DEA 2730: Human Centered Design Methods
Tuesday and Thursday, 11:40 – 12:55

- 3 credits.
- enrollment limited to 25 students in DEA; otherwise by permission.
- letter grade only.
- course webpage: (linked from https://arl.human.cornell.edu/academics.htm).

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NOTE: This pdf file for the syllabus is comprehensive; however, the active and most complete documentation for this course is found in the course guide provided online at https://arl.human.cornell.edu/DEA2730%20HCDM.htm. Here, you will find all the information contained in this pdf file, links to most all required readings, and additional supporting documents.

1. Course Description (50 words)
Focused on methods for designing for and with people in an increasingly cyber-physical world, with its many challenges and opportunities. Course topics include: design ideation, personas, scenarios, “WoZ,” rapid prototyping, collaborative design, observations, interviews, surveys, heuristic evaluation, usability engineering, and “RtD.” While the methods considered apply to design broadly, Interaction Design, User Experience Design, and HCI are emphasized.

2. Background and Definitions
"Human-Centered Design Methods" focuses on the iterative, design-research process used to design and evaluate objects and environments.

This course focuses on developing interactive artifacts more than static ones, as interactive artifacts, with embedded digital technologies, are growing in number, kind, and complexity. "Interaction Design" involves designing not only things but also the interaction between things and the people who use and live in them. Interaction design is not only about form-making and composition; it is about creative and meticulous design, (increasingly) technology, and an attentiveness to human needs and opportunities, striving to improve life, enhance existing places, and support the interaction of human beings with their physical and digital surroundings. Interaction Design is more than an aesthetic search, a stylistic possibility, a Utopian dream, or a technological quest; it is, instead, a way of designing a “commodious home” for the ways we live.

You can do two things, right away, on your own, that help frame the objectives for this course:
First, you can listen to "The Power of Design" and "Are the Best Designers Rebels?" on the TED RADIO HOUR.

Second, you can learn from Julie Zhao, Facebook’s young VP of Product Design. Julie explains what Facebook looks for when hiring designers. She also offers guidance on how designers can best start their careers, offering two key points:
• “You need to be good at both interaction design AND visual design. [...] If you can get to the point where everything you make looks great and makes sense, you will not have trouble landing a design job.”
• “Once your hard skills are in a good place, work on your soft skills: communicating clearly; pitching a compelling vision; knowing what matters to whom; collaborating well with others.”

On the second point, pitching a compelling vision, Julie offers four steps to follow that capture the core activity of this course:

• "Describe the problem you’re solving."
• "Describe how many people have this problem."
• "Talk about the solution in terms of the experience, not the product."
• "Let go of 'mine' or 'yours', embrace 'ours'."

3. Course Objectives and Learning Outcomes
“Human Centered Design Methods” aims to cultivate new vocabularies of design and new, complex realms of understanding towards realizing artifacts and systems responsive to human needs and desires. By the completion of this course, student will:

• cultivate an understanding of how human-centric design methodologies can be applied in the iterative process of designing artifacts supporting and augmenting human users.
• demonstrate the ability to develop and test conceptual design prototypes responsive to the challenges and opportunities of an increasingly digital society.
• communicate a design process in a rigorous written paper, poster, design diary, and video.

4. Course Materials
• 1 sketchbook like this one or a comparable one found in our bookstore.
• Materials required to construct your prototypes. Some of these materials and most manual and digital fabrication tools are available in our Digital Design Fabrication Studio on LL2 in HEB adjoining MVR.

To create functioning, interactive prototypes, you are strongly encouraged to embed into your prototype littleBits, electronic “bits” that snap together magnetically. Watch a TED Talk about about littleBits, and review a guide on how to use them. Also watch a short video on how Havas uses littleBits professionally. Finally, you might find project inspiration and ideas from Make (link) which also offers the guidebook, Getting Started with littleBits (a used copy from Amazon costs about $6 including shipping).

Your working prototypes with embedded littleBits will require:
• at least one Input bit (a sensor, such as a motion sensor or a light sensor)
• at least one Output bit (an actuator, such as an LED or a servo motor)
• one battery bit and one 9V battery

The total cost of your littleBits components does not have to be much more than $50. You can purchase your bits on the littleBits web page. You might consider using a wireless bit (e.g. the Bluetooth Low Energy bit or the CloudBit), however, unless you have a computer coding background, I would discourage you from purchasing the Arduino bit or any bits requiring it (e.g. LED Matrix). (If you are interested in designing more complex interactive systems than simple Input-Output ones for this course, take my DEA 5210 Interaction Design studio.)
5. Required Readings
Readings for each class meeting are listed in the CLASS SCHEDULE (below). These readings consist of (parts of) three books and six shorter publications. Only one inexpensive book (The Pocket Universal Methods of Design) must be purchased; all other readings are provided by links from this page. Please read the assigned readings ahead of their class session.

