



## COMS W4170: User Interface Design Course Syllabus – Fall 2022

*Last updated Sep 6, 2022*



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

MW 2:40pm–3:55pm  
Sept. 7 – Dec. 21  
833 Mudd

**Drop-In Hours (DH):** <Time TBA> and by appt. @ 611 CEPSR

### **TEACHING ASSISTANTS:** *(Drop-in Hours also available by appointment)*

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



Vishnu Nair (*Head TA*)

**DH:** \_\_\_\_\_  
@ 7LE5 CEPSR



Gaurav Jain

**DH:** \_\_\_\_\_  
@ 7LE5 CEPSR



Arnavi Chheda

**DH:** \_\_\_\_\_  
@ 7LE5 CEPSR



Sofia Bianchi

**DH:** \_\_\_\_\_  
Location TBD



Laura Castro Venegas

**DH:** \_\_\_\_\_  
Location TBD



Anya Devgan

**DH:** \_\_\_\_\_  
Location TBD

## 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 both gauge 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:

Either COMS W3134, COMS W3136, COMS W3157, a similar intermediate course in computer science, or some significant programming experience is strongly encouraged. Basic working knowledge of HTML and CSS is strongly encouraged, but will be covered in supplemental lectures. JavaScript, jQuery, and Flask experience is not necessary.

## FORMAT:

This course will meet for lecture in person, and we will try our best to make them interesting, interactive, and worth your time. 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 a bit as the semester progresses. Please see the Course Schedule document for the full course schedule with related readings.

## 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 six “checkpoints” — instead of having just one round of practice.

This course comprises six units, and each is directed toward specific learning goals. The Course Schedule document details the schedule in full with related readings.

### **Unit 1: Usefulness and Usability (Class 1–2)**

- Understand what usefulness and usability are and how to gauge them.

### **Unit 2: User-Centered Design (Class 3–9)**

- Learn how to ideate, prototype, and evaluate designs to meet users' needs.
- Practice each stage of the user-centered design process for a real project.

**Unit 3: Interaction Design (Class 10–14)**

- Learn how to organize information effectively across space and time.

**Unit 4: Web Development (Class 15–19)**

- Learn how to translate designs into working websites.

**Unit 5: Principles of Interaction (Class 20–23)**

- Understand the psychology of interacting with everyday things.
- Learn how model interaction and usability in a quantitative way.
- Become familiar with the “user interface designer’s toolbox” including menus, input devices, displays, new device form factors, and accessibility tools.

**Unit 6: Designing for Life (Class 24–26)**

- Understand how different design fields share common motivations.
- Understand what it means for design to be humane.

**TEXTBOOKS AND RELATED READING:**

There is no required textbook and the lectures will be self-contained. We will distribute each lecture’s slides on CourseWorks before each class. For those of you who would like to explore the topics that we cover in class more deeply, we have included a set of related reading for each lecture in the Course Schedule document. We call these readings “related” and not “required” or “suggested” because we generally do not expect you to read them. You can find a full index of textbooks — with free download links where available — at the end of this document.

**GRADING AND EVALUATION:**

Weekly Reflections:	18%	(1.5% each)
Starter Homework:	5%	
Checkpoints 1–5:	40%	(8% each)
Checkpoint 6 (Final Deliverable):	30%	
Submitting 360 Evaluations:	3%	(1% each)
Mentor Meeting Attendance:	2.5%	(0.5% each)
Project Video Screening Attendance:	1.5%	
<b>TOTAL:</b>		<b>100%</b>

**SEMESTER PROJECT:**

The Semester Project will be a group project involving groups of four students each and will include a series of both individual and group deliverables. The project is organized into six “checkpoints” spaced into equal intervals throughout the semester:

- **Checkpoint 1:** User Research
- **Checkpoint 2:** Low-Fidelity Prototyping
- **Checkpoint 3:** UX and Development Kickoff
- **Checkpoint 4:** Iterative Development
- **Checkpoint 5:** Goal Calibration
- **Checkpoint 6:** Final Deliverable

All checkpoint deliverables will be due at 3:00pm ET on their respective due dates and must be submitted electronically via CourseWorks. The 3:00pm time gives the teaching staff time during the workday (rather than on the weekend) to review what you turn in.

We will use this course's scheduled final exam slot (during finals week) for project presentations 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 our head TA Vishnu Nair 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 are aware of your submission.

