# Senior Design Projects (EECS 159A, CSE 181A)

First Meeting

# Outline

- Signing up
- Teams
- Mentors
- Projects
- Stages of Projects
- Paper project
- Administration

# What is Senior Project for EECS and CSE

- 2-quarter sequence
  - EECS 159A, CSE 181A: planning + project work
  - EECS 159B, CSE 181B: project work only
- Purposes
  - hands-on experience with solving a real problem
  - multidisciplinary team work
  - consider broader impacts (economic, societal, environmental, etc), professionalism, ethics

# Enrollment

| Course / Section | EECS 159A / CSE 181A | EECS 159B / CSE 181B |
|---|---|---|
| **"Lecture" (where you get your grade)** | Common instructor | Team's mentor |
| **"Lab"** | Team's mentor (get authorization code to enroll) | Common lab, lower floors of Engineering Tower |

# Steps Required for EECS 159A / CSE 181A

1. Form a team (3-4 people)
2. Ask a faculty to agree to be your mentor
3. Enroll in **lab** under your mentor's name
    - May need to get authorization code from mentor!
4. Course work for the course
    - Common project for the "lecture" portion
    - Team project with your mentor

# Approach

- First quarter (‘A’ course)
  - Paper Project - same topic for all
  - Your own team project - with mentor
- Second quarter (‘B’ course)
  - Continuation of team project with mentor
  - Mentor gives you the grade

# The 'A' Course

- "Common Paper Project"
  - Lecture: Topics on project planning & issues
  - Homework: your team's approach & trade-offs
- "Real Project"
  - Schedule your own team meeting
  - Meet with mentor => Your responsibility!!
  - Design review: Poster, possibly demo
  - Project Plan for your project

# The ‘B’ Course

- Entirely between you and your mentor
  - Execute your plan from 159A/181A
  - Arrange your own meetings & project updates
- TA help and lab space (TBA)
  - On the lower 4 floors of Engineering Tower
  - Shared by different engineering majors
  - computing, mechanical, electrical, etc.

# Teams

- Size
  - 3-4 people per team *from this course*
- Majors
  - *preferably* from different majors (CSE, CpE EE)
  - *Skill sets* are more important than majors
- Team captain
  - contact window to mentor, administrator, etc.
  - facilitator, not dictator!

# Mentors

- Any EECS or ICS faculty
  - most qualified to mentor EECS-CSE projects
  - if no lab section, can request one be created by email at engcasa@uci.edu
- Non-EECS/ICS faculty
  - Yes, from other departments or schools!
  - mentor can email engcasa@uci.edu to create lab section
- What about non-UCI mentors?
  - Possible, but still need to team up with a UCI faculty

# Roles of Mentor

- Interested in guiding your team
  - interested in your project topic, or defines your project
  - wants to see you succeed by *guiding* you
    - high-level guidance, not detail-level debugging
- (bonus) providing resources
  - parts, boards, lab space, grad student, money..
  - NOT obligated!!  They do this out of kindness
- Gives your grade on project (159B/181B)

# Preparation before Approaching a Mentor

- Prepare a "Group Resume"
  - Introduce each member: major, skill set, work or undergrad-research experience, GPA
  - Focus on the strengths of the team
- Discuss potential projects
  - something you may have been working on
  - should have some clues about how to make it
- Research about potential mentors
  - their research areas, previous senior projects, etc.

# How to decide on a Mentor

- You have to like each other
  - talk to them in person to find out for yourself
  - management style: micro- or macro-managed?
- Mutual interest in project
  - You want to work on mentor's project, or
  - Mentor is interested in your project idea
- Make sure they are not overloaded!
  - ok if they mentor 1-2 projects; maybe not reasonable if they mentor over 3-4 projects

# Who defines the projects?

- Faculty
  - in faculty's own area of research
  - faculty's area of curiosity
- Students
  - in student's own area of interest or competence
- External sources
  - Design contest (e.g., TI, Freescale, conferences)
  - Industry (local company) or institute (e.g., JPL)

# Grading ('A' Course)

- 50% Weekly assignments
  - Team formation, Paper project
- 30% Project plan and work w/ mentor
  - For your team's project with your mentor
  - Graded by your mentor
- 20% Class Participation
  - attendance, peer evaluation
- See syllabus at https://canvas.eee.uci.edu/courses/2588/

# Two Websites

- Canvas Site for EECS-CSE projects
  - https://canvas.eee.uci.edu/courses/2588/
  - for assignments, course materials
- EECS-CSE Senior Projects Portal
  - http://srproj.eecs.uci.edu/
  - public project pages, by mentors and students
  - general forums (not limited to the class)

# Lecture Topics

1. (9/23) Introduction: teams, mentors, paper project
2. (9/30) Application & Technology exploration
3. (10/7) Constraints, Requirements, and Objectives
4. (10/14) Technology Options
5. (10/21) Design Aspects
6. (10/28) Design Refinement
7. (11/4) Project Tasks
8. (11/11) Project Planning and tools
9. (11/18) Engineering standards, Ethics in engineering, IP
10. (12/2) Winter Design Review

# Weekly Assignments and due dates

1. (9/30) Team formation & mentor confirmation
2. (10/7) Technology exploration
3. (10/14) Constraints, requirements, objectives
4. (10/21) Detailed Technology options
5. (10/28) Design aspects: flowchart vs block diagram
6. (11/4) Design Refinement
7. (11/11) Project Tasks
8. (11/18) Project Planning and Management
9. 10. (12/2) Broader impacts, ethics, standards, IP, …

# Outline of Project Plan (due at end of quarter)

- Introduction: Motivation, Impacts
- Related work
- Problem statement
- Design plan
- Implementation plan
- Evaluation plan
- Project Plan, deliverables
- Conclusions

# Funding

- By default, you pay for your project
- Get others to pay for your projects!
- Options
  - Dean's office
  - Profs (if relevant to ongoing projects)
  - UROP
  - other sources

# Stages of a Project

- Explore
  - conceptualization, tinkering, prototyping
- Design
  - Problem statement: requirements, constraints, objectives
  - top-down, define organization & interface, trade-offs
- Plan
  - tasks, schedule (Gantt chart), budget, tools to use
- Build (implement)
  - Build subsystems, integrate, test as you go
- Evaluate
  - Do individual parts work? Does whole system work? How well?

# Project Phases

## Explore

application

cool idea

mapping

technology

app

radios

battery

boards

sensor

chips

cloud

tinkering

## Design

flowchart (temporal)

block diagram (spatial)

schematic

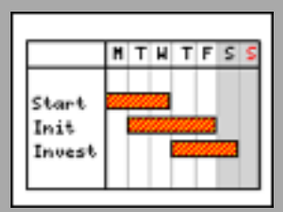
mechanical design

design tool, version control

## Plan

team communication progress report

statement of work

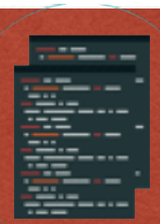



Gantt chart milestones deliverables

development tools

version control

## Build



firmware, app, server,..

hardware, network

3D modeling & printing

## Evaluate

performance (throughput, latency)

power (battery life, peak power)

correctness

cost

manufacturability

broader impact

management

# Common Paper Project

- Taking Attendance in a class
  - Current practice: sign-in sheet.
  - Obvious problems: inconvenient, forgeable
- High-tech solution?
  - Embedded system vs. smartphone?
  - Local or server?