Friday, July 14th, 2017 (11:00 - 2:30)

* Got MCP3008 A/D converters and successfully was able to output X and Y directions with a joystick.
* Was able to take that information and push it to thingspeak.
* Learned that if we want to adjust the data collection refresh rate on thingspeak, we need our own server of some sorts.
* Sent Rich an Email on our progress and that we are ready to pick a project to work towards.

\*We worked a few extra hours this week because Jeremiah can’t work for as many hours next week. These extra hours will compensate and keep it so 19 hours of work is the average between the two weeks.

**End of week 4**

**Week 5**

Monday, July 17th, 2017 (11:00 - 1:30)

* Emailed Dr. Louie our schedule and requested a meeting time to demonstrate the smart light project.
* Began working on writing a tutorial for how to get a push button and a joystick to work with raspberry pi to send data to thingspeak.

Tuesday, July 18th, 2017 (9:00 - 1:30)

* Talked to Rich and we decided on working on the sensing light and motion for the lab room to analyze power consumption of the room and to know if the lab room is occupied
* For the MATLAB course, Rich will work on writing a MATLAB code to analyze cycling data
* Looked up some sensors and asked Rich to order some motion sensors
* Attempted to build a light sensor but we don’t have access to the hardware so we worked on writing instructions for the push button and the joystick and have them send data to thingspeak

Wednesday, July 19th, 2017 (11:00 - 1:30)

* Nearly finished curriculum for setting up raspberry pi, thingspeak, and having a push button and joystick send data to thingspeak using raspberry pi.

Thursday, July 20th, 2017 (9:00 - 1:30)

* Finished our first draft of curriculum for setting up a raspberry pi and having it send digital and analog data to thingspeak.
* Started work and testing for a light sensor for the matlab project.

Friday, July 21st, 2017 (11:00 - 2:30)

* Finished with the light sensor and had it send data to thingspeak
* Brainstormed on how to setup the motion sensor for the matlab project
* Met and talked with Dr. Louie about the smart light project and demonstrated it
* Emailed Dr. Louie the rough draft of the curriculum of the smart light project

**End of week 5**

**Week 6**

Monday, July 24th, 2017 (11:00 - 3:00)

* Investigated how to get sensor data across the internet without having it tethered to the raspberry pi.

Tuesday, July 25th, 2017 (9:00 - 2:00)

* Recieved a PIR sensor and a wifi module that will allow us to connect multiple sensors to one raspberry pi instead of tethering a raspberry pi to every sensor.
* Able to get the PIR sensor to work while tethered to the raspberry pi.
* Worked on connecting the sensors with the wifi chip ESP8266 so that they may send data to a raspberry pi via wifi.

Wednesday, July 26th, 2017 (11:00 - 1:30)

* Tried to setup ESP8266 wifi chip. Was able to get it to compile code but it kept throwing an error when we tried to upload the code to the chip.

Thursday, July 27th, 2017 (9:00 - 1:30)

* Attempted to set up the ESP8266 wifi chip again. Still was unsuccessful with getting it to work.
* Emailed Dr. Abraham for further assistance with the chip and to possibly order a new one. The power light does not turn on when powered and I fear that it may not be working correctly.

Friday, July 28th, 2017 (11:00 - 1:30)

* Researched more on how to set up the ESP8266 but it still doesn’t work
* Ordered a new ESP8266 on Amazon

**End of week 6**

**Week 7**

Monday, July 31st, 2017 (11:00 - 3:00)

* Received feedback from Dr. Louie for the smartlight project and worked on revising the final curriculum guide.
* Received a new ESP8266 Wifi chip and programmed it to work with the light sensor.
* Met with Dr. Abraham about progress and expectations before the end of the 8 weeks

Tuesday, August 1st, 2017 (11:00 - 12:00)

* Successfully made the ESP8266 wifi chip send light sensor data to thingspeak
* Worked on the final tutorial for the smart light project

Wednesday, August 2nd, 2017 (11:00 - 4:00)

* Able to get motion and light sensors working with the ESP8266 ship and successfully pushed the data to thingspeak.
* Finished up the modifications to the smart light project tutorial.

Thursday, August 3rd, 2017 (9:00 - 3:00)

* Sent Dr. Louie the revised Smart Light Project curriculum.
* Worked on the curriculum for getting started with RPi and thingspeak with how to send data from a pushbutton and a joystick to thingspeak.
* Finished the sending both light and motion sensor data to thingspeak at the same time using the ESP8266 and started the curriculum for that.

Friday, August 4th, 2017 (11:00 - 3:00)

* We finished our first draft for the curriculum for setting up RPi 3 with thingspeak and sending push button and joystick data to it. We then emailed this to Rich
* We worked on the curriculum for sending light and motion sensor data to thingspeak using the ESP8266.

**End of Week 7**

**Week 8**

Monday, August 7th, 2017 (11:00 - 5:00)

* Worked on the tutorial for setting up the motion and light sensors untethered with the ESP8266 chip.
* Edited the Smart Light Project and sent it to Dr. Louie. He said he will look at it later in the week.

Tuesday, August 8th, 2017 (9:00 - 5:00)

* Finished creating curriculum for the light and motion sensor data
* Send the tutorial to Rich and communicated to him the finishing pieces of the project.
* Sent Dr. Abraham the materials lists for both the smart light project and the light and motion sensor project.

Wednesday, August 9th, 2017 (11:00 - 4:00)

* Wrapped up things and communicated with professors.
* This is our last day for the summer.

**End of Week 8**