Cornell University  Design + Environmental Analysis  Spring 2020

DEA 5210: Interaction Design | course site  
Tuesday and Thursday, 1:25-4:25pm, HEB 2L32 “Assembly Room” next to the shop  
• 4 credits; letter grade only.  
• Enrollment is limited to twelve students to make full use of the digital fabrication facility and its staff.  
• Permission of instructor is required (by email). Preference is given to MAE students, and DEA students who have completed two DEA studio courses at 2000 or 3000 level.  
• In previous years, this course had upper-level Bachelors, MS, M.Eng., and PhD students from DEA, MAE, IS, CS, and FSAD. Students from ECE, Architecture, Art, and other departments are welcomed.

Professor Keith Evan Green, DEA & MAE, keg95@cornell.edu, office hours tbd, MVR 2421

I. Course Description  
The built environment made interactive and adaptive by embedded computation has great promise to support and augment us at work, school, and home, as we roam, interconnect, and age. Students will design and prototype artful, meticulous, cyber-physical artifacts and environments responsive to specific challenges of an increasingly digital society.

Please note:  
• This syllabus, prior student projects, and supporting materials are provided on-line at the course site, an elaborated syllabus, at https://arl.human.cornell.edu/DEA4210%20lxD%20studio.htm. Found on this webpage, in the upper-left corner, is “Documents” which links to a webpage of downloadable readings supporting this course. To enter this “Documents” page, you will need to enter the case-sensitive password, ARDUINO, when prompted.  
• This syllabus and the elaborated syllabus online is subject to revision.

II. Course Objectives and Learning Outcomes  
1. to identify under-constrained, “wicked” problems and opportunities of an increasingly digital society  
2. to investigate design opportunities that may prove responsive to these problems and opportunities  
3. to understand how digital technologies and human-centric design methods, combined, can be employed in the design of such physical environments (from furniture to the metropolis in scale)  
4. to demonstrate an ability to realize, in working prototypes, interactive and adaptive physical environments

III. Assessment of Student Performance and Grading Policies  
There are two assignments for this course. One assignment is accomplished individually, and one assignment is developed as a team. The deliverables are the same for both assignments:

• your working prototype (15%)  
• your video and digital photos of your prototype (15%)  
• documentation of your design (15%); your documentation includes all of the headings presented in this example from a previous class: (a) a unique name for your prototype, (b) an abstract, (c) a scenario, (d) the operation of the prototype, (e) a list of components, (f) the process of construction, (g) a discussion (of what worked and didn't work), (h) proposal of future work (as a response to your discussion), (i) a link to your video uploaded to YouTube or Vimeo, and (j) the code.
The final 10% of your course grade is for attendance, participation, and uploading your documentation - your best photos, sketches, and other visual and written products, and the URL to your video - to our shared Box or Google Drive folder. Name files and folders clearly with your name (for assignment 1) and your team name (for assignment 2).

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.

In past deliveries of this course, students elected to submit posters, papers and/or videos of individual or collected projects to ACM conferences like DIS (Designing Interactive Systems), TEI (Tangible, Embedded and Embodied Interaction), IDC (Interaction Design and Children), and CHI (Human-Computer Interaction). For each project, the student designer(s) will be designated first authors and the TA and professor will be designated as, respectively, second-to-last and last author for any conference submission. Here is an example from my lab of the 1-page CHI Video Showcase paper that accompanies a video submission.

A close ally to this course is the Interactive Environments Minor at TU Delft

Assignment 1 | A box inspiring wonder (45% of the course grade; individual effort)

- Using Arduino and the Grove kit, create a box of moving parts, lights, and/or sounds that arouses wonder and serves as a portal to elsewhere. Your box enclosure must be constructed following the dimensional and material specifications required of all boxes for this assignment so that all the boxes for this assignment have the same physical-enclosure.
- (Optional requirement: it communicates with at least one project made by another team).
- See the online course site (link above) for an elaboration of this year’s assignment.

