ECEG 201 – Homework 11 Due at noon on 2020-04-13

For the rest of the semester we will assume that you are working as a member of a project team. The team is trying to create an Internet of Things device built around a Feather M0 Express and an ESP-01 module. The project has progressed to the proof-of-concept stage, and the team is preparing to demonstrate that the device will work as designed and meet the requirements set for it. The only test equipment you can use is your Analog Devices 2 (AD2).

If (and only if) your major is Electrical Engineering then your responsibility is to consider how you could demonstrate that the Feather is capable of supplying power to the ESP-01 module under all anticipated operational scenarios. This would include both the average power and short-term peak power. Assume that the IoT device has already been designed and you are confident that it will pass these demonstrations.

If (and only if) your major is Computer Engineering then your responsibility is to consider how you could demonstrate that the software can detect problems with the ESP-01 module. You need to show that the software can use the onboard LED to indicate an error condition to the user. Assume that the software for the Feather has already been written and you are confident that it will pass these demonstrations.

If (and only if) your major is Electrical Engineering then you should talk about how you will demonstrate for your customer that the 3.3 V output of the Feather will meet the worst-case average and peak current demands of the ESP-01 module while maintaining proper voltage regulation. A complicating factor is that the ESP-01 module you have on hand may not exhibit worst-case behavior, so you can't just measure the supply voltage while the IoT device is running. You will need to use some kind of dummy load in place of the ESP-01, something that will reproduce the worst-case power conditions that your device *might* encounter. Assume that all of your measurements will be made with your AD2. Assume for now that you can use any of the other components that you would normally find in the parts drawers in the Bucknell ECE labs.

If (and only if) your major is Computer Engineering then you should talk about how you will demonstrate for the customer that your software detects and "handles" problems with the ESP-01. Eventually you will need to perform this demonstration for **all** of the possible problem scenarios, but for this report you should talk only about potential problems when issuing the AT+RESTORE, AT+CWMODE=1, and AT+CIPMUX=1 commands. Since it will be very difficult to create these problem scenarios with a real ESP-01, you should plan to use the AD2 in place of the ESP-01. Using the AD2 you can send whatever messages you like back to the Feather, even invalid or erroneous messages.

You have one week to deliver a report to your project's Lead Engineer (that's me, the instructor). This will be a formal internal communication, so you should use the proper fonts and formatting for equations, variables, subscripts, and similar items. You should include tables or graphics as necessary to explain the testing procedure. Remember that photographs are a poor substitute for proper schematics.

Note that this report itself **is not the demonstration**. Your report should describe **how to perform the demonstration**. Assume that the actual demonstration might be performed by a technician (not yourself) standing at a workbench with your very important customer. Your report should tell the technician how to perform the demonstration: what equipment is needed and how to connect it, a step-by-step procedure for performing each part of the demonstration, and a clear description of what a "passing" result will be.

You **may not** collaborate with another student or discuss this assignment with another student. If you have questions about what is expected, **address them to the instructor**. The writing you submit for this assignment must be entirely your own original work.

Your report **must** be delivered in the form of a pdf file. The pdf file should be emailed to the instructor as an attachment.

If you are not sure what you should do, ask questions!