The three books (one to buy):
• The Pocket Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions (readings are assigned by method number--e.g. 01, 16).
• Interaction Design (readings are assigned by chapter number--e.g. Ch.1, to p. 56).
• The Delft Design Guide (readings are assigned by letter linked from this page--e.g. A)

The six shorter publications (articles and papers):
• Dow, Steve. Wizard of Oz Interfaces [WOz].
• Frayling, C. Research in Art and Design [RtD]
• Ishii, Hiroshi. Radical Atoms: Beyond Tangible Bits
• Mau, Bruce. An Incomplete Manifesto for Growth
• Perec, G. Observational "Experiments" in Species of Spaces and Other Pieces
• Winograd, T. From Computing Machinery to Interaction Design.
• Zimmerman, J., Forlizzi, J. and Evenson, J. Research through Design [RtD]

A useful online resource for design research methods: designresearchtechniques.com

A book that provides thorough case studies of the methods presented in this course is my own book which is not required for this course but suggested:

6. Grading
Throughout this course—an intimate and intensive “conversation” across students, professor, and TA—students will have ample opportunity to receive feedback on their work. In addition, students within teams will grade each other, student teams will grade other student teams, and student grading will be considered in assigning grades for this course. Students will receive a grade in response to work, weighted as follows:

• (10 points) Attendance, participation, and sketchbook (turned in with final deliverables at least class session). This is based on: (1) occasional, unannounced attendance calls taken in the first ten minutes of class, (2) the quality of your input when your name is blindly selected from my “magic box,” a box holding the names of all enrolled students in this course; and (3) the quality of your sketchbook, which is used for exploring and documenting your in-class activities, and maybe be used for course note-taking and reflection. Failure to attend a class without an approved excuse that was submitted by email prior to that class will lower your grade 2 points out of 100 points total.

• (10 points) Completion of Cornell IRB’s CITI training for new human participant researchers. Email Cornell’s completion certificate to the TA before Thanksgiving break. Failure to complete this task or late submission results in 0% grade for this component of the course. No excuse.

• (10 points) Nine Ideation Strategies. For each team, uploaded to our class Box folder and presented in class: one manifestation of each of the 9 ideation strategies (a list of these is found on this page, upper-
left column), a persona, a scenario, a "money shot" (best image) of your prototype, and a "demo" of your design captured by video. Four students will work together as a team and receive the same grade. A student peer-review evaluation form [link] will be used, and peer reviews will be considered in assigning the grade.

• (10 points) Early Concept. For each team, uploaded to our class Box folder and presented in class: a persona, a scenario, a "money shot" (best image) of your prototype, and a "demo" of your design captured by video. Teams of 3 or 4 students will work together and receive the same grade. A student peer-review evaluation form [link] will be used, and peer reviews will be considered in assigning the grade.

• (20 points) 2 quizzes (True/False and multiple choice). Each quiz is worth 10 points of the total grade, testing basic content of assigned readings. (Download publisher’s powerpoint slides if you wish; I do not provide my slides).

• (40 points) Final course deliverables. For each team, uploaded to our class Box or Google Drive folder and presented in class: a paper, a poster, a design diary, and a video. Four students will work together as a team; however, each member of the team will be chiefly responsible for one of the four key deliverables, and will be graded for this component. The student working on the design diary will also be chiefly responsible (and graded) for the section of the paper reporting on the iterative development of the prototype. Team members will make her or his assignment clear to the instructor for the purpose of grading by uploading her/his work with file name in this format: Team1_Poster_CharlesEames. Posters, papers, and design diaries are printed on one-sided paper and each sheet is pinned-up for exhibition. See the course’s grading rubric [link]. A student peer-review evaluation form [link] will be used, and peer reviews will be considered in assigning the grade.

More about the four deliverables for this course:

(1) A written, printed paper [my guide] communicating the iterative, human-centered design process for an interactive artifact developed in-groups of three. You are not reporting on all ideation strategies, data gathering techniques, and evaluation methods; only those that make the most cohesive, compelling reporting of your design process. This paper will adhere to the requirements for a "Provocations or Work-in-Progress" paper submission to the conference DIS (Designing Interactive Systems), using the required paper template. The video will adhere to the requirements for the Video Showcase” submission to the conference CHI (Human Factors in Computing Systems).

(2) A printed poster [Format: A1 portrait.; my guide] communicating the basic content of the same paper.

(3) A printed design diary [example from previous class] containing [a] weekly photographs of your team's developing prototype, with a written description of what was learned from the research study (or studies) performed that week that informed its development (this is a one page document); [b] the final prototype carefully photographed (including a “the money shot” and a photo of the prototype in which all components of the prototype are labeled.

