**ECE Capstone – Multiple Band RFID Scanner and Registration**

**Product Design Specification**

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Capstone Team

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**Background**

The Electronics Prototyping Lab (EPL) is a Rapid Manufacturing lab in FAB 84-10. There is a lot of expensive and mildly complicated equipment in the lab. Some people who don’t know how to use the equipment come in and try to use the equipment and then end up either hurting the equipment or wasting time. We would like to be able to use hardware to control access of the equipment using our user database and training database. The overall process of use is: lab user uses their student ID or provided RFID tag to identify themselves and the system then checks a database to confirm they have been trained/checked out on the equipment and then gives some visual/auditory feedback and may deny them access to the equipment by prohibiting it from being powered up.

**Functionality:**

* Must read two different RFID bands (125 KHz & 13.5 MHz)
* Must communicate with other modules with Wifi
* Must run on embedded Linux environment
* Must incorporate a serial 2x30 LCD display
* Must display user information when badge is scanned
* Must include hdmi out, usb ports, digital pins, sd port
* Must be programmed with ip address, station id, unique id, etc
* Must maintain module identity/information after power down
* Should notify user if they have access or not (beeps, flashes, voice, etc)
* May utilize Bluetooth 3.0/4.0/BLE to communicate along with Wifi
* May have optional/customizable notification settings

**Marketing Requirements:**

* Must be usable by anyone / straightforward documentation
* Should be inexpensive to make
* Should only require keyboard and monitor to set up
* May be compatible with other databases

**Performance:**

* Must be easily programed and reprogrammable
* Must be easy to debug (displays ip address, station id, unique device id, etc)
* Should have a quick response time of no more than 1 second

**Economic:**

* Must be cheaper than commercial products

**Energy:**

* Must run off USB power (5v Supply)
* Should have protection from power spikes
* My have backup battery power if needed

**Manufacturing:**

* Must be easily reproduced.
* Must work for Raspberry Pi 0 W
* Must be Modular
* Should have custom designed PCB for final design
* Should have simple and inexpensive casing