

## CE351 Microcontrollers Final Exam

S2022 Final Exam (open-book, open-notes, open-internet)

(Insert the answers, screenshots, link to demo videos, and code into a single Word file, convert the Word file into a **SINGLE PDF file** and send it to [yli@fortlewis.edu](mailto:yli@fortlewis.edu))

1. Design the schematic and PCB layout of a wearable temperature monitor which is powered by a 7.4V Lipo battery (just leave a pair of +/- header pins on your PCB for battery connections). Use any display units you are comfortable with. You can use any MCUs/temperature sensors you are familiar with. Only schematic/PCB layout are needed for this problem, no programming and implementation on MCUs are needed. (30 points).
2. Use any MCU to sense room temperature and send the temperature data to an SD card. No plotting is required, show a picture of the circuit wiring, the screenshot of the temperature data in a txt file on the SD card, and the code. (40 points).
3. Design a vibration detector using your MPU6050 module. Interface the MPU6050 module with your Arduino UNO board, set up an appropriate threshold of the Z Axis acceleration, when you knock the table, the vibration will be detected by the sensor. If the vibration is larger than the threshold, the LED will blink for 5 times. (30 points, record a video of the demo and insert the link to the video into your submission. Take pictures of the circuit wiring and provide a screenshot of the code)