Introduction to Electrical and Computer Engineering Design ECEG 201

Session 06 Lecture Notes

Announcements

1. Reading:
   (a) Making Better Graphs
   (b) Using SI Units
   (c) Writing Equations
   (d) ASTM E29-13, Standard Practice for Using Significant Digits Section 7.4.1
2. In-class lab exercise on Wednesday.
3. Supplemental materials:
   (a) Use of appropriate significant figures from Dartmouth College
   (b) IEEE Editorial Style Manual See p. 12 "Text Citation of Figures and Tables", p. 15 "Where Lists", and p. 20 "Math".

Lab1 Report Grading

I wanted to get a sample of your work. It will not be worth much of your final grade.

- Technical content: 25 points
  - Did you measure/calculate what you were asked to measure/calculate?
  - Did you make the measurements/calculations correctly?
- Data presentation: 15 points
  - Did you provide the expected schematic, table and graph?
  - Were measured and calculated values shown with the appropriate significant digits, as discussed in Lecture 3? Do not confuse **resolution** (number of digits to right of decimal point) with **accuracy** (number of significant digits).
  - Were the guidelines in *Making Better Graphs* and *Using SI Units* followed?
- Writing, style: 10 points
  - Are there errors in spelling, syntax, or grammar?
  - Did figures and tables have appropriate captions?

Importing Graphics

- **Never** use a screenshot to capture graphics
- Use black-and-white or high contrast colors
- Export graphics as **pdf**, **eps**, or **svg**

Calibrating Temperature Sensors

According to NIST Special Publication 330:

"The kelvin, symbol K, is the SI unit of thermodynamic temperature. It is defined by taking the fixed numerical value of the Boltzmann constant k to be $1.380\,649 \times 10^{-23}$ when expressed in the unit J K^{-1}…"

Before 2019-05-19, the definition of the kelvin was based on the **triple point** of water, which was **defined** to be 273.16 K.

The SI also allows the use of **Celsius** temperature.

The **magnitude** of a degree Celsius is equal to the magnitude of a kelvin.

$$T(^{\circ}\mathrm{C}) = T(\mathrm{K}) - 273.15$$