ECE 2881 Practical Skills and Design (0-3-1)

Prerequisite (with concurrency): ECE2040 or ECE2031 or ECE2035 or ECE2036

Description: This course teaches practical skills, such as soldering and prototyping, and introduces students to ECE design.

Topics:

1. Basic Safety Lab (such as the EHS safety course)
2. Introduction to Engineering Design (design process, sizing and ordering parts)
3. Microcontroller Hardware Integration (sensor conditioning, working with ICs)
4. Soldering (through-hole connections, etc.)
5. Advanced Soldering (PCB surface mount, etc.)
6. Wiring Introduction (connectors etc)
7. PCB CAD and milling
8. Basic Tools (screwdrivers types, hammers, wrenches etc.)
9. Power Tools (bandsaws, power drills, grinder belts, circular saws, etc.)
10. 3D CAD (3D printing, CNC milling)

The course will have scheduled labs for ten weeks where students learn practical skills on the tools and machines. During the remaining weeks of the term, students will work on a design project of their choosing that incorporates these skills.

Grading:

Lab Participation	50%
Lab quizzes (10%, lowest one dropped)	
Lab work (40%)	
Design Project	50%

Course objectives:

As part of this course, students

- Utilize their earlier coursework in the design, fabrication, and testing of a physical system

Learning outcomes:

At the end of the term, students will be able to

- solder wires and perform surface mount soldering
- use power tools to build mounts or enclosures for electronic boards
- use CAD software to design simple objects
- understand the use of machines such as 3D printers, CNC machines, laser cutters, and PCB milling machines to build components
- integrate basic sensors with embedded systems
- understand the fundamentals of design and be able to conduct a design and build of a product from the fundamental requirements through testing

Course Expectations & Guidelines

Absence and Late Policy

Most of the labs require that students do some background review prior to the lab, then class starts with a short lab on that material. Students who miss class or who are late to the lab and miss the quiz will get a 0 for that quiz. Students who miss a lab will be able to make up the lab only if 1) it is an excused absence or 2) if it is not an excused absence, then they may be able to obtain 70% of the lab work credit by completing the corresponding senior design workshop. In the second case, they would be responsible for checking the schedule of workshops on the door of E363 to make sure that there is an available upcoming workshop and for making sure that the instructor of the workshop signs off on their work. Students with medical or family emergencies should contact the Dean of Students. See http://catalog.gatech.edu/rules/4/ for an articulation of the Institute rules.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/ or http://www.catalog.gatech.edu/rules/18/.

Any student suspected of cheating or plagiarizing on a quiz or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or http://disabilityservices.gatech.edu/, and http://disabilityservices.gatech.edu/content/welcome-accommodate as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Collaboration & Group Work

The project may be done individually or by a team. All students working in groups in the labs and in the project are expected to participate substantially. Students are expected to turn in their own work for assignments and quizzes, however, discussion among students on understanding of the subjects and topics is encouraged.   At all times students are expected to follow the Academic Honor Code (http://www.catalog.gatech.edu/policies/honor-code/)