Campus and Faculty: St. Augustine Campus, Faculty of Science and Technology
School, Department, or Centre: Department of Computing and Information Technology
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School, Department, or Centre: Department of Computing and Information Technology
Course Code and Title: COMP 3603 Human-Computer Interaction
Semester and Level: Semester 2 Level 3
Pre-requisites: COMP 2606
Co-requisites: None
Anti-requisites: None
Course Type: Core (Special Degree Only)
Credits: 3
Projected Enrolment: 100
Projected Start Date: January 2024
Mode of Delivery: Face-to-Face ❑ Blended ☑ Online ❑

Office Hours: Tuesdays 10:00AM - 12:00PM

Course Description

Human-computer interaction is an interdisciplinary field that integrates theories and methodologies from computer science, cognitive psychology, design, and many other areas. The course introduces the main concepts of analysing, designing, evaluating and functional deploying, effectual user-system interactions within the User Centred Design process. The approach is cognitive, focusing on matching user goals with computer technologies. The goal of the course is to help students to learn basics concepts of the field such as, design rules and guidelines, prototyping and design patterns for interactive systems. The heart of the course is a semester-long group project that will provide students with hands-on skills in creating and testing designs of human-computer systems through low, medium and high fidelity prototypes and not with implementing a piece of software in this class.

Rationale

Human-computer interaction (HCI) has become an area of great interest and concern. HCI is concerned with the joint performance of tasks by humans and machines. It stresses the importance of good interfaces and the relationship of interface design to effective human interaction with computers. Specifically, we concentrate on so-called interactive systems. This course uses an integrative and cross-disciplinary approach to bring together a broad variety of topics together in relation to the problem of developing quality user interaction designs to provide an introduction to the field of HCI. This course is different from a majority of CS courses like software engineering that take a systems perspective. It focuses more on application (and less on theory) of user-centred design principles, guidelines, and evaluation.

Course Aims

This course aims to expose students to the foundations of design interaction, user-centred design and evaluation within the area of Human-Computer Interaction (HCI). The course teaches students how to create, develop and assess concept plans, low-level interface designs, high fidelity prototypes and software artefacts. Students are exposed to core HCI concepts related to collaboration, communication, user experience and interactive technologies.

Course Learning Outcomes

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

1. **Review the foundations and principles of human-computer interaction and discuss current research and technologies for interaction design and user interface design.**
2. **Prepare a project plan that is based on user-centred design principles and then carry out activities to design, evaluate and refine user interaction based on iteration.**
3. **Assess the strengths and limitations of human cognition and memory and apply Information Systems tools to prototype the end-user design.**
4. **Develop questionnaires/surveys/sketches to obtain pre- and post-test information from users, and to design more usable interfaces that do not cognitively overload users.**
5. **Create user data driven designs and prototypes of different levels of fidelity for mobile, web and desktop devices using multimodal interaction such as pen, stylus touch screen, etc.**
6. **Develop design skills, initially using paper for rapid solutions and later using electronic tools, to consolidate individual designs within the groups in order to understand the importance of design decisions and the selection process.**
7. **Employ user centred design processes to be inclusive of all users, including international audiences, those with special needs, as well different levels of user experience; to design interfaces appropriate to a particular group of users. Consideration must also be given to ethical and privacy guidelines.**
8. **Assess paper and electronic based designs for their usability,**
9. **Evaluate the usability and user appreciation designs of a website**
10. **Demonstrate strong interpersonal skills including teamwork during interactions with peers.**

Course Content/Syllabus

The following main topics are covered in this course:

1.Foundations

- **1.1 Contexts for HCI(anything with a user interface, e.g.,webpage, business applications, mobile applications,**
- **1.2 Processes for user-centred development, e.g.,early focus on users, empirical testing, iterative design**
- **1.3 Different measures for evaluation, e.g.,utility, efficiency, learnability, user satisfaction**
- **1.4 Usability heuristics and the principles of usability testing**
- **1.5 Physical capabilities that inform interaction design, e.g.,colour perception, ergonomics**
- **1.6 Cognitive models that inform interaction design, e.g.,attention, perception and recognition, movement, and**
- **1.7 Social models that inform interaction design, e.g.,culture, communication, networks and organisations**
- **1.8 Principles of good design and good designers; engineering tradeoffs**
- **1.9 Accessibility, e.g.,interfaces for differently-abled populations (e.g.,blind, motion-impaired)**
- **1.10 Interfaces for differently-aged population groups (e.g.,children, 80+)**

2.Designing Interaction

- **2.1 Principles of graphical user interfaces (GUIs)**
- **2.2 Elements of visual design (layout, colour, fonts, labelling)**
- **2.3 Task analysis, including qualitative aspects of generating task analytic models**
- **2.4 Low-fidelity (paper) prototyping**
- **2.5 Quantitative evaluation techniques, e.g., keystroke-level evaluation**
- **2.6 Help and documentation**
- **2.7 Handling human/system failure**
- **2.8 User interface standards**

