

COURSE
OUTLINE

AND

A BRIEF INTRODUCTION

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CSE 4274

Human Computer Interaction

3-credit course offered to the 4th year 2nd semester students of CSEDU (2017)

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Connect with the course:

Course signup link: http://piazzza.com/university_of_dhaka/fall2017/cse4274
access code : cse4274

Twitter:

YouTube channel:

Facebook Page: @HCI.CSEDU

Vision and Objective

Systems are to serve humans, or rather the humanity for good. The traditional pedagogy of computing has focused mostly on the intricacies of the computing environment- not much on the people who use those tools. Sometimes it scares the humans as they think the machines may take over; sometimes it tires them, as they feel pressured to use the machines. The art of human centric design opens new facets to develop tools that may help and not scare. Human computer interaction (HCI) came about to bridge the gap between what individuals want and what the machines can provide. This course is a soft introduction to the world of design.

Through lectures and a project, the students will learn the fundamentals of HCI. The focus will be on design thinking, qualitative and quantitative (both statistical and machine learning methods) approach to need finding. Students will learn to work together, brainstorm, make decisions (scientifically!), and deliver a state-of-the-art semester long project for good. The setting for the course is primarily mobile and web applications. However, depending on availability various interactive instruments will also be introduced for the students to explore. At the end of the course the students will present their projects to a jury consisting of faculty, industry, IT and design individuals.

Text Books and References

[Text and the reference materials will be provided by the instructor as and when required]

Alan Dix et al., Human Computer Interaction 3rd Edition

Carolyn Snider, Paper Prototyping

David Benyon, Phil Turner and Susan Turner,

Designing Interactive Systems: People, Activities, Contexts, Technologies

Soren Lauesen, User Interface Design: A Software Engineering Perspective

Ben Shneiderman and Cathrerine Plaisant , Designing the User Interface: Strategies for Effective Human-Computer Interaction 4th Ed.

Steve Love, Understanding Mobile Human-Computer Interaction

Anton Nijholt (Editor), Playful User interfaces

Vannevar Bush, As we may think

Karen Holtzblatt et al. Rapid Contextual Design

Panos Markopoulos et al., Evaluating Children's Interactive Products

David Brooks et al., Web-teaching

Online resources

CMU HCI <https://www.hcii.cmu.edu/>

CMU ML ml.cmu.edu/research/index.html

CMU CASOS <http://www.casos.cs.cmu.edu/>

MIT CSAIL <https://www.csail.mit.edu/videoarchive/researchdemos/hci>

MIT Media lab <https://www.media.mit.edu/>

Stanford HCI hci.stanford.edu/

Google Research research.google.com/pubs/pub43803.html

Microsoft Research <http://research.microsoft.com/en-us/research-areas/human-computer-interaction.aspx>

Khan Academy <https://www.khanacademy.org/>

[Online course] <http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=HC>

Schedule *

| Class | Topic | Primary Materials | Assignments (at the lab) |
|-------|---|---|--|
| 1-3 | Introduction to HCI Why are we here? What do we care? Man, Society and Culture, History of HCI, Paradigms | Vannevar Bush, As we may think Foundations , Alan Dix et Al., Human Computer Interaction 3 rd Edition Design for Life, Holtzblatt | Initial Project plan, group formation, tentative plan of action |
| 4-10 | Design Process Understanding the users Human Cognition Interaction Design Basics | 'Introduction' (Alan Dix et Al., Human Computer Interaction 3 rd Edition) Chapter 1 'Designing Interactive Systems: A Fusion of Skills' Chapter 2 'People, Activities, Contexts and Technologies: A Framework for Designing Interactive Systems' (Benyon et al.) Chapter 5 'Understanding people 1: An introduction to Cognitive Psychology' Chapter 16 'Hearing and Haptics' (Benyon et al.) | <ul style="list-style-type: none"> • Brain storming • Learning prototyping tools and techniques • Learning to Draw! Wizard of Oz prototyping, pen based user interfaces • Students are encouraged to start learning various tools that help to create mobile apps, web interfaces etc. |
| 11-14 | Usability Methods, Interaction Design basics, Design process, Evaluation Techniques, Multimodal Interaction (Design Rules Need finding, Communicating with the users, <i>Prototyping</i> -using pen and paper, video, learning with the users, evaluation <i>Data collection and interpretation (Interview, observation, Interpretation sessions, Mental models) Consolidation and Ideation Detailed Design and Validation)</i> | Karen Holtzblatt et al. Rapid Contextual Design Carolyn Snider, Paper Prototyping Karen Holtzblatt et al. Rapid Contextual Design Colville-Hyde (2016). UX Comics: Visually Communicating User Experiences. https://constructive.co/insights/ux-comics-visually-communicating-user-experiences/ Chapter 1 'Usability' (Lauesen) Chapter 2 Guidelines, Principles, Theories' (Shneiderman and Plaisant) Chapter 3 'Managing Design Processes' (Shneiderman and Plaisant) Chapter 15 'Systems | <ul style="list-style-type: none"> • Exercising with the techniques • Prototyping with videos • Finding the users • Project Plan Submission by the students |

