UNIVERSITY OF NEBRASKA AT OMAHA
COURSE SYLLABUS/DESCRIPTION

Department and Course Number	CSCI 4260
Course Title	User Interface Design and Development
Course Coordinator	Brian Dorn
Total Credits	3
Date of Last Revision	March 10, 2014

1.0 Course Description

1.1 Overview of content and purpose of the course (Catalog description)
GUI design is concerned with the application of user-centered design principles to graphical computer interfaces.   Topics covered include user-centered design, establishing usability criteria and measures, usability testing, psychology of the user, rapid prototyping, iterative design, and design tools. This course is an extension and application of its prerequisite, Human-Computer Interaction.

1.2 For whom course is intended
Computer Science or Information Systems Engineering majors

1.3 Prerequisites of the course (Courses).
CSCI 4250 or instructor's permission
CSCI 4830

1.4 Prerequisites of the course (Topics)
1.4.1   Human Computer Interaction
1.4.2   Software Engineering
1.4.3   OOP and C++/Java
1.4.4   Experience with any visual programming language

1.5 Unusual circumstances of the course
None

2.0 Objectives

2.1 Apply principles of interface design covered in CSCI4250 to the design, development, and empirical evaluation of user interfaces.
2.2 Understand the user-centered design project lifecycle and gain hands-on experience working through all stages of UCD in a semester-length team project
2.3 Engage in contextual inquiry to understand target users' work domain and perform a task analysis, identifying the key elements of a task critical in user interface development.
2.4 Understand and apply the engineering, human as information processor and design thinking paradigms to the design and prototyping of novel user interfaces to meet user needs
2.5 Develop a user interface satisfaction questionnaire.
2.6 Conduct a hands-on usability evaluation study to empirically evaluate a user interface.
2.7 Analyze qualitative and quantitative data collected during user interface evaluation sessions, including application of basic inferential statistics

2.8 Based on the results from above, recommend and implement solutions for the redesign of the prototype.

3.0 Content and Organization

Contact hours

3.1 Introduction to the science of GUI design   (1 hours)
        3.1.1 The specific disciplines that comprise HCI
        3.1.2 Information and solutions provided by each discipline

3.2 The development process   (2 hours)
        3.2.1 Alternative system development processes
        3.2.2 Inclusion of HCI discipline in the development process

3.3 Methodology   (6 hours)
        3.3.1 Methods for capturing, analyzing and applying data at the organizational and social level of human behavior
        3.3.2 Problems of validity
        3.3.3 Questionnaire design
        3.3.4 Conducting surveys
        3.3.5 Unobtrusive measures
        3.3.6 Statistical techniques in the application of usability testing.

3.4 The Human Information Processor   (6 hours)
        3.4.1 Description of human architecture and performance of critical subunits (e.g., memory, perception, motor skills, etc.)
        3.4.2 Models of human activity (e.g., GOMS models, Keystroke Level model, etc.)
        3.4.3 Applications of model human information processor to example problems

3.5 Application areas in human-computer interaction: a survey of relevant problems and characteristics   (3 hours)

3.6 Design specification techniques   (6 hours)
        3.6.1 Methods for describing the interface (e.g., design specification, design analysis, etc.)
        3.6.2 Application of task analyses

3.7 Implementation techniques   (6 hours)
        3.7.1 Prototyping tools and trade-offs

3.8 Evaluating the design   (6 hours)
        3.8.1 Conducting and analyzing usability studies

3.9 Case studies of the development and introduction of specific interfaces (3 hours)

3.10 Special Project and Examinations: Sample Project (Running throughout the course with lectures devoted specifically to its support): Design and implement a prototype system. First, using questionnaires, interviews and unobtrusive observation, obtain and evaluate the initial design information. Next, create a paper design, followed by modeling and evaluation of the design with the human information-processing model. Finally, do prototyping and user testing of the design, followed by redesign and improvement based upon the information gained.   (6 hours)

4.0 Teaching Methodology

4.1 Methods to be used.

Teaching methods will include in-class lectures, hands-on lab exercises, case studies, demonstrations, and self-directed study (using materials distributed via the class web site).

4.2 Student role in the course.
Students are expected to attend all lectures and labs, participate in class discussions on GUI design-related issues, and complete assigned homework, projects, and examinations.

4.3 4.3 Contact hours.
Three hours per week.

5.0 Evaluation

5.1 Type of student projects that will be the basis for evaluating student performance, specifying distinction between undergraduate and graduate, if applicable. For Laboratory projects, specify the number of weeks spent on each project).

Design and implement a prototype system. First, using questionnaires, interviews and unobtrusive observation, obtain and evaluate the initial design information. Next, create a paper design, followed by modeling and evaluation of the design with the human information-processing model. Finally, do prototyping and user testing of the design, followed by redesign and improvement based upon the information gained.

