COMS W4170: User Interface Design
Course Syllabus — Fall 2023

Last updated Oct. 3, 2023. Changes since first release highlighted in ==yellow==.

Prof. Brian A. Smith
brian@cs.columbia.edu
(Please contact via Ed Discussion or Slack)

Class Time & Location:
TR 1:10pm–2:25pm
428 Pupin

Office Hours (OH): T 4:30–5:30pm and by appt. @ 611 CEPSR.
(Canceled 10/24 & 10/31)

TEACHING ASSISTANTS: *(Office Hours also available by appointment)*

Please use Ed Discussion or Slack instead of email for all communication. Doing so will allow us to prioritize course-related communication over our general email.

Leo Zhang *(Head TA)*
OH: ==R 4–5pm==
@ 6LE5 CEPSR

Vishnu Nair
OH: ==T 11am–12pm==
@ 6LE5 CEPSR

Gaurav Jain
OH: W 12–1pm
@ 6LE5 CEPSR

Christina Su
OH: ==M 11am–12pm @ 502 Milstein Ctr. (Barnard)==

Liam McGrane
OH: ==W 9–10am @ 122A Mudd (CS TA Room)==

Manasi Soman
OH: ==M 3–4pm @ 502 Milstein Ctr. (Barnard)==

Mauricio Gonzalez

OH: W 2–3pm
@ 6LE5 CEPSR

OVERVIEW:

This course covers the skills, process, and thinking necessary to make computer systems useful and usable to people. We will explore what usefulness and usability mean and how we can gauge both of these in computer systems. We will practice the user-centered design process, including how to think and brainstorm more creatively, how to prototype user interface designs and iterate on them, how to test designs on users and critique others' designs, and how to analyze experimental results. We will also practice building websites using HTML, CSS, and JavaScript and managing exploratory software development projects. By the end of the course, you will have designed and implemented a novel computer system that enhance the lives of a user population that you identify by solving a key problem that they face.

PREREQUISITES:

This course has no strict prerequisites. We strongly encourage either COMS W3134, COMS W3136, COMS W3157, a similar intermediate course in computer science, or some significant programming experience. We encourage you to come with basic working knowledge of HTML and CSS, but will cover HTML and CSS in supplemental lecture videos. Experience with JavaScript, jQuery, Flask, and React experience is not necessary, as we will cover them in class.

FORMAT AND PRE-CLASS ASSIGNMENTS:

This course will meet in person, and we will try our best to make them interesting, interactive, and worth your time. In order to reserve more time for hands-on practice and instructor feedback, many class sessions will have pre-class reading assignments and/or short lecture videos to view beforehand. These pre-class assignments will be accompanied by short CourseWorks quizzes to help you focus on the knowledge that is important to learn beforehand. Late quiz submissions incur a 25% penalty just like other assignments.

To help you take notes during class, we will distribute any slides that we will use during class on CourseWorks before each class. There is no midterm or final exam planned;

the course will feature a semester-long group project in lieu of exams. We may update this syllabus as the semester progresses.

COLUMBIA VIDEO NETWORK (CVN) STUDENTS:

Class sessions will be recorded for CVN students, and CVN students have the option to attend class synchronously or asynchronously. CVN students are expected to complete all assignments including pre-class assignments and post-class reflections with the same deadlines as on-campus students. The pre-assignments for the Studio sessions are group deliverables and will be submitted as a team.

Regarding the Semester Project, we will, by default, place CVN students into their own teams. Our reasoning for this is that on-campus students (particularly undergraduates) often prefer meeting with their teams in person and have reported finding it difficult to coordinate remotely across time zones with CVN teammates. We have also had several reports of CVN students feeling less included as a result of not being able to join on-campus teams in person.

This being said, we are open to suggestions. If you strongly prefer working within a team of on-campus students or have specific teammate suggestions in mind, please let us know and we will consider it. The Semester Project synopsis describes our process for forming teams.

CVN students are not expected to attend the Project Showcase during our course's final exam period. The weight of the rest of your grades will be scaled up proportionally. CVN students *are* still expected to attend Checkpoint feedback meetings with their team's mentor.

VIDEO RECORDINGS:

Since our class includes CVN students, it is being recorded by the CVN team for them. Only CVN students have access to the recordings, which they can view via the "Video Library" section on CourseWorks. If you are a CVN student and are having trouble accessing the recordings, please email `support@cvn.columbia.edu`.

If you are an on-campus student and must miss class, we can provide access to the recording for that session. Let the Head TA and Prof. Smith know why you are missing class (via Ed Discussion or Slack), and we can give you access to that class's recording. Once we do, you should be able to view the recording the "Video Library" section on CourseWorks.

