

# EE 193 Project

## System requirements

Your team's objective is to design, build, and program a fleet of wireless temperature monitoring probes which can be deployed across the Tufts Medford/Somerville campus.

The system must include at least 10 nodes which each:

- Measure temperature at least every hour, and ensure that measurements have a timestamp accurate to within 5 minutes.
- Provide temperature measurements that accurately reflect the ambient air temperature within 2 degrees Fahrenheit.
- Report temperature data to an MQTT server on the Tufts campus network. We will decide on the exact protocol through class discussion.
- Are designed to be powered for at least 6 months without a connection to mains power.
- Are designed to withstand the weather for a year (heat, cold, rain, ice, wind, etc.)
- Have a complete BOM costing less than \$30 each, assuming a quantity of 1000 nodes.

Since the goal of this course is to move beyond development kits and breadboards, the system should integrate a discrete microprocessor or microprocessor module onto your PCB instead of a standalone development board.

## Team tasks

There are many tasks to be done, so make a list early and determine who will be responsible for what. A few less obvious tasks:

- Finding suitable electronic components
- Managing the bill of materials (BOM)
- Designing test procedures to ensure that the sensor produces accurate results
- Documenting the process and organizing the team's work
- Quality assurance (QA) — testing the completed modules to make sure they are functional
- Managing physical deployment (finding suitable locations, tracking where you've placed the nodes)

## Deliverables and deadlines

### Thursday 3/31

- Team charters due (copy Google doc template into your team folder and complete it)

## **Tuesday 4/5**

- HW 3 and 4 due

## **Thursday 4/7**

- Conceptual design due (choice of microcontroller, sensor, etc)
- Power analysis due (battery size, solar panel size, estimated uptime)

## **Tuesday 4/12**

- Preliminary design due

## **Thursday 4/14**

- Purchasable BOM due
- Final PCB designs due

## **Friday 5/6**

- Demonstration party, 12-2pm (TBD)
- Final documentation due