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| | | Development' (Lauesen) Chapter 13 'More on Usability Testing' Chapter 14 'Heuristic Evaluation' (Lauesen) Chapter 10 'Universal Design' (Dix et al.) | |
| 15 | Mid Term1 | | |
| 16-17 | Research Methods –I Qualitative approaches Survey design, Soft introduction to Decision analytic approaches, | Steve Love, Understanding Mobile Human-Computer Interaction | <ul style="list-style-type: none"> • Questionnaire design • Conducting survey • Learning to work with various Interfacing tools |
| | Design Heuristics and Evaluation Learning strategies: designing and running experiments to learn from the users | | Lab evaluation-1 (30% of the total lab points) |
| 18-19 | Research Methods –II Quantitative approaches Thinking Statistically and Introduction to Data analytics, Flaw of Average, Uncertainty | Karen Holtzblatt et al. Rapid Contextual Design Darrell Huff, How to Lie with Statistics | Hands on practice on quantitative and qualitative approaches- introduction to various tools, Excel, Matlab, C#, Java IDE for mobile, Python, Swift (students will learn the tools as and when they require.), How to present Learning to work with various Interfacing tools <i>*depending on student's requirement</i> |
| 20 | Visual Design Representation, Visual layout, Typography, Information design | | Project meetings of various groups, Students should start surveys or other techniques by now Learning to work with various Interfacing tools |
| 22-23 | Designing for the Children, and the Society Playful User interfaces, how to design | Playful User interfaces Anton Nijholt (Editor) Playable Cities Anton Nijholt (Editor) | Conducting Survey / learning to work with various Interfacing tools |

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| | <p>interfaces that invite social and physical interaction, games for change, personalization and teaching, health and sports, designing interactions for children, Perils of children's digital life, Pro-poor user interface, designing for development Playable cities</p> <p><i>*Students will present selected papers assigned</i></p> | | |
| 23-24 | <p>Persuasive Technology</p> <p><i>*Students will present selected papers assigned</i></p> | <p>Theories:</p> <p>* Lockton, Dan, David Harrison, and Neville A. Stanton. "Design for Sustainable Behaviour: investigating design methods for influencing user behaviour." Annual Review of Policy Design 4.1 (2016): 1-10.</p> <p>* Oinas-Kukkonen, Harri. "A foundation for the study of behavior change support systems." Personal and ubiquitous computing 17.6 (2013): 1223-1235.</p> <p>* DESIGN FOR BEHAVIOUR CHANGE: A MODEL-DRIVEN APPROACH FOR TAILORING PERSUASIVE TECHNOLOGIES</p> <p>* Deterding, S., Sicart, M., Nacke, L., O'Hara, K., and Dixon, D., "Gamification. Using game-design elements in non-gaming contexts", 29th Annual CHI Conference on Human Factors in Computing Systems, CHI 2011; Vancouver; Canada, 2011, pp. 2425-2428.</p> | <p>Conducting Survey / learning to work with various Interfacing tools</p> |
| 25 | <p>Persuasive Technology</p> <p><i>*Students will present selected papers assigned</i></p> | <p>1. Foster, D., Lawson, S., Blythe, M., and Cairns, P. "Wattsup: Motivatiiong reductions in domestic energy consumption using social networks", NordicCHI'10, Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries, pp 178-187, 2010.</p> | <p>Project meetings of various groups</p> |