(4) A video [my guide] communicating the full, cohesive story of the designed artifact your team produced, answering why, for whom, and how it was developed, including an overview of the methods
used to design and evaluate it. The animated GIF assigned early in the term is part of this video deliverable.

Grading is on a 40-point scale that follows the course's grading rubric. You are encouraged to learn from prior Works in Progress papers linked to this course web page (see above) and those found (in the thousands) in the ACM DL.

### 7. Policies

- Switch off your mobile phone.
- Arrive on time, engage, and participate.
- Ask if there is something you don’t understand.
- Offer an insightful remark (when you find a natural break in our class activity).
- Check your email address and the online course page for timely information about this course.
- Don’t plagiarize; cite the work of others ([https://plagiarism.arts.cornell.edu/tutorial/index.cfm](https://plagiarism.arts.cornell.edu/tutorial/index.cfm)).

**Attendance, timely arrival to class, and participation are mandatory and count for 10% of the grade.**

Attendance at the start of class will be taken for some class sessions without advanced notice. For each absence or late arrival, **email the professor and TA with an explanation, attaching supporting documentation** (e.g. doctor’s note); we will consider these as a valid excuse (hardship, medical appointment) without penalty, or not. It is your education, so you should take responsibility for yourself in attending all class sessions on time.

**Late submissions will NOT be accepted,** except with a doctor’s certificate or other proof of personal crisis or hardship. Failure to submit the printed documents and digital files will reduce your mid-term or final assignment grade 10 points.

**Grading for this course is carefully determined** by the professor and TA with thoughtful consideration of student grading of their peers. If you believe the grade for any component of this class including the final grade is incorrect, you may submit a written argument along with the component-in-question for reassessment. The written argument must reference a specific issue with the graded component of the course and must be thoroughly substantiated. The professor and TA will together consider the request, potentially with the assistance of other faculty with expertise in the area. The reassessment will result in any of the following outcomes: no change of grade, a change of grade for the better, or a change of grade for the worse. Be warned: reassessment cases are too frequently cases in which a component (e.g. the paper, poster, or design diary) falls well short of the high expectations for the course such that the grade is changed for the worse! You understand that the grade for work submitted for reassessment may result in a grade lower than originally assigned.

### 8. Consent

To prepare the required paper and video for this course, enrolled students may conduct peer-to-peer participant studies using their peers as participants. Methods may include interviews, observations, surveys, co-design activity, heuristic evaluations, and cognitive walkthroughs. As part of this design research activity, students conducting these studies may take written notes, photographs, and/or video as a means of documentation. This documentation may appear in papers, videos, and conferences for academic audiences. Student will not be identified by name, and no aspect of these studies should cause discomfort or risk to participants. Should any student in the class choose not to participate in any aspect of the study, or have questions about her/his participation, please make this known to the instructor.
Additionally, for any work of the course submitted for publication, student authors will be identified as first authors of the submission, and the instructor and TA will follow in the list of authors of such work in recognition of their efforts in cultivating this work. If these terms are not acceptable to you, please indicate so to the instructor. Non-participation will not impact your grade for this course in any way.

9. University Statement on Academic Integrity and Honesty
Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. Any work submitted by a student in this course for academic credit will be the student's own work, except in the cases of projects that are specifically structured as group endeavors. In compliance with the Cornell University policy and equal access laws, the faculty, teaching assistants, and teaching associates for this course are available to discuss appropriate academic accommodations that may be required for students with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances, so that arrangements can be made. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.

10. DEA Statement on Academic Integrity and Honesty
DEA is dedicated to fostering a respectful and accepting learning community in which individuals from various backgrounds, experiences, and perspectives can embrace and respect diversity. Everyone in this community is empowered to participate in meaningful learning and discussion, regardless of an individual's self-identified gender, sexual orientation, race, ethnicity, religion, or political ideology. We encourage students to share their uniqueness; be open to the views of others; honor and learn from their colleagues; communicate in a respectful manner; and create an inclusive environment.

11. Schedule

08.23 | 01 Course Organization and Definitions
> READ: Ch. 1; 02; Mau, B. “An Incomplete Manifesto”; Winograd, T. From CM to IxD
> IN CLASS: form teams of (ideally) four members

08.28 | 02 Intro to IxD Research / Data Gathering for User Requirements
> READ: Ch. 9; 56; A D. Cyc; B Prob Def.; D Requir.s; G Mind Map; NY Magazine
> IN CLASS: define the problem (incl.needs & requirements); generate a Mind Map

08.30 | 03 Interfaces – Defined, Types, Cases / littleBits / Literature Review
> READ: Ch. 5 to p. 147; 11, 53; C Lit Review; iishi; explore the different littleBits
> IN CLASS: prepare a lit review; iterate you Mind Map; think "littleBits"