LEARNING GOALS:

Our goal is for you to learn how to engineer usefulness and usability in computer systems. Engineering is not just the act of building but the entire *process* behind creation — including design, evaluation, working with others, and understanding the broader implications of the work that you do. The course is structured to give you

multiple rounds of practicing these skills — via the Semester Project's five "checkpoints" — instead of having just one round of practice.

This course comprises five units, and each is directed toward specific learning goals:

Unit 1: User-Centered Design *(Class 1–11)*
o   Ideate, prototype, and evaluate designs to fit users' lives and values.
o   Structure your product development cycle to find a design that users love.

Unit 2: Interaction Design *(Class 12–16)*
o   Design UX mockups to support users' journeys and information needs.

Unit 3: Web Development *(Class 5 & 17–19)*
o   Transform designs into working websites.

Unit 4: Principles of Interaction *(Class 20–22)*
o   Design tools that support human psychological needs in interaction.
o   Determine when and how to use the "UI designer's toolbox" including menus, input devices, displays, device form factors, and accessibility tools.

Unit 5: Designing Your Career *(Class 23–25)*
o   Plan your impact and career in a proactive rather than reactive way.
o   Judge what it means for design to be humane.

TEXTBOOKS AND ADDITIONAL RESOURCES:

There is no required textbook, and all required readings and videos will be posted to CourseWorks. The readings and short lecture videos for the pre-class assignments will be enough to give everyone the baseline knowledge required for our deeper discussions and activities during class. The Textbooks and Additional Resources document on CourseWorks provides a full index of textbooks including free download links where available. That document also lists additional readings for each class session for those of you who wish to explore particular topics more deeply.

GRADING AND EVALUATION:

Pre-Class Assignments:	8%	
Post-Class Reflections:	8%	
Programming Assignments:	12%	(6% each)
Checkpoint 1:	6%	
Checkpoints 2–4:	30%	(10% each)
Checkpoint 5 (Final Deliverable):	30%	
Submitting 360 Evaluations:	3%	(1% each)
Mentor Meeting Attendance:	2%	(0.5% each)
Project Showcase Attendance:	1%	
TOTAL:	100%	

SEMESTER PROJECT:

The Semester Project will be a group project involving groups of four students each and will include a series of deliverables. The project is organized into five "checkpoints" spaced throughout the semester:

- **Checkpoint 1:** Understanding Users

- **Checkpoint 2:** Low-Fidelity Prototyping

- **Checkpoint 3:** UX and Development Kickoff

- **Checkpoint 4:** Iterative Development

- **Checkpoint 5:** Final Deliverable

All checkpoint deliverables will be due at 11:59pm ET on their respective due dates and must be submitted electronically via CourseWorks. We will use this course's scheduled final exam slot (during finals week) for the project showcase, and attendance will be mandatory. We will provide additional details about the Semester Project in the first couple of weeks of the course.

Checkpoints submitted late for an unexcused reason will incur a 25% penalty. There are no free "late days" in this course. You must contact both our Head TA and the TA serving as your project mentor whenever you submit a checkpoint late (whether the late submission is excused or not) so that they know when to look for your submission.

PLAGIARISM / ACADEMIC DISHONESTY:

We will handle all cases of plagiarism and academic dishonesty according to your school's academic dishonesty and disciplinary procedures. Several schools' procedures are listed below, as are the Dept. of Computer Science's procedures. A full list of Columbia's policies can be found at https://studentconduct.columbia.edu.

Dept. of Computer Science	https://www.cs.columbia.edu/education/honesty/
Barnard College	https://barnard.edu/student-code-conduct
Columbia College	http://bulletin.columbia.edu/columbia-college/standards/
School of Engineering and Applied Science	https://bulletin.engineering.columbia.edu/academic-integrity-and-discipline
School of General Studies	http://bulletin.columbia.edu/general-studies/academic-policies/academic-integrity-community-standards/

ELECTRONICS POLICY:

Please silence all electronic devices that can ring, and please do not use them in class, except for taking handwritten notes (for example, on a tablet with a stylus) and participating in in-class polls and activities. If you expect an important call or text during class, you should sit near one of the doors or aisles so you can easily step out when it comes.

We will ask you to bring your laptops to class during our Web Development and Studio class sessions, as you will need them to participate in those activities. Outside of these sessions, we discourage laptops because the screens are almost always distracting to the people sitting behind you. Formal studies have found that laptops hurt learning for both their users and people around them (see this New York Times article for more info), and that notes written using laptops are less effective for learning than handwritten notes (see this source). If you must use your laptop during a normal class session, we ask that you sit in the back row.