### **WEEKLY REFLECTIONS:**

The weekly reflections are individual assignments and are due every Friday at 3:00pm ET, except for the Friday after Thanksgiving.

These assignments serve two purposes. First, they allow you to reflect on what you are learning in the class, in lieu of you not having to review everything again as part of preparing for a midterm or final exam. Second, they create a weekly ritual in which you can reflect on whether your weekly energy is in alignment with what you want to get out of your semester. Becoming accountable for our own learning and growth by regularly reflecting on it and getting the help we need as we need it is a crucial life skill that takes practice and habit-forming to build.

Your turn-in should be brief—one page at most, though likely much less—and we will grade these on a √- / √ scale, where a √- counts for one point and a √ counts for two points. If you answer all of the questions honestly, you will receive a √ even if the answers are bad. Late submissions automatically receive a √-.

### **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	<a href="https://www.cs.columbia.edu/education/honesty/">https://www.cs.columbia.edu/education/honesty/</a>
Barnard College	<a href="https://barnard.edu/student-code-conduct">https://barnard.edu/student-code-conduct</a>
Columbia College	<a href="http://bulletin.columbia.edu/columbia-college/standards/">http://bulletin.columbia.edu/columbia-college/standards/</a>
School of Engineering and Applied Science	<a href="https://bulletin.engineering.columbia.edu/academic-integrity-and-discipline">https://bulletin.engineering.columbia.edu/academic-integrity-and-discipline</a>
School of General Studies	<a href="http://bulletin.columbia.edu/general-studies/academic-policies/academic-integrity-community-standards/">http://bulletin.columbia.edu/general-studies/academic-policies/academic-integrity-community-standards/</a>

### **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 we expect you 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 diverse and representative of different viewpoints.

### **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). 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 strongly 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). If you must use your laptop, 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 Prof. Smith.

### **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>

### **TEXTBOOKS:**

Below is a listing of textbooks in the order that they appear. They are available as electronic copies or are on reserve in the Science and Engineering Library:

- Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven Jacobs, Niklas Elmqvist, and Nicholas Diakopoulos. *Designing the User Interface: Strategies for Effective Human–Computer Interaction*, Sixth Edition. Addison-Wesley, 2017, ISBN-13: 9780134380384.
- Karen Holtzblatt and Hugh Beyer. *Contextual Design: Design for Life*, 2<sup>nd</sup> ed. Morgan Kaufmann, 2016. ISBN-13: 978-0128008942
  - Electronic copy available for free to Columbia affiliates:  
<https://clio.columbia.edu/catalog/12477264>
- William Buxton. *Sketching User Experiences: The Workbook*. Elsevier/Morgan Kaufman, 2011. ISBN-13: 978-0123819598.
  - Electronic copy available for free to Columbia affiliates:  
<https://clio.columbia.edu/catalog/9485420>
- Jonathan Lazar, Jinjuan Heidi Feng, and Harry Hochheiser. *Research Methods in Human–Computer Interaction*. Elsevier/Morgan Kaufman, 2017. ISBN-13: 978-0-12-805390-4
  - Electronic copy available for free to Columbia affiliates:  
<https://clio.columbia.edu/catalog/15774230>
- I. Scott MacKenzie. *Human–Computer Interaction: An Empirical Research Perspective*. Elsevier/Morgan Kaufman, 2013. ISBN-13: 978-0-12-405865-1.

- Electronic copy temporarily available for free to Columbia affiliates:  
<https://clio.columbia.edu/catalog/10284543>
- Jennifer Kyrnin and Julie Meloni. *Sams Teach Yourself HTML, CSS, and JavaScript All in One*, 3<sup>rd</sup> ed. Sams Publishing, 2018. ISBN-13: 978-0672338083.
- Thomas Michaud. *Foundations of Web Design: Introduction to HTML and CSS*. New Riders, 2013. ISBN-13: 978-0321918932.
- Don Norman. *The Design of Everyday Things: Revised and Expanded Edition* (“2<sup>nd</sup> ed.”). Basic Books, 2013. ISBN-13: 978-0465050659.
- Stuart K. Card, Thomas P. Moran, Allen Newell. *The Psychology of Human-Computer Interaction*. L. Erlbaum Associates, 1983. ISBN: 0898592437.