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| | | <p>2. Magana, V. C., and Munoz-Organero, M., "GAFU: Using a Gamification Tool to save Fuel". Intelligent Transportation Systems Magazine, IEEE, Volume:7 , Issue: 2, pp. 58-70, 2015.</p> <p>3. Albaina, I., Wisser, van der Mast, T., Charles, A.P.G, and Vastenburg, M. H., "Flowie: A Persuasive Virtual Coach to Motivate Elderly Individuals to Walk", Proceedings of the 3d International ICST Conference on Pervasive Computing Technologies for Healthcare, 2009.</p> <p>4. Consolvo, S., McDonald, D. W., Toscos, T., Chen, M. Y., Froehlich, J., Harrison, B., Klasnja, P., LaMarea, A., LeGrand, L., Libby, R., Smith, I., and Landay, J. A. "Activity sensing in the wild: A field trial of UbiFit Garden", 26th Annual CHI Conference on Human Factors in Computing Systems, CHI 2008, pp 1797-1806, 2008. [UbiFit]</p> <p>5. Clynes, M. P., and Raftery, S.E.C. "Feedback: An essential element of student learning in clinical practice", Nurse Education in Practice, Vol. 8, Issue 6, Novemeber 2008, pp. 405-411</p> <p>6. Denny, P., "The effect of virtual achievements on student engagement". 31st Annual CHI Conference on Human Factors in Computing Systems: Changing Perspectives, 2013, pp. 763-772.</p> | |
| 26 | Persuasive Technology <i>*Students will present</i> | 7. Petkov, P. Křobler, F., Foth, M., | Project meetings of various groups |

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| | <p><i>selected papers assigned</i></p> | <p>and Krcmarm, H. "Motivating Domestic Energy Conservation through Comparative, Community-Based Feedback in Mobile and Social", Proceedings of the 5th International Conference on Communities and Technologies, pp. 21-30, 2011 [EnergyWiz]</p> <p>8. Ehrhardt-Martinez, K., Donnelly, KA., and Laitner, S., "Advanced metering initiatives and residential feedback programs: a meta-review for household electricity-saving opportunities", Energy 123, Report no. 6: 128.</p> <p>9. Wienhofen, Leendert WM, Carmel Lindkvist, and Matthias Noebels. "User-centered design for smart solar-powered micro-grid communities." Innovations for Community Services (I4CS), 2014 14th International Conference on. IEEE, 2014.</p> <p>10. Brindal, Emily, Gilly A. Hendrie, and Jill Freyne. "Combining Persuasive Technology With Behavioral Theory to Support Weight Maintenance Through a Mobile Phone App: Protocol for the MotiMate App." JMIR research protocols 5.1 (2016).</p> <p>11. Hsu, Anne, et al. "Persuasive technology for overcoming food cravings and improving snack choices." Proceedings of the 32nd annual ACM conference on Human factors in computing systems. ACM, 2014.</p> <p>12. Pinder, Charlie, et al. "Exploring nonconscious behaviour change interventions on mobile devices." Proceedings of the 17th International Conference on Human-Computer Interaction with Mobile Devices and Services Adjunct. ACM, 2015.</p> | |
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| 27 | <p>Persuasive Technology <i>*Students will present selected papers assigned</i></p> | <p>13. Selker, Ted, et al. "SweetBuildingGreeter: A Demonstration of Persuasive Technology for Public Space." International Conference on Universal Access in Human-Computer Interaction. Springer, Cham, 2015.</p> <p>14. Alrobai, Amen, et al. "Exploring the Requirements and Design of Persuasive Intervention Technology to Combat Digital Addiction." International Conference on Human-Centred Software Engineering. Springer International Publishing, 2016.</p> <p>5. Rezai, Leila S., and Catherine M. Burns. "Using Cognitive Work Analysis and a Persuasive Design Approach to Create Effective Blood Pressure Management Systems." Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care. Vol. 3. No. 1. Sage India: New Delhi, India: SAGE Publications, 2014.</p> <p>16. Miranda, Brenda, et al. "Examining the efficacy of a persuasive technology package in reducing texting and driving behavior." International Conference on Persuasive Technology. Springer, Berlin, Heidelberg, 2013.</p> <p>17. Wang, Yunlong, Ulrike Pfeil, and Harald Reiterer. "Supporting Self-Assembly: The IKEA Effect on Mobile Health Persuasive Technology." Proceedings of the 2016 ACM Workshop on Multimedia for Personal Health and Health Care. ACM, 2016.</p> <p>18. Huber, Martina Z., and Lorenz M. Hilty. "Gamification and sustainable consumption: overcoming the limitations of persuasive technologies." ICT</p> | <p>Project meetings of various groups</p> |
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| | | Innovations for Sustainability. Springer, Cham, 2015. 367-385. | |
| 28 | Persuasive Technology <i>*Students will present selected papers assigned</i> | <p>19. Bawazir, Mohammed Abdullah, et al. "Persuasive Technology for Improving Information Security Awareness and Behavior: Literature Review." Information and Communication Technology for The Muslim World (ICT4M), 2016 6th International Conference on. IEEE, 2016.</p> <p>20. Lister C, West JH, Cannon B, Sax T, Brodegard D. Just a Fad? Gamification in Health and Fitness Apps. Eysenbach G, ed. JMIR Serious Games. 2014;2(2):e9. doi:10.2196/games.3413.</p> <p>21. Bardhan, Ronita, et al. "Designing a game based persuasive technology to promote pro-environmental behaviour (PEB)." Humanitarian Technology Conference (R10-HTC), 2015 IEEE Region 10. IEEE, 2015.</p> <p>22. Cowan, Benjamin R., et al. "The stroppy kettle: an intervention to break energy consumption habits." CHI'13 extended abstracts on human factors in computing systems. ACM, 2013.</p> <p>23. Wong, Shuk-Kwan Barbara, Kin Wai Michael Siu, and Peter Chan²and Yanta Lam. "Understanding the influence of user context in persuasive self-management systems for diabetes control: The example of Chinese adults." Design 4 Health 2013 3-5 July 2013, Sheffield, UK Sheffield Hallam University (2014): 292.</p> <p>24. Li, Ian, Anind K. Dey, and Jodi Forlizzi. "Understanding my data, myself: supporting self-reflection with ubicomp technologies." Proceedings of the 13th</p> | Lab evaluation-2 (30% of the total lab points) |

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| | | international conference on Ubiquitous computing. ACM, 2011. | |
| 29 | Persuasive Technology <i>*Students will present selected papers assigned</i> | <p>25. Munson, Sean A., and Sunny Consolvo. "Exploring goal-setting, rewards, self-monitoring, and sharing to motivate physical activity." Pervasive computing technologies for healthcare (PervasiveHealth), 2012 6th international conference on. IEEE, 2012.</p> <p>26. Thieme, Anja, et al. "We've bin watching you: designing for reflection and social persuasion to promote sustainable lifestyles." Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, 2012.</p> <p>27. Nachman, Lama, et al. "Jog falls: a pervasive healthcare platform for diabetes management." Pervasive Computing (2010): 94-111.</p> <p>28. Nahum-Shani, Inbal, Eric B. Hekler, and Donna Spruijt-Metz. "Building health behavior models to guide the development of just-in-time adaptive interventions: A pragmatic framework." Health Psychology 34.S (2015): 1209.</p> <p>29. Fortmann, Jutta, et al. "WaterJewel: design and evaluation of a bracelet to promote a better drinking behaviour." Proceedings of the 13th international conference on mobile and ubiquitous multimedia. ACM, 2014.</p> <p>30. Varoudis, Tasos, et al. "Ambient displays: influencing movement patterns." CHI'11 Extended Abstracts on Human Factors in Computing Systems. ACM, 2011.</p> | Final Project Delivery Hard Deadline |
| 30 | Recap | | Final Project Presentation |

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| | | | (40% of the total lab points) |
| ***Final Exam*** | | | |

* We may change the syllabus depending on the class performance and enthusiasm of the students and the faculty.