GUESTS AND AUDITORS:

You may bring the occasional guest to class with you, but please introduce them to the instructor before class. Your guest should not be a distraction during class.

Our class is open to auditors. If you are interested in auditing the class, please reach out to our Head TA Leo Zhang.

DISABILITY ACCOMMODATIONS:

If you have a health condition that affects your learning or class experience or otherwise require accommodations because of a disability, please let Prof. Smith know as soon as possible. We will, of course, provide all of the accommodations listed in official accommodation letters from the Office of Disability Services that you present to Prof. Smith, but we may be able to do even better if you let us know what really matters to you.

DIVERSITY AND INCLUSION:

We would like to create a stimulating learning environment that honors our diverse experiences and supports a diversity of thoughts and perspectives, so we ask that you be respectful of others' identities including their race, gender, nationality, socioeconomic class, sexual orientation, gender identity and expression, religion, disability status, etc. We expect you to be respectful when critiquing others' work or making an argument, and to respect others who disagree with you. Listening deeply to understand what frames others' perspectives is key to great leadership.

If something is said in or outside of class that made you or someone else feel uncomfortable, please tell us about it. Please also talk to us if you have an idea or suggestion for making the course material more inclusive.

MENTAL HEALTH AWARENESS:

If you are experiencing significant stress or anxiety, please do not hesitate to schedule a meeting with any of the course staff. There are many resources on campus to that can help, and a nearly complete directory is here:

https://health.columbia.edu/content/counseling-and-psychological-services

Bring laptops to class:

COURSE SCHEDULE: 🔵 Web Development   🟠 Studio

1	**T, Sept 5**	Introduction to User Interface Design
2	**R, Sept 7**	What is Good Design?
3	**T, Sept 12**	Introduction to User-Centered Design (UCD)
4	**R, Sept 14**	The Semester Project + Choosing a Problem
		—— **PROGRAMMING 1 DUE FRI, SEPT 15 (11:59 PM)** ——
5	**T, Sept 19**	🔵 Getting Started with JavaScript
6	**R, Sept 21**	Understanding Users
7	**T, Sept 26**	Storyboarding
8	**R, Sept 28**	Low-Fidelity Prototyping
		—— **PROGRAMMING 2 DUE FRI, SEPT 29 (11:59 PM)** ——
9	**T, Oct 3**	🟠 Studio 1

	R, Oct 5		*NO CLASS*
			—— **CHECKPOINT 1 DUE FRI, OCT 6 (11:59 PM)** ——
10	**T, Oct 10**		Evaluating Designs with Users
11	**R, Oct 12**		Midterm AMA
12	**T, Oct 17**	🟠	Studio 2
13	**R, Oct 19**		Information and Interaction Design I
			—— **CHECKPOINT 2 DUE FRI, OCT 20 (11:59 PM)** ——
14	**T, Oct 24**		Information and Interaction Design II
15	**R, Oct 26**		Getting Started in Visual Design
16	**T, Oct 31**	🟠	Studio 3
17	**R, Nov 2**	🔵	Getting Started with Flask
			—— **CHECKPOINT 3 DUE FRI, NOV 3 (11:59 PM)** ——
	T, Nov 7		*NO CLASS (ELECTION DAY)*
18	**R, Nov 9**	🔵	Getting Started with React
19	**T, Nov 14**	🟠	Studio 4
20	**R, Nov 16**		Principles of Interaction
			—— **CHECKPOINT 4A DUE FRI, NOV 17 (11:59 PM)** ——
21	**T, Nov 21**		Accessibility
	R, Nov 23		*NO CLASS (THANKSGIVING)*
22	**T, Nov 28**	🟠	Studio 5
23	**R, Nov 30**		Alumni Panel
			—— **CHECKPOINT 4B DUE FRI, DEC 1 (11:59 PM)** ——
24	**T, Dec 5**		Final AMA
25	**R, Dec 7**		Humane Design

T, Dec 19 1:10–4:00pm (Projected Exam Slot)	**PROJECT SHOWCASE** (Location to be announced later.) —— **CHECKPOINT 5 (SEMESTER PROJECT) DUE** ——

BONUS LECTURES: *(Available in CourseWorks's Video Library)*

1. 🔵 Getting Started with HTML/CSS
2. Experimental Design I
3. Experimental Design II
4. Data Analysis and Hypothesis Testing
5. Modeling Human Cognition and Low-Level Interaction
6. Interaction Styles