

Marlboro College Graduate Center
MSIT618.F07: Human Computer Interaction and Business System Design
CIS360.F07: Human Computer Interaction

1. Title

Human Computer Interaction and Business System Design (3 credits)

2. Description

This course provides a graduate-level introduction to human computer interaction (HCI) and its role in user-centered design and usability engineering of technology products and services. Through readings, discussions, and activities, students are exposed to topics and ideas that pose a challenge to developing business systems and products in the context of project constraints such as limited time, money, and personnel. While the focus of the course is on business systems that incorporate electronic collaboration, e-commerce, and other web-enabled technologies, the principles and topics are applicable to almost any product, service, or system that must be designed. Course projects and activities are intended to provide experience and understanding of how to carry out techniques such as product design, prototyping, usability analysis, and formal evaluation, as well as promote awareness of constraints, trade-offs, and sacrifices that must be made during the design lifecycle of a product or service.

3. Intended Audience and Rationale

The audience for this course includes graduate students and upper-level undergraduates with some experience and awareness of factors that contribute to product design, including but not limited to Marketing, Project Management, Business Analysis, Systems Engineering, Cognitive Psychology, and Graphic Design. While none of this background is *required*, the specialized nature of this course precludes coverage of these specific areas in depth, so some background will likely prove beneficial. The rationale for this course is to provide students a solid grounding in Human-Computer Interaction as a practical field based on theoretical psychology, design, business, and development constructs. The course fits within the curriculum of Marlboro Graduate Center programs, and is consistent with the integration of “practical hands-on skills and operational training with the interdisciplinary and conceptual understanding necessary to cope with an ever-changing landscape of tools and technologies, positioning graduates as strategic managers within the new economy. Graduates are immediately marketable through a combination of leading edge technologies, real world practice, collaborative team-based training, and interaction with excellent faculty and learning resources.”

4. Goals

Students in this course will gain an understanding of the following concepts and methods:

- Philosophy of interaction design and how it is related to psychology, marketing, and development
- Components of user centered design and usability engineering, including:
 - understanding user needs and design constraints
 - making educated design choices based on requirements, user abilities, and performance goals
 - measuring performance, usability, and acceptance
- Aspects of human performance that should be considered when designing products
- Processes and techniques used to assess, measure, and review HCI and user experience factors
- Methods for developing prototypes, assessing usability, and eliciting/analyzing feedback from stakeholders
- Designing systems to support single user performance and multiple user collaboration

5. Learning Objectives and Activities

To satisfy the goals of this course, students will complete a cycle of activities to research, design, test, and redesign an interface. These activities serve the following objectives:

- Learning about conducting field research on potential users of a product
- Capturing and prioritizing product requirements based on user needs
- Specifying performance criteria for product usability and acceptance
- Identifying and analyzing tasks
- Developing and revising product mockups and prototypes for evaluation
- Delivering a design proposal to seek funding from a (fictitious) business client

6. Topical Outline

- Product development lifecycle and user-centered design process
- Foundations of human psychology and performance relevant to product design

- Evaluating user needs, analyzing user tasks, and establishing performance goals
- Interaction design models, interface design principles that support performance
- Usability planning and evaluation
- Representing and specifying interactions to support the development process
- Specialized topics such as ubiquitous computing, collaboration, and multimedia

7. Instructional Procedures

This course will be delivered through independent reading assignments, classroom presentations and discussions, individual and group activities, facilitated online discussions, and asynchronous internet communications. There are 14 weeks of readings and assignments that build upon previous work. Students are expected to actively participate in discussions, complete assigned activities, present their projects and activities, and share their design experiences.

8. Evaluation Procedures

Note: Students in the Master's program must earn a "B-" or higher to pass the course.

