Syllabus

Overview

CS 196-25 is a Freshman Honors course developed to help new students become acclimated to the environment here at CS @ Illinois and develop practical programming skills for industry. The goals for the course can be broken down into 3 directives:

1. Practical programming skills

Many CS students at Illinois come with close to no prior programming experience. Although the core curriculum is an excellent introduction to classical computer science topics, there are few opportunities to improve skills that are directly applicable to industry. This kind of education becomes extremely problematic for students, who often struggle with applying abstract concepts learned in classes to real life industry problems. Interviews are often difficult even with algorithmic training provided by core CS classes and students have historically struggled to obtain relevant job experience.

CS 196 aims to bridge this gap by providing an extremely fast-paced and rigorous environment where students are encouraged to develop technical skills.

2. Introducing CS@ Illinois

CS 196 aims to become a gateway for students to the CS @ Illinois experience. We have many events, promotions, and lectures designed to help students find their interests and become engaged with the community!

3. Networking

Networking is critical to success in both personal and professional endeavors. We hope to provide a chance for new students to receive mentorship and advice from experienced upperclassmen. CS196 has over 30 highly talented course assistants, most of whom have had industry experience at top tech companies such as Google, Facebook, and Microsoft. Alumni of CS 196 and staff include the current and previous presidents and treasurers of ACM, the technical director of IEEE, the current president of WCS, and the current presidents of SIGmobile, SIGVRST, SIGir, and SIGchi. Our CA's are more than happy to assist you with any challenges that you may face during your time here at Illinois, from getting interviews to completing difficult technical projects!

Prerequisites

There are no required prerequisites for the course (not even CS 125). We highly encourage students in other departments, especially those who work closely with computer science, to take the class. Although the course is programming-focused, there is ample opportunity for students to practice other aspects of product creation especially in the fields of design, math, electrical engineering, statistics, linguistics, psychology, and business. Prior knowledge of programming is not assumed, but the course is extremely rigorous and fast-paced.

Class Structure

Project

Students will pitch ambitious project ideas in week 3. Students will indicate the projects that are most interesting to them and will then be assigned to one of the project teams. This team will spend the semester building out this project.

Each team will also be assigned a Project Manager to help them complete this ambitious project. This PM will be someone from out course staff. The project group will meet with their PM at least once a week. During these meetings, the PM will set the expectations for the upcoming week. These meetings are NOT intended to be used for writing code.

Projects progress will be evaluated on individual contribution, code quality, and end product. Weekly meetings with project groups are required and active participation will play a substantial role in your final grade. The exact division of grades is as follows:

Version Control and Workflow	Did you branch correctly? Following VC standards? Are you meeting deadlines for tasks? Are you adhering to agile methodologies? How are code reviews going?	10%
Contribution	How many points did you earn? statistically (2 standard deviations) greater or less than the rest of the group	30%
Participation	Did you show up to meetings?/Are you contributing to engineering and product decisions?	10%
Code Quality	Are your project components written scalably with good style? Is the documentation thorough? Did you optimize for efficiency? Did you write tests?	20%

Final Review	Final review of your course project. Did you hit 2 releases of the project (MVP, MLP)? Is it written in a scalable manner, with stable code (i.e tests, access control, generally not hacky)?	30%

Lecture Sessions

Lectures for CS 196 are held in Siebel 1404 on Tuesdays at 7pm-8:30pm. Lectures will be broken up into multiple , which are classified into either , , or . Homeworks will be based off of these microlectures.

Algorithmic programming microlectures are designed to provide a rigorous introduction to language mastery, programming practices, and complex algorithmic topics. This microlecture will most assist in developing raw programming maturity and programming interviews.

Each week will introduce one generic industry topic based microlecture. For example, we may have a week dedicated to "creating scalable applications" or "testing". These topics will be covered generically in lecture and be applied during Hackerspaces.

We will sometimes invite guest speakers to give microlectures on certain topics related to programming in industry.

Hackerspace

Hackerspaces are 1-hour lectures that are separate from the main lecture held in Siebel 1404. The purpose of Hackerspace is to teach programming concepts related to a specific

skillset/trade that can be used in industry. Current Hackerspaces include Mobile Development, Frontend/UI/UX Development, Backend Development, and Data Science.

Hackerspaces will meet weekly and students will be required to attend one Hackerspace series for the entire semester.

Homeworks

Ten Homework assignments will be given throughout the semester. Homework problems will be based on core programming fundamentals that we will be covering in python this semester. There are no late homeworks accepted and there is no forgiveness policy. Homework assignments will be submitted through Git by 7pm on the following Tuesday lecture.

Events

CS 196 has events planned throughout the semester designed to help you improve your technical skills and meet new people! Some of these events are mandatory. Either way, we highly suggest that you show up to as many as you can.

The select few of these events will be mandatory, include the first Hackathon (where you will meet your teammates and start working on your group project) and the "Gauntlet", which is a series of in-person interviews with algorithmic questions that will count as your midterm grade. Details to come!

Semester Schedule

Lectures are held in Siebel 1404 on Tuesdays at 7pm - 8:30pm. Attendance will be taken and is mandatory. The following is a tentative lecture schedule for the semester:

Week	Programming Fundamentals	Practical Applications	Hackerspace
1	None	Interviewing	NONE
2	Types, Functions, Strings, Conditionals, numbers	Pitching, Linux Basics, Git	Introduction
3	PROJECT PITCHES		Best Practices
4	Loops	Programming Tools, Language Choice	Tools / Frameworks
5	Iterables (arrays, tuples, etc)	Runtime analysis	Implementation / Performance
6	2d arrays	Testing, debugging, style	Testing/debugging
7	Dictionaries, OOP	API's, Databases	Queries + Persistence
8	None	Deployment	Deployment
9	MVP 1 PRESENTATIONS		NONE
10	Stacks / Queues	Parallelism and Async	Performance
11	Trees	Compression, Optimization	Big Data Management and transfer
12	Trees / Recursion	Cloud Infrastructure	Scalability
13	Graphs, Dynamic Programming	Research in industry	Algorithmic Applications
14	Functional Programming, Python performance quirks	Where to go from here	Future Direction

15	FINAL PROJECT PRESENTATIONS	NONE

In addition to this schedule, each team will have a project schedule. These will be formulated by the team's PM.

Office Hours

Office Hours will be held in order to assist students with homework. These will be held for an hour immediately after any hackerspace section. Feel free to go to any of the office hours, even if they aren't immediately after your assigned hackerspace section.

Overall Grading

The overall grading rubric is detailed below. Attendance will be taken for lectures, hackerspaces, events, and project meetings. There may be extra credit in this class. Make sure you're listening closely or you might miss it ;).

Category	Description	Weight
Participation	Participation in lectures, hackerspaces, and events	15%
Midterm	Performance on midterm review	15%
Project	Project performance as detailed above	50%
HW	10 HW assignments given through the semester	20%