3. User-Centred Design and Testing

- **3.1 Approaches to, and characteristics of, the design process**
- **3.2 Functionality and usability requirements (cross-reference toSE/Requirements Engineering)**
- **3.3 Techniques for gathering requirements, e.g.,interviews, surveys, ethnographic and contextual enquiry**
- **3.4 Techniques and tools for the analysis and presentation of requirements, e.g.,reports, personas**
- **3.5 Prototyping techniques and tools, e.g.,sketching, storyboards, low-fidelity prototyping, wireframes**
- **3.6 Evaluation without users, using both qualitative and quantitative techniques, e.g.,walkthroughs, GOMS,**
- **3.7 Evaluation with users, e.g.,observation, think-aloud, interview, survey, experiment**
- **3.8 Challenges to effective evaluation, e.g.,sampling, generalisation**
- **3.9 Reporting the results of evaluations**
- **3.10 Internationalisation, designing for users from other cultures, cross-cultural**

4.New Interactive Technologies

- **4.1 Internationalisation, designing for users from other cultures, cross-cultural**

5.Collaboration and Communication

- **5.1 Choosing interaction styles and interaction techniques**
- **5.2 Asynchronous group communication, e.g.,e-mail, forums, social networks**
- **5.3 Synchronous group communication, e.g.,chat rooms, conferencing, online games**
- **5.4 Social media, social computing, and social network analysis**

5.5 Online collaboration, 'smart' spaces, and social coordination aspects of workflow technologies

5.6 Online communities

5.7 Software characters and intelligent agents, virtual worlds and avatars(cross-reference IS/Agents)

6.Human Factors and Security

6.1 Social psychology

7.Design-Oriented HCI

7.1 Usability design and security

7.2 Intellectual styles and perspectives to technology and its interfaces

7.3 Consideration of HCI as a design discipline

8.Social Context

8.1 Critically reflective HCI

9.SP/Professional Communication

9.1 Reading, understanding and summarizing technical material, including source code and documentation

9.2 Writing effective technical documentation and materials

9.3 Dynamics of oral, written, and electronic team and group communication

Assignments

Assignment 1 (Groups: 2 persons) - HCI Literature Review : 10%
Assignment 2 (Groups: 3-4 persons) - Needfinding 15%
Assignment 3 (Groups 3-4 persons) - Analysis testing & evaluation: 20%
Coursework Exam - HCI Concepts, Design & Evaluation: 15%
Project (Groups 3-4 persons) - Redesign & Presentation : 40%

Course Calendar

Week	Week Start Date	Topics	Assessment/Activities	Holidays
1.	04/09/2023	**Foundations - Introduction and History of HCI**	**Tutorial 1 1/2**	
2.	14/09/2023	**Interaction Design**	**Tutorial 1 2/2** **A1 Released**	
3.	18/09/2023	**User-Centered Design Principles 1/2**	**Tutorial 3**	
4.	25/09/2023	**User-Centered Design Principles 2/2**	**A1 Due** **A1 Presentations**	
5.	02/10/2023	**User Research Methods**	**Tutorial 4**	
6.	9/10/2023	**Data Analysis, Interpretation & Presentation**	**Tutorial 5** **A2 Released**	
7.	16/10/2023	**Usability Testing and Evaluation**	**Tutorial 6** **A2 Due** **A3 Released**	
8.	23/10/2023	**Prototyping Techniques**	**Tutorial 7**	
9.	30/10/2023	**Graphical HCI design**	**Tutorial 8** **A3 Due**	
10.	06/11/2023	**Mobile and Multimodal Interfaces** **CW Exam**	**Tutorial 9** **Project Released**	
11.	13/11/2023	**Ethical and Social Issues in HCI**	**Tutorial 10**	

12.	20/11/2023	**Review**		
13	27/11/2023	**Project Presentations**	**Project Presentations** **Project Due**	

Readings/Learning Resources *(Online and Print)*

Required/Essential

Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven Jacobs, Niklas Elmqvist, Nicholas Diakopoulos (2017) Designing the User Interface: Strategies for Effective Human-Computer Interaction, 6th edition. ISBN-13: 978-0134380384,,

Helen Sharp, Jennifer Preece, Yvonne Rogers (2019) Interaction Design: Beyond Human-Computer Interaction, 5th Edition. ISBN: 978-1-119-54725-9 ,

Russ Unger, Carolyn Chandler, (2012) A Project Guide to UX Design: For user experience designers in the field or in the making, 2nd Edition, New Riders, ISBN-13:978-0321815385, ISBN 10:0321815386

Susan Weinschenk, 100 Things Every Designer Needs To Know About People. (2011). New Riders is an imprint of Peachpit, a division of Pearson Education.

Recommended

Dix A. et al., (2004) Human-Computer Interaction. Harlow, England: Prentice Hall ,ISBN-10: 0130461091

Online resources

The Encyclopedia of Human Computer Interaction, 2nd Edition (online text available at https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed)