

Syllabus

CS 5317: Graduate Human-Computer Interaction

Fall 2020

Tuesdays 1:30 - 2:50 in CCSB 1.0704 and Thursdays 1:30 – 2:50 in Blackboard.
(As a fully online alternative, remote students can participate through Blackboard on Tuesdays also.)

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Office Hours: Mondays and Wednesday 1-2 in Blackboard Collaborate, and by appointment

Course Objectives

Acquire the knowledge and skills needed to create highly usable software systems.
Prepare to contribute to the advancement of Human-Computer Interaction theory and practice.

Main Topics Human Perception, Ergonomics, Cognition, and Psychology
Task Analysis
User Interface Design
Interface Programming
System Evaluation

Format Lectures, student presentations, discussions, in-class design exercises, lab time, project activities, project presentations, etc.

Textbook *Designing the User Interface, 6th Edition*. Ben Shneiderman, Catherine Plaisant, *et al.*, Addison Wesley, 2017. We will be skipping back and forth in the book as we follow the topics listed above.

This will be supplemented by readings handed out in class. Some other good books to own are listed at the course website.

Course Website: <http://www.cs.utep.edu/nigel/hci/>

Format Lectures, student presentations, discussions, in-class design exercises, lab time, project activities, project presentations, guest speakers (tentatively Drs. Mueller and Novick).

Face-to-face every Tuesday until Thanksgiving, and otherwise online, but subject to change. Fully online attendance will also be an option, and is required if you feel sick, etc., as detailed below.

Materials Bring the textbook to class, also unlined paper and pens or pencils of different thickness, darknesses or colors for sketches and designs.

Assignments There will be a number of structured assignments, designed to reinforce knowledge and hone skills. Most assignments will be done in teams. Writing quality is important, and

rework may be required if not up to standard. Graduate students will have two additional assignments.

Assignments will be generally due at 10:28 in Blackboard or 10:30 if you choose to submit hardcopy. For group assignments, only one submission is needed, making sure that all team member names are listed. Late assignments will receive at most 90% credit, less when the solution has been discussed in class, decreasing by 10% per day late. Feedback on group assignments will generally be visible only to the submitter, so he/she will need to communicate them to the rest of the group.

Cooperation among students and among teams is encouraged, but not to the extent that it interferes with each individual's understanding or with learning-by-doing. Help given to and received from other students and sources should be noted in the assignment write-up.

Grading

assignments (~75 points)
project (~75)
midterms and final exam (~150)
participation and quizzes (~50)
total (~350)

Grading will be on a points-earned basis (points above zero), rather than a points-off basis (points below expectation), and everything will be challenging. Letter grades will be assigned appropriately; in the past, the A/B break has been around 80% and the B/C break around 70%. The gradebook in Blackboard is not reliable; actual grade-to-date information will be provided periodically, and upon request.

Tests

The format of tests remains to be determined, but will most likely be done remotely, using Respondus Lockdown Browser. The final exam may be face-to-face. Tests will most likely be closed-book, except that one page of hand-written notes may be used for the first test, two for the second test, and three for the final. For in-classroom tests, if you leave the room for any reason, your test will be graded on only what you did up until that time. No make-up exams or assignments will be given except under the conditions set forth in the Catalog.

Participation

Class will be synchronous: all are expected to attend in person or in Blackboard Collaborate.

Participation credit will be based on live participation, either in-person or through Blackboard, and on postings on the discussion boards. Visual attention and feedback count towards participation, so during online sessions keep your webcam on as much as possible. Fully online students will have additional postings assigned and in general should post more. Postings that are especially helpful to the class, for example to General Questions pointing out the need for clarification on an assignment or answering other students' questions, are greatly appreciated and may be rewarded.

Communication

If you have general questions, questions about assignments, etc., post them to the appropriate discussion board in Blackboard. I will monitor these and reply rapidly during class times and office hours, and less rapidly at other times, probably responding in batch two or three times a day, Mondays through Fridays. Do not expect responses on weekends; please plan ahead. If you can help a classmate with a question, please do so by responding on the discussion board.

If you have questions or issues that you want to discuss live: Please join virtual office hours in Blackboard. If you need to meet using a different method or at another time, send email.

Personal or private issues can be addressed by email etc.; please do not post them in Blackboard.

UTEP-General Information

Academic Integrity Students will follow the spirit and letter of the UTEP Standards of Student Conduct and Academic Integrity policy <https://www.utep.edu/student-affairs/osccr/student-conduct/academic-integrity.html> . Suspected violations will be reported.

Disabilities If you have or suspect a disability and need accommodation please contact CASS at 747-5148 or at cass@utep.edu or visit Room 106 Union East Building.

