1.0 Course Description

1.1 Overview of content and purpose of the course (Catalog description)
   Human-computer interaction is concerned with the joint performance of tasks by humans and
   machines; human capabilities to use machines (including learnability of interfaces);
   algorithms and programming of the interface; engineering concerns that arise in designing
   and building interfaces; the process of specification, design, and implementation of
   interfaces; and design trade-offs.

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

1.3 Prerequisites of the course (Courses)
   CSCI 4830

1.4 Prerequisites of the course (Topics)
   1.4.1 Basic concepts of Software Engineering
   1.4.2 OOP and C++/Java
   1.4.3 Demonstrated fluency in any visual programming language

1.5 Unusual circumstances of the course
   None

2.0 Objectives

2.1 Understand and apply the principles underlying HCI including: visual sensation and
   perception; limits of human memory, cognition, and learning; ergonomics and physical
   abilities; and the human as information processor (HIP) model.

2.2 Apply scientific principles of interface design to the critique and evaluation of user
   interfaces, demonstrating the psychological properties of the user that will interact/affect the
   usability of the interface

2.3 Understand and apply common user interaction techniques, metaphors, and design patterns to
   maximize usability

2.4 Design a user interface based on user requirements (e.g., goal/needs analysis, task and
   functional analysis, etc.).

2.5 Conduct a heuristic evaluation and other rapid inspection techniques on user interfaces.

2.6 Employ feedback from rapid inspection to propose re-designs of user interfaces.
3.0 Content and Organization

3.1 The relationship of user interface design to the science of human-computer interaction (1 hour)

3.2 Interface quality and evaluation (usability) (5 hours)
   3.2.1 Measures of user interface quality
   3.2.2 Methods for observation and evaluation

3.3 Interactive system and interface design examples (4 hours)
   3.3.1 Examples such as word processors, spreadsheets, hypertext systems, programming environments, ATM's, voice answering systems and mail systems

3.4 Dimensions of interface variability (5 hours)
   3.4.1 Languages, communication and interaction
   3.4.2 Dialogue genre; the role of metaphor
   3.4.3 Dialogue techniques (including windows, menus, icons, etc.)
   3.4.4 User support and assistance, documentation, training

3.5 User-centered design and task analysis (9 hours)
   3.5.1 Software engineering design models, user-centered design, participatory design
   3.5.2 Task analysis
   3.5.3 Prototyping and the iterative design cycle; the evolution of designs
   3.5.4 The role of principles and guidelines
   3.5.5 Examples of designs

3.6 User interface implementation (9 hours)
   3.6.1 Prototyping tools and environments
   3.6.2 Input and output devices
   3.6.3 Ergonomic issues
   3.6.4 Basic results from computer graphics
   3.6.5 Interface modalities: color, sound, etc.
   3.6.6 The role of graphic and industrial design
   3.6.7 Toolkits and interface development environments, e.g., window managers

3.7 Evaluation revisited; learning from HCI research; the role of models (6 hours)
   3.7.1 A deeper look at evaluation (usability)
   3.7.2 Learning from HCI research; applying science to interface design
   3.7.3 Human information processing models and their role

3.8 System and interface design project: presentations and discussion (6 hours)
   (spread throughout term)

4.0 Teaching Methodology

4.1 Methods to be used
   Teaching methods will include in-class lectures, hands-on lab exercises, homework involving interaction design, 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 HCI-related issues, complete assigned homework, group project(s), and examinations. Students
will additionally be asked to present their ideas on interaction design from the homework assignments.

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).

Evaluations of user interfaces, task analysis of a simple computerized task, design and development of a prototype user interface (group project), and examinations.

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 one possible grading scale.

<table>
<thead>
<tr>
<th>Points</th>
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<td>60-62%</td>
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6.0 Resource Material

6.1 Textbooks and/or other required readings used in course


6.2 Other suggested reading materials, if any


6.2.10 Soegaard, M & Dam, R.F., editors (2013) The Encyclopedia of Human-Computer Interaction, 2nd ed, open-access educational material available online: http://www.interaction-design.org/books/hci.html

6.3 Other sources of information
Students are directed to search the World Wide Web for relevant articles or case studies.

6.4 Current bibliography of resource for student’s information
(See 6.2)

7.0 Computer Science Accreditation Board (CSAB) Category Content (class time in hours)

<table>
<thead>
<tr>
<th>CSAB Category</th>
<th>Core</th>
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<tbody>
<tr>
<td>Data structures</td>
<td>3</td>
<td>5</td>
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<tr>
<td>Computer organization and architecture</td>
<td>10</td>
<td>4</td>
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<tr>
<td>Algorithms and software design</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Concepts of programming languages</td>
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8.0 Oral and Written Communications

Every student is required to submit at least ___1__ written reports (not including exams, tests, quizzes, or commented programs) to typically ___10__ pages and to make ___1__ oral presentations of typically ___15__ 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

Universal design and universal accessibility of interfaces will be discussed in detail. This includes aspects of designing and developing interfaces to provide equal access for disabled and disadvantaged user populations. The course also introduces students to professional ethics related to the conduct of evaluation research with human subjects including topics such as informed consent, IRB, and proper handling of human subjects data.
10.0 Theoretical content

10.1 The relationship of user interface design to the science of human-computer interaction  
10.2 Interface quality and evaluation (usability)  
10.2.1 Measures of user interface quality  
10.2.2 Methods for observation and evaluation  
10.3 Dimensions of interface variability  
10.3.1 Languages, communication and interaction  
10.3.2 Dialogue genre; the role of metaphor  
10.3.3 Dialogue techniques (including windows, menus, icons, etc.)  
10.3.4 User support and assistance, documentation, training  
10.4 User-centered design and task analysis  
10.4.1 Software engineering design models, user-centered design, participatory design  
10.4.2 Task analysis  
10.4.3 Prototyping and the iterative design cycle; the evolution of designs  
10.4.4 The role of principles and guidelines  
10.5 User interface implementation  

Contact hours

10.1 0.5  
10.2 4.0  
10.3 5.0  
10.4 12.0  
10.5 15.0

11.0 Problem analysis

Students will learn to apply scientific principles of interface design to the evaluation of user interfaces, conduct a heuristic evaluation (usability test) of the student’s user interface, and evaluate a number of interfaces, demonstrating the psychological properties of the user that will interact/affect the usability of the interface.

12.0 Solution design

Students will design a user interface based on user requirements (e.g., goal/needs analysis, task and functional analysis, etc.) and employ feedback from usability tests to the re-design of user interfaces.

CHANGE HISTORY

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<td>Insertion of table mapping course objectives to program outcomes</td>
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<td>Updated Teaching Methodology section to include student presentation requirements.</td>
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