ECE411 Practicum Lecture 1

Timeline and Toolsets

“Project management tools are like chihuahuas.
Annoying at first, but they grow on you.”

2014/10/01

Rough Project Timeline

- Week 1-2: Conception and requirements
- Week 3-4: Specifications, schematics, **prototyping**, design
- Week 5-6: Layout, parts and board ordering
- Week 8-9: Assembly and testing
- Week 10: Demonstration and documentation

Project Milestones

- Wed 10/8: Teams formed, projects decided
- Wed 10/22: Preliminary schematic done
- Wed 11/5: Preliminary layout done
- Mon 11/10: Boards to Fab
- Mon 12/8: Demonstrations

See “1-schedule.pdf”

Collaboration Tools Help

- **You need them, use them.**
  - Also: required in this class.
  - Also: industry demands them.
- Shared files **under revision control**
- Parallel documentation
  - Design docs, datasheets, pictures, test results
- Issue tracking

Collaboration Tools, Actualized

- **Version Control System (VCS)**
  - “Git”, “Subversion”
  - NOT Dropbox or Google Drive!
- **Live, parallel editing documentation**
  - Editable online, AND associated with your VCS
  - E.g., Wiki
  - NOT Office 360 or Google Docs (although both are good for collaborative editing)
- **Issue/bug tracking**
  - Assign issues and tasks to your team members

Collaboration Tools, Suggested

- **Github**
  - Suggested for open source projects
  - Git + Wikis + live markdown files + issues
  - Free public repos
- **Bitbucket**
  - Suggested for close source projects
  - Git + Wikis + issues
  - Free private repos for < 5 person teams
- **Redmine**
  - PSU hosted
  - Git or Subversion + wiki + issues
  - Secured, but slightly painful
- **Others?**

Schematic CAD Tools

- Schematic capture and board layout tool required
  - Must have forward/backward annotation
  - Must have ERC and DRC
  - Must generate standard Gerber files
- EAGLE CAD - http://www.cadsoft.de/
  - What I'll be lecturing on in this class
- KiCAD - http://www.kicad-pcb.org/
  - Up and coming open source software
- Other
  - Altium – Expensive, but student version?
  - Mentor Graphics – installed on school PCs

Other CAD Tools

- 3D modeling
  - SolidWorks – installed on PCs, student version
  - FreeCAD – open source, but mostly broken
- PCB file checking
  - Gerbv
- Simulation and such
  - LTSpice, HFSS, etc.

Component & Board Vendors

- Digi-Key - http://www.digikey.com/
- SparkFun - http://www.sparkfun.com/
- AdaFruit - http://www.adafruit.com/
- Also: Mouser, Jameco, etc.
- Manufacturer’s web sites and online datasheets.

Available Equipment

- Capstone lab
  - Soldering stations
  - Scopes, power supplies, and PCs
  - Atmel (and some other) programmers
  - Make sure you have card access!
- Electronics Prototyping Lab
  - http://psu-epl.github.io/
  - Almost in FAB 84
  - 3D printer, laser cutter, PCB routers, precision soldering stations
  - All for student use!