Blackboard Course content is delivered via the Internet through the Blackboard learning management system. Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard; other browsers may cause complications. When having technical difficulties, update your browser, clear your cache, or try switching to another browser. The UTEP Helpdesk can help if you have problems.

Equipment For online sessions, besides your computer/laptop you will need a webcam with microphone. You will also need a scanner or camera in order to upload images of hand-drawn designs and solutions.

Copyright Course materials, recordings, and Blackboard postings are private, and should not be reposted to any publicly accessible website etc.

Covid-19 You must STAY AT HOME and REPORT if you (1) have been diagnosed with COVID-19, (2) are experiencing COVID-19 symptoms, or (3) have had recent contact with a person who has received a positive coronavirus test. Reports should be made at screening.utep.edu. If you know of anyone who should report any of these three criteria, you should encourage them to report. If the individual cannot report, you can report on their behalf by sending an email to COVIDaction@utep.edu.

For each day that you attend campus—for any reason—you must complete the questions on the UTEP screening website (screening.utep.edu) prior to arriving on campus. The website will verify if you are permitted to come to campus. Under no circumstances should anyone come to class when feeling ill or exhibiting any of the known COVID-19 symptoms.

Wear face coverings when in common areas of campus or when others are present. You must wear a face covering over your nose and mouth at all times in this class. If you choose not to wear a face covering, you may not enter the classroom. If you remove your face covering, you will be asked to put it on or leave the classroom. Students who refuse to wear a face covering and follow preventive COVID-19 guidelines will be dismissed from the class and will be subject to disciplinary action according to Section 1.2.3 *Health and Safety* and Section 1.2.2.5 *Disruptions* in the UTEP Handbook of Operating Procedures. If unable to wear a face covering (e.g., medical reasons), the best course of action is to take the online option.

- You are encouraged to complete Covid training at <https://covidtraining.questionpro.com/> .
- Contact instructor if temporary accommodations due to COVID-19 are needed (i.e., due to positive COVID-19 test, symptoms, or exposure).
- Maintain 6 feet of separation at all times, including when talking with other students.
- Follow signage indicating specific entry and exit doors and pathways.
- Do not cluster in groups and keep hallways open.
- Wash hands and/or apply hand sanitizer prior to entering classroom and after leaving a classroom. Do not touch face until after hands are washed/sanitized.
- Use an alcohol wipe, provided outside of classrooms, to sanitize the desk, chair, or table.
- Follow faculty protocols for leaving and re-entering the classroom.

Important Dates

August 25: Class begins
September 24: Test 1 (tentative)
October 27: Test 2 (tentative)
November 26: Thanksgiving (no class)
December 10: Final Exam, 1:00 - 3:45

Schedule

- A. Course Overview** (Chapter 1) (1 day)
1. Why Design for Usability?
 2. Historical Perspective: machinery, computers, PCs and GUIs, the Web
 3. Possible Futures
- Assignment A: Analyze a Usability Problem (1hr)*
- B. Observing Users** (Sections 5.3 ~ 5.7) (2 days)
1. Time and Motion Studies
 2. GOMS Keystroke-Level Modeling
 3. Working with Users: Mindset and Methods
 4. Subject-Running Techniques
 5. Usability Studies
- Assignment D: A Time-and-Motion study of GUI Use (2hr)*
Assignment E: Observe Users with a GUI; Presentation (4hr)
- C. Usability Analysis** (Chapter 3, Section 5.2) (2 days)
1. Error Handling, Error Prevention (3.4.2)
 2. Cognitive Walkthroughs (3.3.4, 5.2)
 3. Heuristic Evaluation
 4. Usability Guidelines
 5. Choosing Among Usability Methods
- Exercise F: Evaluate the GUI Again (2hr)*
- D. Task Analysis, User-Centered Design** (Sections 4.4 - 4.8, 5.1, 5.6, Chapter 6) (3 days)
1. Systems Analysis
 2. Techniques: Task Decomposition, CARD, Ethnographic Observation
 3. Allocation of Functions; (3.3.6)
 4. Usability Engineering in the Business Context
- Exercise J: Sketch People-Icons (.5 hr)*
Exercise K: Task Decomposition (1.5 hr)
Exercise I: Ethnographic Observation (1 hr)
Inclass Exercise: Allocation of Functions (1 hr)
- Test 1
- E. Interaction Styles, Higher Cognition** (Chapters 3, 7, 9) (2 days)
1. Metaphor (in-class exercise)
 2. Direct Manipulation
 3. Widget Survey
 4. Other Interaction Styles
 5. Choosing Among Interaction Styles

Exercise Q: The Unix Command Line (1.5 hr)