09.04 | 04 Ideation and Prototyping (part 1)
> READ: Ch. 8; 14; 47; 66; 99; E Collage; Mood boards, U Ix Prototyping; WoZ
> IN CLASS: ideate with the strategies above and littleBits

09.06 | 05 Ideation and Prototyping (part 2)
> READ: 36; F Analogy & Metaphor; H Morphological Chart (more)
> IN CLASS: ideate with the strategies above and littleBits

09.11 | 06 Ideation and Prototyping (part 3)
> READ: 58; 82; I SCAMPER; J Storyboard (more), (an example)
> IN CLASS: ideate with the strategy above, reflect, and prepare a Storyboard

09.13 | 07 Personas, Scenarios, Task Analysis
> READ: 63; 71; 72; 73; 84; K Scenario (more); L Role Playing
> IN CLASS: reflect, write a scenario, and play the roles

09.18 | 08 Interaction Design in Practice (including IRB and Agile UX)
> READ: U Ix Prototyping; Dow, S. WoZ; review Animated GIFs above
> IN CLASS: analyze, reflect, and iterate your prototype; develop an animated GIF

09.20 | 09 Data Gathering: Overview, Observation, Ethnography, Triangulation
> READ: Ch. 12; 42; 57; 59; 61; 91; N Observations; Pereg, G. Observational "Exp.s"
> IN CLASS: observe, analyze, reflect, and iterate your prototype

09.25 | 10 Data Gathering: Interviews
> READ: Ch. 13 pp. 389-398; 43; 48; O Interviews; Q Focus Groups
> IN CLASS: interview; present your Nine Ideation Strategies, one per slide

09.27 | 11 Data Gathering: Surveys [Nine Ideation Strategies: 10 pts]
> READ: Ch. 13 pp. 389-407; 67; 83; P Surveys; Online survey (example); Review survey examples above.
> IN CLASS: survey, analyze, reflect, and iterate your prototype

10.02 | 12 Data Gathering: Cultural Probes, Diary Studies
> READ: 24; 30; R Cultural Probes; Cultural Probes
> IN CLASS: develop a cultural probe; generate your money shot (ex.s 1, 2, 3 and 4)

10.04 | 13 [Pulling threads together and reflecting] [QUIZ-1: 10 pts]

10.09 | [F A L L  B R E A K]

10.11 | 14 [No lecture: Presentations] [Early Concept: 10 pts]

10.16 | 15 [No lecture: Presentations] [Early Concept: 10 pts]

10.18 | 16 Research through Design
> READ: 70; RtD; Frayling Research; Zimmerman RtD; V Videos; Paper Template
> IN CLASS: review poster/paper/video examples above, assign team members

10.23 | 17 Evaluations: Heuristic Evaluations, including Cognitive Walkthroughs
> READ: Ch. 13 pp. 407-428; 13; 46; 87
> IN CLASS: perform Cognitive Walkthroughs, analyze, reflect, and iterate

10.25 | 18 Workshop to Advance Your Paper, Poster and Video

10.30 | 19 Evaluations: Usability Studies
> READ: Ch. 14 to p. 447; 93; 94; M Heuristic Eval., (Nielsen's Heuristics), SUS
> IN CLASS: perform a Usability Study, analyze, reflect, and iterate
11.01 | 20 Workshop to Advance Your Paper, Poster and Video

11.06 | 21 Evaluations: Delphi Method and Quasi-Experiment Studies
> READ: The Delphi Method
> IN CLASS: perform a Delphi Method study, analyze, reflect, and iterate

11.08 | 22 Workshop to Advance Your Paper, Poster and Video

11.13 | 23 Evaluations: Analytics, Crowd Sourcing, Models
> READ: Ch. 14 p. 448-456; 23; 97; Qualtrics, Survey Monkey and Mechanical Turk
> IN CLASS: perform a web survey with Qualtrics (free via Cornell; more at this link)

11.15 | 24 Workshop to Advance Your Paper, Poster and Video

11.15 | 24 Presenting Design: Public Speaking [PAPER DRAFT]
> VIEW: Steve Jobs; Sheryl Sandberg
> IN CLASS: prepare your 2-minute madness presentation

11.20 | 25 Workshop to Advance Your Paper, Poster and Video [IRB DUE]

11.22 | [THANKSGIVING]

11.27 | 26 Practice presentations in class [QUIZ-2: 10 pts]

11.29 | 27 Presentations: "2-Minute Madness," Poster and Paper Exhibit, Demos
> Submit a single slide created with Google Slides to the class Box folder before class.
> Pin-up your printed poster and each, individual page of your printed paper and design diary.

12.04 | 28 Presentations: Videos

12.12 | [UPLOAD ALL FILES by 11:30am: 40 pts]

By 11:30am on December 12, you will have uploaded digital files of your paper, poster, design diary, and video to our class Box file or Google Drive. This time and date is mandated by the department of DEA and will not be changed.