Grading

- Final Exam (60%)
- Mid-term Evaluation (25%)
- Reading and Presentation and Assignments (10%)
- Class Participation (5%)

Assignments and Presentations

A number of Reading Assignments and Presentations will be scheduled on the following topics:

- a. Playful user interface
 - b. Assistive Technology
 - c. Persuasive Technology
 - d. Interactive physical computing
 - e. Smart City and Playable cities
 - f. Privacy and security in digital life
- * students can select the topic of they choose and start reading papers that they may find interesting

LAB

Assessment

HCI lab is predominantly project oriented. The students will be work in small groups to find a design centric problem of which they will find a technological solution during the semester.

A typical group may have a size of 3 to 4 students.

2017 Project Theme

HCI for Digital Nudging

Preamble: Most of our discussions related to “technology”, now-a-days, centers around the technical features- processing speed, memory consumption etc. No doubt these are important features. However, technology has a “human component” which mostly stay outside the radar of discussions. Digital revolution has changed the way we live, the way we behave, even the way a country wages war against another. Digital technologies can bring a positive change to people’s lives. However, as we are getting bombarded with a number of alternatives and choices, we in most cases fail to choose the best. While reading news, we miss the relevant details, while buying products we choose the lesser quality products that blinks in the advertisements. Moreover, some of start to love to live a digital live as opposed to the normal live where we breathe normal air. While too little digital usage may keep our productivity low, too much of screen time can render us unproductive as well. Over consumption of technology thus needs to be checked.

Theme:

Finding technology driven solutions to check over consumption of digital products while helping the users reach their goals in life.

You can start to think about it from here:

[Stefaan Verhulst, January 2017] Digital Nudging: Altering User Behavior in Digital Environments
<https://wi2017.blob.core.windows.net/website/download/papers/WI2017-0370.pdf>

[2016 Project Theme: HCI for Public Good
2015 Project Theme: HCI for changing a citizen's life]

The students will be evaluated in 3 phases:

0. Initial Project plan, group formation, tentative plan of action
Submission Project Proposal (10% of the total lab points)
 - 0.1. Project Brainstorm Report (2% of the proposal grade)
 - 0.2. Project Proposal (8% of the proposal grade)
1. After completion of their need finding phase
Deliverables: Initial Report, Initial Presentation
Lab evaluation-1 (20% of the total lab points)
2. After completion of their prototyping phase
Deliverables: Paper Prototype, Digital Prototype or any other tangible prototype, Plan for survey or observational methods, time-line for completion
Public presentation for mid-term evaluation.
Lab evaluation-II (30% of the total lab points)
3. Final judgement of their design and validation
Deliverables: Final Report, Poster session, Final Public Presentation
Final Project Presentation (40% of the total lab points)

Judgements will be made based on their personal acumen and group performance.

The instructors will judge the students by their skills of need finding, prototyping, communication with the users, research methods and skills, usability, product development and management skills, visual design, merit of the projects pertaining to the society, broader impact of the project etc.

Submission Deliverables: At each of the phases of evaluation, the groups will submit written documents and other materials to the instructors via Piazza platform. Students will be showcasing their works at the department staging a day long HCI event after the completion of phases 1 and 2. A public presentation will be made at the final judgement day.

Projects done by the students of 4-2 2016 and 2015 semesters can be found at the CSEDU HCI page in Facebook.

For all the deliverables:

Report:

Make sure your report is appropriately clear and easy to read. Remember :

- *Text should be clear and concise*
- *Use section headings as appropriate*
- *Include images in the body of the write-up with appropriate figure numbers and captions*
- *Refer to the figures in the body of your text*
- *Check for typos, spelling, and grammar errors*

Presentation:

Must look good!

- *Choose appropriate colors, fonts, and styles*
- *Make liberal use of whitespace*

Submission

Ensure your name and roll are at the top of your submission.

No more than one page of text in PDF format.

Images do not count against your page limit, and are therefore effectively free. You should embed images throughout your PDF, keeping them near the text that references them. The limit applies to the approximate amount of text you would have if all images were removed.

Late Submission Penalty (10% of total points of the assignment will be deducted after 1 min of submission deadline. 50% of the total points of the assignment will be deducted after 24 hours of Submission deadline)

Grading

Proposal:

will be graded on a scale of **10 points**:

1. Problem and Motivation: (3 points)
2. Analysis of Problem: (3 points)
3. Novelty and Creativity: (2 points)
4. Report Clarity and Presentation: (2 points)