Course activities include timely completion of readings, participation in discussions, and submission of assigned activities. While the materials covered in the in-class portion of this course will be posted to the online environment, and the audio content captured on podcast, it is important to be present for in-class meetings. Grades will typically be assigned as follows: "A-" to "A+" 90-100 points, "B-" to "B+" 80-89 points, "C-" to "C+" 70-79 points, "D-" to "D+" 60-69 points, "F" below 60 points.

Grading Distribution

Note: Attendance is mandatory for MSIT618, and recommended for CIS360; grades are reduced for late assignments and late online participation; there is no "make-up" available for missed attendance or missed final presentation

In-class attendance and participation: 25%

Online participation: 25%

Individual assignments: 30%

Full proposal and final presentation: 20%

9. Format and Schedule

Note: Readings and assignments may change depending on progress and class interest. Each new week starts on a Friday, and readings and assignments are expected to be completed before the beginning of the next week (i.e. the next Friday).

Timeline (Starts on Friday)	Topic(s)	Readings for this week	Assignments (requirements listed in section 12)
Week 1 (5:30-8:30 at GC)	<i>Overview:</i> Introduction to human computer interaction (HCI), interaction design, and stakeholders	<ul style="list-style-type: none"> • Preece, Chapter 1, What is interaction design? (<i>design process and goals</i>), 1-29 • Preece, Chapter 9, The process of interaction design (<i>user-centered design</i>), 412-444 • Travis, Chapter 3, Identify the stakeholders, 15-20 • Travis, Chapter 5, Segment the market, 28-34 	(Identify a class project – discuss in the online environment)
Week 2	<i>Understanding users:</i> User needs and requirements	<ul style="list-style-type: none"> • Preece, Chapter 2, Understanding and conceptualizing interaction, 45-91 • Preece, Chapter 10, Identifying needs and establishing requirements (<i>needs and requirements</i>), 473-504 	Business proposal overview
Week 3 (5:30-8:30 at GC)	<i>Understanding users:</i> Cognitive characteristics, data collection	<ul style="list-style-type: none"> • Preece, Chapter 3, Understanding users, 93-133 • Preece, Chapter 7, Data gathering (<i>key issues, interviews, questionnaires</i>), 291-321 • Travis, Chapter 6, Build customer profiles, 37-54 	Customer segments and stakeholders

Timeline (Starts on Friday)	Topic(s)	Readings for this week	Assignments (requirements listed in section 12)
Week 4	<i>Understanding users:</i> Supporting user collaboration, data collection	<ul style="list-style-type: none"> • Preece, Chapter 4, Designing for collaboration and communication, 135-179 • Preece, Chapter 7, Data gathering (<i>direct and indirect observation</i>), 321-352 • Travis, Chapter 7, Build environment profiles, 55-60 	User and environment profiles
Week 5 (5:30-8:30 at GC)	<i>Developing solutions:</i> Agents and emotions, user needs and tasks	<ul style="list-style-type: none"> • Preece, Chapter 5, Affective aspects, 181-215 • Preece, Chapter 10, Identifying needs and establishing requirements (<i>task description and analysis</i>), 504-526 • Travis, Chapter 8, Build task profiles, 61-70 • Travis, Chapter 9, Agree key performance indicators, 73-85 	Task analysis and Key Performance Indicators (KPI)
Week 6	<i>Developing solutions:</i> Interfaces and iterative development	<ul style="list-style-type: none"> • Preece, Chapter 1, What is interaction design? (<i>design principles</i>), 29-42 • Preece, Chapter 6, Interfaces and interactions, 217-289 	Initial design rationale
Week 7 (5:30-8:30 at GC)	<i>Implementing the solution:</i> Refining the design and preparing for evaluation	<ul style="list-style-type: none"> • Preece, Chapter 11, Design, prototyping and construction, 529-583 • Travis, Chapter 10, Develop the information architecture, 86-97 • Travis, Chapter 11, Lay out the screens, 98-117 	Sample prototype and interaction approach
Week 8	<i>Evaluating the solution:</i> Evaluation processes and data analysis	<ul style="list-style-type: none"> • Preece, Chapter 9, The process of interaction design (<i>lifecycle models</i>), 444-470 • Preece, Chapter 12, Introducing evaluation (background and approaches), 585-595 	Initial usability plan
Week 9 (5:30-8:30 at GC)	<i>Evaluating the solution:</i> Usability testing, quantitative analysis	<ul style="list-style-type: none"> • Preece, Chapter 14, Usability testing and field studies (<i>usability testing</i>), 645-666 • Travis, Chapter 12, Evaluate usability, 118-152 	Usability test plan
Week 10	<i>Evaluation:</i> Informal testing methods and “discount” approaches	<ul style="list-style-type: none"> • Preece, Chapter 8, Data analysis, interpretation, and presentation, 355-411 • Preece, Chapter 14, Usability testing and field studies (<i>field studies</i>), 667-683 • [Reference] ANSI NCITS 354-2001: “Common Industry Format for Usability Test Reports” 	Usability test report
Week 11 (5:30-8:30 at GC)	<i>Reporting:</i> Communicating the results of usability evaluations	<ul style="list-style-type: none"> • Preece, Chapter 15, Analytical evaluation, 685-722 	Modified prototype

