DEA 4210: Interaction Design  | course site
Tuesday and Thursday, 1:25-4:25pm, HEB 2L32 “Assembly Room” next to the shop
- 4 credits; letter grade only.
- Prerequisite for DEA students: 2 studios at 2000-level or higher.
- DEA seniors get preference; DEA graduate students with permission.
- Enrollment by permission for those outside DEA.
- Encouraged: students, grad or senior undergrad, from IS, CS, MAE, ECE, FSAD, Art, Architecture.

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I. Course Description (50 words max.)
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, examples of prior student projects, and supporting materials are provided on-line at our course site: https://arl.human.cornell.edu/DEA4210%20xD%20studio.htm. On this webpage, in the upper-left corner, “Documents” 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 (v. 01.11.2018) is subject to revision; revisions will be dated and distributed online.

Close allies with this course: Interactive Environments Minor at TU Delft

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
Students will design and demonstrate two functioning, interactive and (we hope) adaptive environments, and provide associated documentation (as described in the next section). Students will receive a grade in response to the work presented and documented, weighted as follows:
Assignment-1 | A box inspiring wonder (30% 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 will take inspiration from the boxes created by artist Joseph Cornell. Assembled according to a “dream logic,” Cornell’s boxes are “magical”: they “enchant their onlookers and entice them away to another world.” (Pandora’s Box from my DEA 2730 exhibits some of these qualities, as does the haptic box from another course I've taught.)

The following will acquaint you with Joseph Cornell and his boxes:
Mark Stokes - Joseph Cornell: Worlds in a box (video)
Inside 'Joseph Cornell: Wanderlust' (Part 2) (video)
How Joseph Cornell became an artist (video)
Joseph Cornell and travel (video)

Your deliverables are:
- documentation of your design concept(s) and articulation of the aims/motivations for your design (10%); this includes:
  (a) a problem definition;
  (b) a brief lit review (minimum of 4 references) using ACM DL and IEEE Xplore;
  (c) evidence of at least one of the ideation strategies (E-I above);
  (d) either a Storyboard or a written Scenario (J or K above);
- your working prototype—its functionality, aesthetic refinement, response to stated aim (10%)
- your video and one-page paper (10%)

Assignment-2 | "Repairing 'Stellavista' (60% of your course grade; team effort)

In a team of two or more (tbd), read J G Ballard's short story "The Thousand Dreams of Stellavista" (1962) and design, an interactive/adaptive artifact at any scale that repairs something you discovered in Ballard’s fictionalized suburban, architectural-robotic dystopia. Your user/clients are Fay and Howard Talbot, the couple in the story that is considering moving to a home in Stellavista.

The prototype should be interactive by way of sensors and actuators that move physical mass, You are encouraged to add lighting and/or sound. You may also integrate any manner of input device, actuator, hacked device (e.g. a toy, a camera), machine learning, computer vision, augmented reality,..... Your deliverables are:
- documentation of your design concept(s) and articulation of the aims/motivations for your design (20%); this includes:
  (a) a problem definition;
  (b) a lit review (minimum of 10 references) using ACM DL and IEEE Xplore;
  (c) evidence of at least two of the ideation strategies (E-I above);
  (d) either a Storyboard or a written Scenario (J or K above);
  (e) elaboration of two user studies (M-R above)
- your working prototype—its functionality, aesthetic refinement, response to stated aim (20%)
- your video with one-page paper, or video with short (4 page) paper (20%)
• The final 10% of your course grade is for documentation of both assignments on a CD - all documents you produced in the course, including all photos, sketches, and videos.

Format for video: H.264 encoded MP4, at least 1280px x 720px, at most 5 minutes (2-3 minutes is a more common length), captioned for accessibility in .srt or .sbv format (example video from my lab).

Format for one-page paper: Extended Abstracts Format (example one-page paper from my lab).

The above materials will be completed to meet the submission requirements for an ACM conference like DIS (Designing Interactive Systems), TEI (Tangible, Embedded and Embodied Interaction), IDC (Interaction Design and Children), or CHI (Human-Computer Interaction). For each project, the student designer(s) will be designated first authors and the professor and TA will be designated as last authors for any conference submission, as the professor and TA will be integral to the success of the submission.

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.

VII. 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.
VIII. Topical Outline and Schedule By Week

**First Class** 01.25 | Interaction Design: Definitions, Practices; Arduino
01.29 | OSSIGMENT - 1 | Definition of Problem, Literature Review, and Ideation
02.05 | 02 Prototyping with Arduino and Grove
02.12 | 03 Prototyping / progress reports and discussion; video production
02.19 | 04 Refinement | **Cornell Break Tuesday**
02.26 | 05 Video and paper → wk. 12 DEMO/SCREENING
03.05 | 06 OSSIGMENT - 2 | Definition of Problem, Literature Review, and Ideation
03.12 | 07 Ideation, Storyboards, Scenarios
03.19 | 08 Prototyping / progress reports and discussion
03.26 | 09 Prototyping / progress reports and discussion → DEMO of key technical aspect
04.02 | 10 **Cornell Break**
04.09 | 11 Prototyping / progress reports and discussion → wk. 12 DEMO/SCREENING
04.16 | 12 Prototype and video iteration; testing; paper development
04.23 | 13 Prototype and video iteration; testing; paper development
04.30 | 14 Prototype and video iteration; testing; paper development
**Final Class** 05.08 | DEMOS and SCREENINGS, Conclusions, Lessons Learned

IX. Materials
We will be working mostly with the Arduino-compatible Grove shield and suite of electronics modules. Material costs for this studio are expected to be approximately $100 per student. This includes the purchase, by each student, of:

- 1 Seeedstudio "Grove for Arduino - Starter Kit V3" available widely (see retailers below) including Amazon for $39.91 at the time this document was prepared
- 1 Arduino UNO R3 (or the most current basic Arduino board*) available widely (see retailers below) and from Amazon at $23.97 at the time this document was prepared.) *see Make's Guide to Boards, including Arduinos.
- Typical studio project consumables (cardboard, plastic, ...) and possibly other electronic and mechanical hardware, as needed.
- 1 USB 2.0 Cord USB Type A Male to B Male [e.g.]
- 1 9V battery

To learn how to use Grove, review the following:
- Intro to Grove
- My Powerpoint Slides to get Started with Grove and Arduino
- Grove - Starter KIt v3 online guide
- Grove System Wiki with available modules and their code
- More Grove Tutorials
- More help on uploading code to Grove (if you need it)

To learn how to use Arduino, see resources below.

X. Reading List
• Dow, S. Wizard of Oz Interfaces [WOz].
• Grönvall, E., .... "Causing commotion with a shape-changing bench...."
• Ishii, H., ... “Radical Atoms: Beyond Tangible Bits, Toward Transformable Materials.”
• Jolliffe, Daniel. “Arduino Fever.”
• Mau, Bruce. "An Incomplete Manifesto for Growth."
• Negroponte, N. “Intelligent Environments,” Soft Architecture Machines.

XI. 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.

XII. 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.