



Course Design Document:

IS306: Usability Engineering

Version 0.3

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### 1. Version History

Version	Description of Change	Author	Date
V 0.1	Creation of initial document.	Richard C. DAVIS	Jun 15, 2011
V 0.2	Revised for 2011-12 Term 2	Richard C. DAVIS	Oct 14, 2011
V 0.3	Minor updates to overview and assessment	Richard C. DAVIS	Dec 31, 2011

## 2. Overview of the Usability Engineering Course

### 2.1 Synopsis

Information systems are by necessity highly structured and predictable. Human life, on the other hand, is messy and unpredictable. When we try to fit human life into the structures expected by information systems, problems are inevitable. Usability engineering is a collection of tools for tackling these problems. When applied well, these tools can help you to build information systems that are useful, usable, and a pleasure to use.

A human-centered design process is iterative and proceeds through three stages: observation, prototyping, and evaluation. In the observation stage, we ask users what they need and watch what they do. Watching is essential, because users often do not know or cannot express what they need. In the prototyping stage, we collect our design ideas into physical representations that can be seen and touched. These vary from very rough (low-fidelity) prototypes to more polished (high-fidelity) prototypes. In the evaluation stage, we ask how well our design is meeting users' needs. There are many evaluation strategies that vary by accuracy and cost of execution. Because this is an iterative process, we do not seek a perfect solution at every stage. Instead, we start small, focusing on the most important problems, building inexpensive prototypes, and conducting fast evaluations. As the design develops, we use methods that take more effort to apply, but give more robust results.

In this course, you will learn to lead a professional-quality usability engineering process by conducting your own in a small group of four students on a project of your choice. You will work on these projects through weekly assignments that you will present each week in class. At the end of the semester, you will present your projects to a panel of industry judges.

The first hour of each class session will be devoted to "studio" sessions where you will present your work. The last two hours of each class session will be devoted to lectures that introduce tools you will apply in your weekly assignments and general design concepts that will help you to reflect on the nature of good design in a variety of contexts. Your attendance is required at these lectures, and your understanding of this material will also be assessed in an exam at the end of the semester. In addition to these class sessions, there will be optional technology enrichment classes during the first half of the course. These enrichment classes will present user interface technologies that you may use for your project, but you may prefer to learn about these technologies on your own.

### 2.2 Prerequisites

You are required to take (or be exempted from taking) IS Software Foundations (IS 200), Object Oriented Application Development (IS201), Data Management (IS202), Software Engineering (IS203), and Enterprise Integration (IS301).

### 2.3 Objectives

Upon successful completion of this course, you will be able to:

- Interview and observe users and capture their needs in scenarios and design requirements.
- Design high-quality user interfaces for a variety of contexts (i.e., devices, application domains, and social situations).
- Build user interface prototypes of appropriate quality for each stage in a design process (e.g., paper prototypes or high-fidelity prototypes).
- Evaluate the usability of designs with experts (walkthroughs and heuristic evaluation) or users in laboratories or on the web.

## 2.4 Academic Integrity

All acts of academic dishonesty (including, but not limited to, plagiarism, cheating, fabrication, facilitation of acts of academic dishonesty by others, unauthorized possession of exam questions, or tampering with the academic work of other students) are serious offences. All work (whether oral or written) submitted for purposes of assessment must be the student's own work. Penalties for violation of the policy range from zero marks for the component assessment to expulsion, depending on the nature of the offense.

When in doubt, students should consult the instructors of the course. Details on the SMU Code of Academic Integrity may be accessed at <http://www.smuscd.org/resources.html>.

## 2.5 Structure of the course

Topics - presented as necessary to support weekly assignments.

- Discovery
  - Observation
  - Interviews
  - Data collection methods
  - Defining scenarios
- Design
  - Conceptual models
  - Input methods
  - Visual design
  - Multi-scale design
  - Cross-cultural design
  - Information design
  - Direct manipulation
  - Social and collaborative systems
  - Search systems
  - Pen and touch-based interfaces
  - Ambient systems
- Prototyping
  - Brainstorming
  - Storyboarding
  - Paper prototyping
  - Wizard of oz
  - High-fidelity prototypes
  - Prototyping tools
- Evaluation
  - Heuristic evaluation
  - Cognitive walkthroughs
  - Experimental methods
  - Web-based experiments
  - User studies

## 2.6 Readings

There is no required text book for this course, but there are weekly readings that support the lectures. These readings can help you to reflect on the material and prepare you for the quizzes.

## 2.7 Teaching staff

Professor  
Richard C. Davis (course coordinator)

### 3. Output and Assessment Summary

#### 3.1. Weekly Assignments (40%)

- Design Exercise
- Observation
- Prototyping
- Heuristic evaluation
- A skeleton and a plan
- Meat on the bones
- Ready for testing
- User test results
- Fit and finish
- Web test results

#### 3.2. Final Presentation (10%)

- Short presentation and poster session
- Describes your final result and the process you used.
- Judged by industry representatives

#### 3.3. Exams (30%)

- Midterm exam (10%) and final exam (20%)
- Cover topics presented in lectures
- Closed book

#### 3.4. Self Assessments (10%)

- Your own evaluation of your assignment grade
- Given each week at the end of studio sessions
- This will help you learn to guide your own development.

#### 3.5. Class Participation (10%)

- Based on class attendance and participation in lectures, studios, and technology demonstrations.

### 4. Group allocation for assignments

Assignment	How the teams are formed?	Min size of the team	Average size of the team	Max size of the team
Individual Assignments	N/A	1	1	1
Group Assignments	Students choose their own peers for the team	4	4	4

### 5. Classroom Planning

There will be one session of 3 hours classroom in each week. The first hour will be devoted to “studio” sessions where students will present their work. The two remaining hours will be devoted to lectures, short exercises, and general discussions. During the first half of the course, there will also be optional technology enrichment courses. These demonstrations can help you learn how to build high-fidelity user interface prototypes, if you are not confident that you already possess the skills you need to produce such prototypes.

5.1 Course Schedule Summary

Wk	Studio	Lecture	Other
1		Introduction , Discovery	
2	Design Exercise	User-Centered Design , Prototyping	
3	Observation	Facilitating Learning, Input	
4	Prototyping	Heuristic Evaluation, Direct Manipulation	
5	Heuristic evaluation	Representation Matters, Visual Design	
6	A skeleton and a plan	Information Design, Software Tools	
7	Meat on the bones	Graphics, Designing for Diverse Contexts	
8			Break
9	Ready for testing	Evaluating Designs, Conducting a User Study	
10	User Test Results	Web-scale experiments, Collaboration on Web	
11	Fit & finish	Comparing Rates, Guest lecture (TBA)	
12	Results	What We Learned, Presenting Design Work	
13			Poster Prep
14			Poster Session

6. List of Information resources and references

TBD

7. Tooling

Purpose of the Tool	Description	Remarks

8. Learning outcomes, achievement methods and assessment

	IS306 – Usability Engineering		Course-specific core competencies which address the Outcomes	Faculty Methods to Assess Outcomes
1	Integration of business & technology in a sector context			
	1.1 Business IT value linkage skills	Y	<ul style="list-style-type: none"> <li>Study how user needs affect Information Strategy, Technology Strategy, and IT Solutions.</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Assignments</li> <li>Final presentation</li> <li>Quizzes</li> </ul>
	1.2 Cost and benefits analysis skills			
	1.3 Business software solution impact analysis skills	Y	<ul style="list-style-type: none"> <li>Perform user studies to assess the impact of technology on users.</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Assignments</li> <li>Final presentation</li> <li>Quizzes</li> </ul>
2	IT architecture, design and development skills			
	2.1 System requirements specification skills	YY	<ul style="list-style-type: none"> <li>Discover user needs through interviews and observations.</li> <li>Document user needs in</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Assignments</li> <li>Quizzes</li> </ul>

			scenarios and requirements.	
	2.2 Software and IT architecture analysis and design skills	YY	<ul style="list-style-type: none"> <li>Analyze scenarios and user needs to guide design.</li> <li>Use a lightweight process to guide prototype development.</li> <li>Create prototypes in several levels of refinement (conceptual models, paper prototypes, wizard of oz, high fidelity prototypes).</li> <li>Explain design process decisions.</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Assignments</li> <li>Final presentation</li> <li>Quizzes</li> </ul>
	2.3 Implementation skills	Y	<ul style="list-style-type: none"> <li>Implement a partially functional high-fidelity prototype of a user interface.</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Assignments</li> <li>Final presentation</li> </ul>
	2.4 Technology application skills	Y	<ul style="list-style-type: none"> <li>Select technologies that are appropriate for prototyping.</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Assignments</li> <li>Final presentation</li> </ul>
3	Project management skills			
	3.1 Scope management skills	YY	<ul style="list-style-type: none"> <li>Determine scope of prototyping and evaluation activities given requirements and available resources.</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Assignments</li> <li>Final presentation</li> </ul>
	3.2 Risks management skills	Y	<ul style="list-style-type: none"> <li>Manage risks as part of project.</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Assignments</li> <li>Final presentation</li> </ul>
	3.3 Project integration and time management skills	Y	<ul style="list-style-type: none"> <li>Define and execute a lightweight development plan for high-fidelity prototypes.</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Assignments</li> <li>Final presentation</li> </ul>
	3.4 Configuration management skills			
	3.5 Quality management skills			
4	Learning to learn skills			
	4.1 Search skills			
	4.2 Skills for developing a methodology for learning	Y	<ul style="list-style-type: none"> <li>Report your own assessment of your performance on weekly assignments.</li> </ul>	<ul style="list-style-type: none"> <li>Self-assessments</li> </ul>
5	Collaboration (or team) skills:			
	5.1 Skills to improve the effectiveness of group processes and work products	Y	<ul style="list-style-type: none"> <li>Apply leadership, communication, and conflict resolution skills while working on the project.</li> </ul>	<ul style="list-style-type: none"> <li>Weekly Assignments</li> <li>Final presentation</li> <li>Team assessment</li> </ul>
6	Change management skills for enterprise systems			
	6.1 Skills to diagnose business changes			
	6.2 Skills to implement and sustain business changes			
7	Skills for working across countries, cultures and borders			
	7.1 Cross-national awareness skills			
	7.2 Business across countries facilitation skills	Y	<ul style="list-style-type: none"> <li>Study approaches to designing interfaces for multiple cultures.</li> </ul>	<ul style="list-style-type: none"> <li>Quizzes</li> </ul>
8	Communication skills			

	8.1 Presentation skills	YY	<ul style="list-style-type: none"> <li>• Present status in weekly design studio sessions.</li> <li>• Produce a final presentation and poster for project.</li> </ul>	<ul style="list-style-type: none"> <li>• Class participation</li> <li>• Weekly Assignments</li> <li>• Final presentation</li> </ul>
	8.2 Writing skills	Y	<ul style="list-style-type: none"> <li>• Document status of project in weekly assignments.</li> </ul>	<ul style="list-style-type: none"> <li>• Weekly Assignments</li> </ul>

Y This sub-skill is covered partially by the course  
 YY This sub-skill is a main focus for this course