Knight Foundation School of Computing and Information Sciences

Course Title: Introduction to Human-Computer Interaction   **Date:** 12/16/2022

Course Number: CEN 3721

Number of Credits: 3

Subject Area: Computer Systems	Subject Area Coordinator: Antonio Hernandez email: antherna@fiu.edu
Catalog Description: Fundamental concepts of human-computer interaction, cognitive models, user-centered design principles and evaluation, emerging technologies.	
Textbook: About Face 4.0: The Essentials of Interactive Design, Cooper, Reimann, Noessel, Cronin, Wiley (4rd edition, ISBN 9781118766576), Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Guidelines, Johnson, Elsevier (ISBN: 9780128182024)	
References: The Humane Interface Raskin, Addison-Wesley, (ISBN: 0201379376)	
Prerequisites Courses: COP 2210 or COP 2250 or equivalent	

Type: Required (CY, IT)

Prerequisites Topics:

- Basics of perception, cognition, and memory
- Basic program control structures
- Basic concepts of data organization

Course Outcomes:

1. Apply the essentials of computer system design [Apply]
2. Examine human-centered computing concepts and principles [Analyze]
3. Practice principles and practices of interactive system design [Apply]
4. Recognize the human information processing mechanisms [Remember]
5. Employ computer interaction design for single user interaction [Apply]
6. Define embodied, situated and distributed cognition [Remember]
7. Employ techniques of interactive design to ensure high usability [Apply]
8. Analyze the psychological foundations for interactive system design of the future [Analyze]
9. Assess how interactive design affects the security of the computer system [Evaluate]
10. Analyze the security features commonly used in interactive system design to preserve security [Analyze]

Association between Student Outcomes and Course Outcomes

BS in Computing: Student Outcomes	Course Outcomes
1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	1, 4, 6
2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	2, 7
3) Communicate effectively in a variety of professional contexts.	
4) Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.	3, 8
5) Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.	

Program Specific Student Outcomes	
6) Apply computer science theory and software development fundamentals to produce computing-based solutions. [CS]	

6) Apply security principles and practices to maintain operations in the presence of risks and threats. [CY]	5, 9, 10

6) Use systemic approaches to select, develop, apply, integrate, and administer secure computing technologies to accomplish user goals. [IT]	5, 9, 10

Assessment Plan for the Course and how Data in the Course are used to assess Student Outcomes

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School's Assessment Plan:
https://abet.cis.fiu.edu/

Knight Foundation School of Computing and Information Sciences
CEN 3721
Introduction to Human-Computer Interaction

Outline

Topic	Number of Lecture Hours	Outcome
• Essential Interactive Design System 　o Varieties of interactive Systems 　o Framework for design 　o Skills of the interactive systems designer 　o Importance of human-centered computing • People, Activities and Contexts 　o Accessibility, Usability, Acceptability, Engagement 　o Design Principles	7	1,2
• Understanding People 1: Introduction to cognitive psychology and human information processing 　o Seven-stage activity 　o Memory 　o Attention 　o Visual perception 　o Gestalt laws of perception 　o Depth perception 　o Color 　o Mental models 　o Virtual reality	4	2,4
• Supporting Single User Interaction 　o User interfaces 　o Graphical user interfaces 　o Input devices 　o Output devices 　o Multimodal Human-Computer Interfaces	4	2,5
• Understand People 2 : Embodied, Situated and Distributed Cognition 　o Ergonomics 　o Avatars 　o Embodied Conversational Agents 　o Affordance	5	4,8
• Activities and Contexts of Interactive Systems Design 　o Scenarios 　o Requirements	8	7, 9

o Prototyping o Evaluation o Conceptual and Physical Design o Security requirements		

• Psychological Foundations
   o Memory, attention, and making mistakes
   o Hearing and Haptics
   o Affective Computing and Pleasure
   o Intelligent User Modeling
	5	4,6,8

• Techniques for Interactive Systems Design and Evaluation
   o Contextual Design, interview and work modeling
   o Task Analysis
   o Generic techniques and current issues
   o Software characters, intelligent agents and special contexts
   o Design techniques used to support secure computing
	7	7, 8, 10

Course Outcomes Emphasized in Laboratory Projects / Assignments

	Outcome	Number of Weeks
1	Home Information Center Outcomes: 2,3,4,5	2
2	Single User Interaction System Design Outcome: 7, 10	3
3	Innovative System Prototyping Outcomes: 6,8, 9	2

Oral and Written Communication

Some coverage

Social and Ethical Implications of Computing Topics

Some coverage

Knight Foundation School of Computing and Information Sciences
CEN 3721
Introduction to Human-Computer Interaction

Approximate number of class credit hours devoted to fundamental CY/IT topics

Topic	Core Hours	Advanced Hours
Algorithms:		
Software Design:	2.0	1.0
Computer Organization and Architecture:		
Data Structures:		
Concepts of Programming Languages		
Other CS Topics:		

Theoretical Contents

None

Problem Analysis Experiences

1.	Human Information Processing Analysis
2.	Task Analysis

Solution Design Experiences

1.	Single User Interaction Design
2.	Innovative Interaction Prototyping

Knight Foundation School of Computing and Information Sciences
CEN 3721
Introduction to Human-Computer Interaction

The Coverage of Knowledge Units within Information Technology Body of Knowledge[1,2]

Knowledge Unit	Topic	Lecture Hours
HC1	Human factors: cognitive principles, understanding the user, designing for humans	6
HC2	HCI aspects of application domains: type of environments, cognitive models, approaches	6
HC3	Human-centered evaluation: heuristics, usability testing and standards	6
HC4	Developing effective interfaces: understanding interaction styles, matching interface elements to user requirements, GUIs and non-GUI interfaces, prototyping	6
HC5	Accessibility: biometrics, repetitive stress syndrome, guidelines and regulations	2
HC6	Emerging Technologies: alternative input/output devices, mobile computing, wearable computing, virtual reality systems, pervasive computing, sensor-nets	6
HC7	Human-Centered Computing: human-centered design methods, software development lifecycle, user analysis of profiles and personas, social computing, task analysis, scenarios, uses cases	6
Software Security: Implementation	Designing interfaces to support data masking, privacy, and secure access; validation of input	3
Human Security: Personal Data Privacy and Security	Developing effective interfaces: selective data input requirements and data masking to ensure privacy and security	3

---

[1]See https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf for a description of Knowledge units

[2] See https://www.acm.org/binaries/content/assets/education/curricula-recommendations/csec2017.pdf for a description of Knowledge units