MedTech Prototyping Skills: Software Installation & Tutorials

BME254L - Spring 2026 - Palmeri

Dr. Mark Palmeri, M.D., Ph.D.

2026-01-06

Table of contents

Git (Version Control)

Please follow the instructions on this dedicated git page to:

- Install `git`

- Configure `git`

- Setup an SSH key

- Provide links to `git` tutorials to reinforce the concepts and mechanics of using `git`.

KiCad (EDA)

- Please install KiCad: https://kicad.org

> **ⓘ Note**
>
> This installation file can be a bit large, so this may take a few minutes to download.

Onshape (CAD)

- Please make sure to activate your invitation to Duke's Onshape server (see email).

> **ⓘ Note**
>
> If you did not receive an email invitation, please send Dr. Palmeri and your TAs a private message on Ed.

Visual Studio Code (IDE)

We will be using Visual Studio Code as the IDE for all projects in this class. In addition to installing the base program, please install the following Extensions:

- PlantUML (generate state diagrams)
- GitLens (help with git operations / visualization)
- Microsoft C/C++ Extension Pack
- PlatformIO
- GitHub CoPilot Chat (AI-assisted coding)
  - Sign up for free GitHub Education Student account to get access to this extension: https://github.com/education/students
  - Install the `GitHub CoPilot Chat` extension

> **💡 Tip**
>
> You will need a document to verify your student status that includes your dates of enrollment, which your DukeCard does not contain. Instead, you can get an Enrollment Verification document through DukeHub (Academics Tab) and convert the downloaded PDF to a JPG or PNG file to upload to GitHub.

- Python & Jupyter extensions (for technical report preparation)
- Conda to install a Python virtual environment for Jupyter notebooks.

> **ℹ Note**
>
> You can use an existing Python installation on your laptop if you have one.

Arduino Nano Every

- Order yourself an Arduino Nano Every.

> **ℹ Note**
>
> You do not have to order from the Arduino store if you can find this board elsewhere, but please make sure you get the "Every" version of the Nano. Other versions of the board use different logic voltages and even different chips!

- Make sure you have a data-cable USB cable to connect your Arduino Nano Every to your laptop.

Technical Report Preparation

Each lab exercise will have an associated technical report submitted. These reports will be prepared and submitted using Python-based Jupyter notebooks that will be included as part of your assignment git repositories.

You will need to be able to perform the following tasks in your Jupyter notebooks:

- Read CSV text data saved from an oscilloscope.
- Perform simple statistics (e.g., mean, standard deviation, 95% CI) on the data.
- Generate plots

If you need to install a Python environment on your laptop, then this is a good starting point: Getting Started with Python in VS Code.

This is a good tutorial on getting started with Jupyter notebooks in VS Code: Jupyter Notebooks in Visual Studio Code.

Lab Policies & Safety

Please review the lab policies and safety guidelines for working in the lab.

What to Submit

Complete the online Gradescope "quiz" indicating completion of each of the main tasks above.