Assignment 2 | A cyber-physical artifact (45% of your course grade; team effort)

Requirements for the prototype:

- It must be full-scale.
- It must be made interactive by way of sensors and actuators to create. combinations of movement, lighting, displays, and sound. You may integrate any manner of input device, actuator, hacked device (e.g. a toy, a camera) and any technological approach (e.g. machine learning, computer vision, AR,...).
- (Optional requirement: it communicates with at least one project made by another team).
- See the online course site (link above) for an elaboration of this year’s assignment.
IV. Organization

A key objective for this studio course is to have everyone in the class design not only their project but every project in the class. How? By benefiting from various inputs:

- Once per week, present a (maximum) 3-minute update on your developing project, noting what you did and why you did it. Use as supporting evidence a single page/slide document that you, ahead of class, prepare and upload to our class Box folder.
- Once per week, select a peer who will be your critique partner for the class session. Confer with your partner at least once in class.
- Benefit from informal exchanges with peers.
- Deliver formal presentations at designated milestones throughout the semester.
- Advance your project through "desk crits" with the professor and TA.
- Work with D2FS staff on fabricating your project.
- Engage in peer-to-peer grading and user studies.
- Review and respond to critique and grades.

V. Academic Integrity and Other Policies

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 grade 10%.

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.

VI. 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.

VII. Materials
See the online course site (link above) for a list of materials required. (No book is required for purchase.)

VIII. Topical Outline and Schedule By Week

Week 01.22 | Course Introduction | Assignment 1 Introduction
Week 01.29 | Ideation, Storyboards, Scenarios | discussion
Week 02.05 | Prototyping with Arduino and Grove
Week 02.12 | Prototype / progress reports; video production
Week 02.19 | Prototype and video iteration > DEMO
Week 02.26 | Prototype and video iteration | Cornell Break Tuesday
Week 03.05 | DEMOS and SCREENINGS | Assignment 2 Introduction
Week 03.12 | Ideation, Storyboards, Scenarios | discussion
Week 03.19 | Prototyping / progress reports
Week 03.26 | Prototyping / progress reports > DEMO
Week 04.02 | Cornell Break
Week 04.09 | Prototyping / progress reports > DEMO
Week 04.16 | Prototype and video iteration / progress reports
Week 04.23 | Prototype and video iteration / progress reports
Week 04.30 | Prototype and video iteration> DEMO
Final Class 05.07 | DEMOS and SCREENINGS

IX. Reading List (these titles available for download on course site (link above)

MY FOUNDATIONAL PUBLICATIONS
• Keith Evan Green. Rethinking the Machines in Which We Live. IEEE RAS.

READINGS
• Steve Dow. Wizard of Oz Interfaces [WOZ].
• Jen Golbeck. Back off, man. I’m a scientist.’Using Fiction to Teach Beginners HCI.
• E. Grönvall, et al. Causing commotion with a shape-changing bench.
• Kristina Höök. Affective Interaction.
• Hiroshi Ishii. Tangible Bits and Radical Atoms: Beyond Tangible Bits.
• Bruce Mau. An Incomplete Manifesto for Growth.
• Terry Winograd. From Computing Machinery to Interaction Design.
X. Consent
To prepare the required paper and video for this course, enrolled students may conduct peer-to-peer participant studies using their peers, enrolled in the same course, as participants. These studies will use methods considered in my course DEA 2370, Human-Centered Design Methods, the new core course for all DEA students. These 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 be reproduced in the papers and videos for submission to CHI or a like conference, and may be presented at the conference. Student will not be identified by name in such submissions/presentations, and no aspect of these studies should cause discomfort or risk to participants; nevertheless, should any student in the class chose not to participate in any aspect of the study, or have questions about her/his participation, please make this known to the instructor prior to the start of such study. Non-participation will not impact your grade for this course in any way.

XI. You are encouraged to join ACM SIGCHI and DRN
Students enrolled in this course are encouraged to join email postings (aka listservs) for ACM SIGCHI ANNOUNCEMENTS and DESIGN RESEARCH NEWS (both of these for design opportunities) and also ACM SIGCHI JOBS (in design). Students are also encouraged to become a student member of SIGCHI which brings you a 1-year subscription to interactions magazine [print] and discounts on ACM conferences. Directions for joining all of these.

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.