SYLLABUS FOR Human-Centered Design and Prototyping of Ubiquitous Computing Systems

What: CSCI 5127: Human-Centered Design and Prototyping of Ubiquitous Computing Systems
When: [TBD]
Where: [TBD]

Course Instructor

Instructor: Lana Yarosh
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Contact me: lana@umn.edu
Office hours: [Office Hours]

Course Goals and Overview

In this course, you will apply the principles of human-centered computing and design to address real-world challenges faced by people and groups. You will learn and demonstrate mastery in three phases of design: (1) investigating the needs of target stakeholders, (2) charting the solution space through ideation and visual exploration, and (3) rapidly prototyping and iterating on solutions. Finally, you will acquire significant practice in the skills of independent learning, video presentation, and critique by implementing and evaluating peer tutorial videos.

Required Course Materials

There is no required textbook for this class and all readings will be available for free online. The department will also supply basic course materials such as Arduino kits and other similar physical computing parts for your class projects or peer tutorial presentations. However, you are advised to reserve $50 per person in case your project or presentation requires additional parts that are not provided in the basic kits (e.g., additional sensors, laser cut components, etc.).

Role of Writing in this Course

One goal of this class is to help you master written communication skills. This is a Writing Intensive course and each student will independently complete a significant amount of writing. This will take several forms:

- Each milestone will have a writing component(s) that will be independently drafted by one student on the team (you will receive an email with writing assignments) and edited by the whole team. This is similar to tasks you may do in the workplace, such as writing white papers or reports in both industry and academia.
- You will submit written critiques to your classmates on various components of their work, including presentations and video tutorials. These will be graded as part of your class participation grade. This is similar to the kind of written feedback you may be expected to offer your colleagues in the workplace.
- You will be expected to submit a detailed script for your video tutorial. This will be graded as part of your peer teaching presentation grade. This is similar to the kind of peer teaching and preparation for peer teaching that you may be expected to do in the workplace.

This process may improve your communication skills and will lead to a well-edited paper and a video tutorial on a technical topic that you may find useful to add to your professional portfolio.

Course Expectations and Grading

For this course, you will be expected to demonstrate your mastery of the course material through in-class participation and the course project. There will be no exams, however I reserve the right to administer unannounced quizzes on assigned readings. The following will determine your grade:

- **Participation in Class Discussion and Critique (10%)**

o   You are expected to be prepared for and contribute to class discussion. This portion may include unannounced quizzes testing that you have read the assigned reading for this class. You will also be expected to provide oral and written feedback to your classmates as they present their project milestones and peer teaching videos.
- **Peer Teaching Video (20% total)**:
    o   You will pick a topic relevant to the course and will create a video tutorial on the topic for your classmates. Your grade will be based on instructor evaluation and student critique.
- **Course Project (70% total):**
    o   *Milestone 1 (15%)*: You will reach out to stakeholders to understand their motivations and goals and read about others' formative evaluations in this space. You will present your results to the class as "Implications for Design" and write the introduction, related work, and formative study sections of your final paper.
    o   *Milestone 2 (15%):* You will practice divergent thinking, generating many possible ideas for technology in your target space. You will present your process and your best ideas to the class and write the design process and initial ideas sections of your final paper.
    o   *Milestone 3 (20%):* You rapidly prototype two or more variations of your ideas. You will present your prototypes to the class and submit the completed paper.
    o   *Teammate Evaluation (10%)*: Your teammates will evaluate your contribution to the project.
    o   *Individual-Writing Evaluation (10%)*: For one of the milestones above, you will be expected to individually produce the first draft of the paper section.

This course is not graded on a curve. The nominal scale awards an A or A- for 90% and better, B+, B, or B- for 80% and better, etc. That scale may be adjusted to lower numerical cut-offs if warranted, but will not be raised.

Course Topic

The following is a list of topics that will be covered in this course, in roughly the order on the schedule. The readings must be completed *prior* to that class meeting. All readings will be linked and available via the class Moodle page:

- Introduction to the Course. Read: Accountability of Design chapter, course syllabus
- Basics of Critique, CHI Design Competitions Intro, Introduction to the Project. Read: project description, one CHI design competition finalist paper from previous years (e.g., 2014).
- Design Research Paradigms and Intro to Literature Review. Read: Design Research chapter.
- Introduction to the IRB. Optional (if you're interested in research): Complete IRB training course.
- Introduction to Peer Teaching. Read: peer teaching guidelines.
- Observational Methods of Understanding Human Needs. Read: Logging Data Chapter (long reading, give yourself time).
- Interview Methods of Understanding Human Needs. Read: Seidman's Interview Tips Chapter
- HCI and the Probe Methods. Read: Design Probes paper, Tech Probes paper.
- Participatory Design Research. Read: Cooperative Inquiry paper.
- Creating a Study Protocol. Read: Example protocol.
- Analyzing Formative Study Data. Read: Analysis Chapter.
- Scenarios and Personas. Read: Personas Chapter (long reading, give yourself time).
- Generating Ideas. Watch: IDEO Shopping Cart. Read: Usability Evaluation Considered Harmful Paper
- Idea Selection Process.
- Human-Centered Design Sketching, part 1. Read: Why Sketch Introduction, Single Image Chapter.
- Human-Centered Design Sketching, part 2. Read: Photo Traces Chapter.
- Human-Centered Design Sketching, part 3. Read: Visual Narrative Chapter, Sequential Art CHI Paper.
- Paper and Low-Fidelity Prototyping. Read: Skeptic's Guide and Interactive Apps Using Keynote.
- Bricolage Prototyping. Read: Bricolage Section (from Wizards and Chameleons chapter).
- Arduino Basics Tutorial. Read: Getting started with Arduino guide.

- Laser-Cutting and 3D Printing.
- Wizard-of-Oz Strategies. Read: Wizard-of-Oz Section (from Wizards and Chameleons chapter).
- Stretch Topics (as we see fit): Value-Sensitive Design, Critical Design, and Design Noir. Readings: TBD

Each of these topics will include in-classroom practice components whenever possible. Additionally, 6 class periods will be devoted to milestone presentations (2 per milestone), 1 class will be a "madness-style" overview of peer teaching videos, and classroom time may be provided for project work.

Standard Policies

This course follows the standard University of Minnesota policy on each of the issues below, please refer to the linked policy for more information:

- Use of personal electronic devices in the classroom
- Student conduct code
- Scholastic dishonesty
- Makeup work for legitimate absences
- Appropriate student use of class notes and course materials
- Grading and transcripts
- Sexual harassment
- Equity, diversity, equal opportunity, and affirmative action
- Disability accommodations
- Mental health and stress management

If you have questions or concerns regarding any of the above policy, please let me know.

Academic Freedom and Responsibility

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom and conduct relevant research. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. When conducting research, pertinent institutional approvals must be obtained and the research must be consistent with University policies.

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.