F. Specifying and Prototyping (Sections 4.1-4.3) (2 days)

1. Low-Fidelity Prototyping
2. Transition Diagrams
3. Visual Basic Prototyping

Exercise H: Propose a Better GUI; Presentation (2hr)

Inclass Exercise ZZ: Widget Behavior Specification

G. Human Perception, Information Presentation, Layout (Chapters 8, 12, 16) (3 days)

1. Perception, gestalt perception, typography
2. Color
3. Graphic design
4. Displays, Paper, and other Output Devices (10.4, 8.3)
5. Forms Design
6. Information Visualization

Exercise B3: Information Visualization (2 hr)

Test 2

H. Interface Implementation (c.f. Chapters 2, 13) (3 days)

1. Events and Handlers
2. The Model-View-Controller Design Pattern
3. Responsiveness Issues, Time-scales and the Illusion of Multi-Tasking

Exercise L2: GUI Implementation: Visual Basic (2 hrs)

Exercise Theta: Events and Handlers (4 hrs)

I. The Human Body and Device Design (Chapter 10) (3 days)

1. Input Devices and Ergonomics (2.2)
2. Virtual Reality (7.5-7.6)

J. Topics (Chapters 11, 14; Afterword) (3 days)

Web, Mobile, Speech and Multimodal, Groupware, Games, etc.

Research Paper Presentations

K. Review (2.4.1) (1 day)

Exercise Y: A Question for the Final Exam (1 hr)

Project Presentations

(The above time estimates for the exercises are for an efficient person, working with a well-organized team)

Target Learning Outcomes

Level 3 (Outcomes in which the student can apply the material in new situations. This is the highest level of mastery.)

Upon successful completion of this course, students will be able to ...

Evaluation

- 3a1. Evaluate user interfaces and detect usability problems by doing usability studies (observations) with human subjects
- 3a2. Visualize/simulate how a user would understand and attempt to use an interface using an analytical method such as the cognitive walkthrough
- 3a3. Find likely usability issues quickly using heuristic evaluation
- 3a4. Communicate usability findings and concerns both in writing and orally

Analysis

- 3b1. Break down a complex activity sequence into its component actions using hierarchical task decomposition
- 3b2. Assign functions appropriately to the human and to the machine
- 3b3. Break down a graphical user interface (GUI) activity sequence into the component actions, identify these actions, and use the GOMS keystroke-level model to estimate the time required

Interface Design

- 3c1. Choose an appropriate interaction style for a given need (GUI, command-line, natural language, etc.)
- 3c2. Choose appropriate widgets for a GUI
- 3c3. Come up with a suitable layout of widgets and display elements for a GUI window
- 3c4. Convey a proposed design with a low-fidelity prototype
- 3c5. Develop high-fidelity prototypes using at least one development tool

Implementation

- 3d1. Be able to implement simple widget-based GUIs both for desktop applications and for the Web
- 3d2. Be able to write handlers for user input events in at least one language
- 3d3. Be able to use simple 2D graphics in at least one language

Level 2 (Outcomes in which the student can apply the material in familiar situations, e.g., can work a problem of familiar structure with minor changes in the details.) Upon successful completion of this course, students will be able to ...

- 2a. Decompose a complex interactive system into simpler components, using appropriate design patterns including client-server and model-view-controller
- 2b. Convey a software design with diagrams and words
- 2c. Select and combine appropriate colors, fonts, and layouts for a specific information-presentation need
- 2d. Develop a suitable organization and navigation scheme for a moderate-sized Website
- 2e. Select an appropriate hardware input device, for a given task and user population, from among various text entry, pointing and drawing devices
- 2f. Select an appropriate hardware output device for a given task and user population
- 2g. Perform a comprehensive task analysis, including ethnographic observation and use case development, for a single-user task of moderate complexity

Level 1 (Outcomes in which the student has been exposed to the terms and concepts at a basic level and can supply basic definitions. The material has been presented only at a superficial level.) Upon successful completion of this course, students will be able to ...

- 1a. Explain how interface design is ultimately dependent on human perception and cognition
- 1b. Explain the role of well-designed, usable interfaces in market success, reliability, and accessibility
- 1c. Explain the roles of HCI professionals and practitioners of related disciplines in the workplace
- 1d. Explain the role of systems software, distributed systems design, and GUI program efficiency in achieving acceptable system response times
- 1e. Explain how much trust can be placed in the various types of knowledge that HCI practitioners commonly deal with, for example facts established by controlled experiments, theoretical models such as Fitts' Law, guidelines, analysis methods, heuristics, and hunches
- 1f. Specify the desired behavior of an interface or interface component with a state-transition diagram