Timeline (Starts on Friday)	Topic(s)	Readings for this week	Assignments (requirements listed in section 12)
Week 12	<i>Sustaining:</i> Establishing processes for continuous improvement	<ul style="list-style-type: none"> Travis, Chapter 13, Track real-world usage and continuously improve the site 	Second usability test report
Week 13	<i>Open issues</i>	None – prepare presentation for next class meeting	Support and training rationale
Week 14 (5:30-8:30 at GC)	<i>Project presentations</i>	Class presentations (10 minute presentation highlighting your project idea, user profiles, prototype, usability results, next steps)	Full business proposal

10. Prerequisites

There are no prerequisites for this course.

11. Instructional Resources

There are 2 required texts for this course:

Sharp, H., Rogers, Y., and Preece, J. 2007. *Interaction Design: Beyond Human-Computer Interaction (2nd Edition)*. England: John Wiley & Sons, Inc. [ISBN-10: 0470018666; ISBN-13: 978-0470018668]

Travis, David. 2003. *E-Commerce Usability: Tools and Techniques to Perfect the On-Line Experience*. New York: Taylor & Francis. [ISBN-10: 0415258340; ISBN-13: 978-0415258340]

12. Requirements for weekly assignments

Weekly assignments are intended as a means to apply the techniques described in our discussions and the book to real-world problems. There is no specific format for these assignments – they are “reflection papers” that demonstrate you have incorporated the information and are responding to requirements in the context of your project. Assignments should be submitted through email or posted to the online environment. Except for the “Full business proposal,” assignments should be presented as single-spaced documents in Word or Rich Text Format, with a recommended *maximum* length of 1 page. Requirements for each assignment are as follows:

- Business proposal overview:** Describe your project, and explain how interaction design can be used to improve or add value to your project. Identify some usability goals you hope to achieve, and describe your end-users. Talk about design constraints you may face, and what standards and guidelines you will incorporate into your design (e.g. technologies, operating environments, and user skill levels).
- Customer segments and stakeholders:** Identify your stakeholders, and specify who will receive the highest versus lowest priority (Travis, chapter 3). Which market segment (Travis, chapter 5) do your end-users represent, and why? Identify some of the goals (tasks) that users will have when using your product, and describe the context in which the product is used (Travis, chapter 6).
- User and environment profiles:** Describe two users of your product: a “typical” user that you think represents most of your user population, and an “atypical” user who is uncommon but still important to remember (such as a person with a disability). For both users, discuss their demographic information including level of knowledge and training, typical age and experience with technology, occupations, environments in which they will use your product, and resources they have available to help them (Travis, chapters 6-7). Explain how you gathered this information (observation, interview, survey, literature research).
- Task analysis and Key Performance Indicators (KPI):** Identify the most common, frequent tasks that users will try to accomplish with your product, and discuss the most common contexts in which these tasks will take place (Travis, chapters 8-9). Analyze 3 tasks for your product, and present an analysis of a *frequent task* commonly performed by users, an *infrequent task* users won’t perform very often, and a *time-sensitive task* that users will have to perform under some kind of time pressure or stress. For each task, identify at least one KPI that you can use to measure task performance.
- Initial design rationale:** Describe your initial product design, and explain your use of design elements such as metaphors, conventions, dialogs, controls, and icons. Include a sketch of a portion of your product’s interface.
- Sample prototype and interaction:** Present a series of sketches illustrating how a user will accomplish each of the 3 tasks you identified in the “Task Analysis and KPI” assignment above. Explain your approach for supporting end-users with disabilities, identifying any weaknesses and limitations that might exist in your approach.

