CS 189B

- **Class Meetings:** Tuesdays 3:30-6:50PM, ESB 1003

- **Instructor:** Tevfik Bultan  
  bultan@cs.ucsb.edu, Phone: x3735  
  Office Hours: Tuesdays 1:00-3:00PM, HFH 2123

- **Teaching Assistant:** Steve Bako  
  sbako@ece.ucsb.edu  
  Office Hours: Please contact the TA for scheduling an appointment

- **Class Website**  
  http://capstone.cs.ucsb.edu
Capstone Project Class

- Two quarter project class in which students put their education into practice by building a significant system as a team
  - Learn by doing
  - Chance to explore the latest technologies
  - Provide practical experience as a form of career building
- Capstone is mandatory for *Computer Engineering* majors and elective for *Computer Science* Majors
- Different Capstone classes are offered in the college
  - CS 189 A/B
    - Software systems engineering oriented
    - Runs Fall/Winter to allow continuity
  - ECE 189 A/B
    - Focuses on development of a hardware prototype
    - Runs Fall/Spring every year so chips can be fabricated during the Winter
  - EE Capstone, ME Capstone
CS Capstone: CS 189 A/B

• Industry Driven
  – Top companies “donate” challenge problems that they wish to explore as R & D
  – Student teams develop prototypes in collaboration with industrial mentors
  – Goal: develop and understand the next industry-leading technology, drive an idea from design to working prototype

• Culminates Monday, March 13th (@the CS Summit!)
  – Present your project to the College, community, your peers, … the world
  – Awards given for best projects!
Capstone Award Judging Criteria

• 5pt **Science**: Has the project demonstrated application of important, interesting, or new aspects of Computer Science? (e.g. use of machine learning, non-trivial algorithms, solid distributed system design techniques)

• 5pt **Practice**: Did the project adhere to techniques that represent the state of best practice in industry throughout the development of the system (e.g. repo workflows, test-driven development, issue tracking, or use of static or dynamic analysis tools)

• 5pt **Scope**: Has the team attacked a problem of significant (but appropriate) scale and complexity. Does the problem require the development of significant new code and/or the integration of complex exciting parts that are not normally made to interface to one another? Was the project able to complete the goals that it set for itself?

• 5pt **Teamwork and Presentation**: Do all the members of the team contribute significantly (in their own ways)? Does the team take the process seriously and communicate effectively with one another and the mentors? Is the project presented both in written and spoken form in a way that is compelling and impressive? Has the team developed an impressive demo?
Capstone Series Overview

- Teams of size 5

- **CS189A**
  - Project vision
  - Requirements and design documentation
  - Prototyping and initial implementation (code!)
    - Including testing

- **CS189B**
  - Complete implementation (debugging, robustness, performance, analysis)
  - Testing and verification
    - Including user studies
  - Optimization and extension (awesome features!)
  - Presentation
The course is structured in four two-week sprints.

At the end of each sprint, the teams are required to perform a Sprint Review (with the sponsor) and a Sprint Retrospective.

The summary of these two efforts is to be discussed with the instructor during class.

The teams will have weekly meetings with the instructors to discuss their progress.

In the second half of the class the teams will practice their project presentations and prepare posters.
CS189B Schedule

• Each student is required to contribute substantially to Github repo every week

• Each team should update their tasks in Trello every week
  – Give access to the instructor (Tevfik Bultan, bultan@cs.ucsb.edu)

• Each team should write their Sprint Retrospectives in google docs
  – Give access to the instructor: (Tevfik Bultan, tbultan@gmail.com)
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CS 189B Schedule

- Each team will have a 15 minute meeting with the instructors every week.
- We will divide each class to three slots and we will schedule a meeting with each team in one of the slots (randomly chosen every week).
  - The meeting slot for each team will be announced at the beginning of each week.
  - Every team member has to attend the meetings, attendance is required.
- Every team should attend at least two of the three slots (the slot their team meeting is scheduled and the previous or the following one).
- The teams should do their sprint meetings and work on the project when they are not meeting with the instructors.
- Some weeks there will be presentations by the instructors or the teams and the team meetings will be shorter during those weeks.
My experience with Capstone Class

- I have taught 189A nine times!
- Rich Wolski and I started the industry sponsored projects in the capstone class a long time ago.
- It is very fulfilling to see the students successfully complete a non trivial project at the cutting-edge of the computing technology
- Some capstone project highlights from long time ago:
  - Capstone students wrote a visual voicemail system on android before android was running on any hardware!
  - Capstone students wrote a web-based document editor before Google docs was available and before Microsoft office had an online version
  - Capstone students implemented an image based question answering system using Amazon’s mechanical turk
Student Comments After the Class

“I enjoyed the structure of this class & I think applying our efforts to “real world” problems given by companies is extremely effective.”

“The pairing with industry is great.”

“I found this course to be very interesting and helpful to my pursuit of a Computer Science degree and Software Engineering job.”

“Working with companies was motivational and fun.”
"As far as getting a job goes, CS189 is probably one of the most useful things you can do as an undergrad."

“CS189 not only helped me during job interviews but also the project I am working on with PowerPoint is very similar to the project that my group worked on (the online slide sharing app)”

"Many projects I am working on now I find myself going through the same steps I did in CS189 class. From gathering requirements, producing design specs, and ultimately presenting my work."