5.2 Basis for determining the final grade (Course requirements and grading standards) specifying distinction between undergraduate and graduate, if applicable.

Grades will be based on the quality of the graded products in 5.1 above, examinations, and class participation.

5.3 Grading scale and criteria.
Determined by course instructor (typically, 90-100: A, 81-90: B, etc.)
The following is the possible grading scale and criteria:

Points	Grade
97-100%	A+
93-96%	A
90-92%	A-
87-89%	B+
83-86%	B
80-82%	B-
77-79%	C+
73-76%	C
70-72%	C-
67-69%	D+
63-66%	D
60-62%	D-

6.0**Resource Material**

    6.1Textbooks and/or other required readings used in course.

        6.1.1Hartson, R. and Pyla, P. (2012). The UX Book: Process and guidelines for ensuring a quality user experience. (Morgan Kaufmann)

    6.2Other suggested reading materials, if any.

        6.2.1Apple Computer, Inc. (1997). Macintosh Human Interface Guidelines. Reading, MA: Addison-Wesley Publishing Co. (Available on the Web)

        6.2.2Schneiderman, B. (1992). Designing the User Interface: Strategies for Effective Human-Computer Interaction. Reading, MA: Addison-Wesley Publishing Co. (OR 7.1.2)

        6.2.3Preece, J., Rogers, Y., Sharp, H., Benyon, H., Holland, S., & Carey, T. Human-Computer Interaction. Wokingham, UK: Addison Wesley, 1994.

        6.2.4Baecker, R. M., Grudin, J., Buxton, W. A. S., & Greenburg, S. (1996). Readings in Human-Computer Interaction: Toward the Year 2000. San Mateo CA.: Morgan Kaufmann Publishers.

        6.2.5Mandel, T. (1997). Elements of User Interface Design. John Wiley & Sons, Inc.

        6.2.6Microsoft Corporation. (1995). The Windows Interface Guidelines for Software Design. Redmond, WA: Microsoft Press. (Available on the Web)

        6.2.7Nielsen, J. (1993). Usability Engineering. Boston, MA: Academic Press.

        6.2.8Sharp, H., Rogers, Y., Preece, J. (2007). Interaction Design: Beyond Human-Computer Interaction, 2nd Ed. Wiley. (or more recent text)

        6.2.9Norman, D. (2002). The design of everyday things. Basic Books. (or more recent text)

    6.3Other sources of information.

Recent research articles from HCI venues will be selected to augment textbook materials and provide examples of real-world HCI projects. Students may also be directed to search the World Wide Web for relevant articles or case studies.

    6.4Current bibliography of resource for student's information.

(See 6.2)

7.0(CS Program) Estimate Computer Science Accreditation Board (CSAB) Category Content (class time in hours):

CSAB Category	Core	Advanced
Data structures	3	5
Computer organization and architecture	7	9
Algorithms and software design	7	8
Concepts of programming languages	3	3

8.0 Oral and Written Communications

Every student is required to submit at least __0___ written reports (not including exams, tests, quizzes, or commented programs) to typically _____ pages and to make __0___ oral presentations of typically _____ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

9.0 Social and Ethical Issues

The course covers professional and ethical handling of human-subject data related to conducting studies and evaluations involving human users. Topics include the Belmont Report, Institutional Review Boards, informed consent, and ethical handling/storage of human subjects data. Students will complete human subjects training and certification as specified by the UNMC IRB as part of the course expectations.

10.0 Theoretical content

	Contact hours
10.1 The specific disciplines that comprise HCI	2.0
10.2 The development process	6.0
10.3 Methodology	5.0
10.4 The Human Information Processor	5.0
10.5 Design specification techniques	5.0
10.6 Implementation techniques	5.0
10.7 Evaluating the design	6.0

11.0 Problem analysis

Students will learn to apply principles of interface design to the evaluation of user interfaces, analyze the user interface satisfaction by questionnaire, conduct usability testing to evaluate a GUI interface. They will perform a task analysis, apply appropriate statistical tests to analyze a usability dataset and identify the key elements of a task critical in user interface development.

12.0 Solution design

Students will design and implement a prototype system. First, using questionnaires, interviews and unobtrusive observation, obtain and evaluate the initial design information. Next, create a paper design, followed by modeling and evaluation of the design with the human information-processing model. Finally, do prototyping and user testing of the design, followed by redesign and improvement based upon the information gained.

CHANGE HISTORY

Date	Change	By whom	Comments
11/07/2002	Initial ABET version	Craiger	
06/14/2003	Cleanup	Wileman	
11/20/2008	Course textbooks updated	Siy	
11/20/2008	Insertion of table mapping course	Siy	

	objectives to program outcomes		
4/10/2014	Updated textbooks, learning objectives and discussion of social/ethical issues	Dorn	