- **Initial usability plan:** Explain how you will approach the testing process for your prototype. Describe your current constraints (time, resources, equipment), and level of fidelity of your prototype (from “sketch on napkins” to “live, functional application”). Identify some of the benefits and weaknesses associated with your evaluation approach and your prototype. Describe how you will recruit and motivate potential end-users to participate in your usability test.
- **Usability test plan:** Describe your usability testing process and resources, including the amount of time each test will take, the resources required for your test, the script you will use to guide users through your prototype, demographic information that you plan to collect from participants, and the data (performance metrics) you will collect to evaluate usability and your progress toward the KPIs you identified in your “Task Analysis and KPI” assignment (Travis, chapter 12).
- **Usability test report:** Describe the results of your usability test sessions, including the number of users you tested, the tasks you had them perform, the data you collected, and your analysis of the data. Explain what aspects of your prototype worked well and not-so-well, and identify changes that you will make to address problems with your design. (Travis, chapter 12; ANSI NCITS 354-2001 document)
- **Modified prototype:** Present a modified prototype that reflects the changes you made based on your usability testing sessions and the user feedback you’ve received. Describe the specific changes you made to your prototype, and your rationale for changing them the way you did.
- **Support and training rationale:** Explain your approach for supporting and training end-users to prepare them to use your product. Identify how you will support users who need help, and describe the resources you will provide to the user, such as ancillary materials (manuals, instruction sheets, customer service scripts, online help systems, live customer support). Provide a short sample from one of these materials.
- **Second usability test report:** Explain the results from your second usability test, including the same topics that were included in the first usability test report.
- **Full business proposal:** This proposal is your “big deliverable” for this course. It should be presented as a report that contains all of the materials covered in each assignment. The proposal should *not* look like a “reflection paper” – it should look like a formal proposal you would submit to a client in order to secure funding for your product. Be sure to include the following sections in your report:
 1. Product description and value proposition: Discuss your product and why it’s worth an investment to bring it to life. Explain why your product should be more valuable as a result of your HCI and usability work.
 2. Customer segments and stakeholders (*based on assignment*)
 3. User environment profiles (*based on assignment*)
 4. Task analysis and Key Performance Indicators (*based on assignment*)
 5. Initial design rationale (*based on assignment*)
 6. Sample prototype and interaction approach (*based on assignment*)
 7. Initial usability plan (*based on assignment*)
 8. Usability test plan (*based on assignment*)
 9. Usability test report (*based on assignment*)
 10. Modified prototype (*based on assignment*)
 11. Project development timeline: Identify the timeline you would anticipate for your “real” product to be designed, tested, refined, and produced. Communicate this using a timeline (such as a Gantt chart) with your major activities identified on it.
 12. Resource list: Identify the specific resources you will need to design and test your product, including access to equipment, prototypes, and compensation for test participants.
 13. Usability testing rationale: Explain why the user profiles, tasks, and KPIs you’ve selected are meaningful, and why your client should view your usability test results as valid and meaningful. If you feel that you did some “guessing” and need to refine and re-test, use this section to explain your approach.