Universidad Nacional de Colombia (UNAL) Sede Manizales
Undergraduate Program in Information Systems
SILABO

CS2H1. Computer Human Interaction (Mandatory)

2022-II

1. General information		
1.1 School	:	Sistemas de Información
1.2 Course	:	CS2H1. Computer Human Interaction
1.3 Semester	:	7^{mo} Semestre.
1.4 Prerrequisites	:	CS393. Information systems. (6^{th} Sem)
1.5 Type of course	:	Mandatory
1.6 Learning modality	:	Face to face
1.7 Horas	:	1 HT; 4 HL;
1.8 Credits	:	3

2. Professors

3. Course foundation

Language has been one of the most significant creations of humanity. From body language and gesture, through verbal and written communication, to iconic symbolic codes and others, it has made possible complex interactions Among humans and facilitated considerably the communication of information. With the invention of automatic and semi-automatic devices, including computers, The need for languages or interfaces to be able to interact with them, has gained great importance. The utility of the software, coupled with user satisfaction and increased productivity, depends on the effectiveness of the User-Computer Interface. So much so, that often the interface is the most important factor in the success and failure of any computer system. The design and implementation of appropriate Human-Computer Interfaces, which in addition to complying with the technical requirements and the transactional logic of the application, consider the subtle psychological implications, sciences and user facilities, It consumes a good part of the life cycle of a software project, and requires specialized skills, both for the construction of the same, and for the performance of usability tests.

4. Summary

1. Foundations 2. Factores Humanos 3. User-centered design and testing 4. Designing Interaction 5. New Interactive Technologies 6. Collaboration and communication

5. Generales Goals

- Know and apply criteria of usability and accessibility to the design and construction of human-computer interfaces, always looking for technology to adapt to people and not people to technology.
- That the student has a vision focused on the user experience by applying appropriate conceptual and technological approaches.
- Understand how emerging technology makes possible new styles of interaction.
- Determine the basic requirements at the interface level, hardware and software for the construction of immersive environments.

6. Contribution to Outcomes

This discipline contributes to the achievement of the following outcomes:

1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions. (**Familiarity**)

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. (**Assessment**)

3) Communicate effectively in a variety of professional contexts. (**Usage**)

4) Recognize professional responsabilities and make informed judgments in computing practice based on legal and ethical principles. (**Familiarity**)

5) Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline. (**Usage**)

7) Develop computational technology for the well-being of all, contributing with human formation, scientific, technological and professional skills to solve social problems of our community. (**Familiarity**)

7. Content

UNIT 1: Foundations (8)

Competences:

Content	**Generales Goals**
• Contexts for HCI (anything with a user interface, e.g., webpage, business applications, mobile applications, and games) • Usability heuristics and the principles of usability testing • Processes for user-centered development, e.g., early focus on users, empirical testing, iterative design • Principles of good design and good designers; engineering tradeoffs • Different measures for evaluation, e.g., utility, efficiency, learnability, user satisfaction	• Discuss why human-centered software development is important [Familiarity] • Define a user-centered design process that explicitly takes account of the fact that the user is not like the developer or their acquaintances [Familiarity] • Summarize the basic precepts of psychological and social interaction [Familiarity] • Develop and use a conceptual vocabulary for analyzing human interaction with software: affordance, conceptual model, feedback, and so forth [Familiarity]

Readings: Dix et al. (2004), Stone et al. (2005), Rogers and Sharp (2011)

UNIT 2: Factores Humanos (8)	
Competences:	
Content	**Generales Goals**
• Cognitive models that inform interaction design, e.g., attention, perception and recognition, movement, and memory; gulfs of expectation and execution • Physical capabilities that inform interaction design, e.g., color perception, ergonomics • Accessibility, e.g., interfaces for differently-abled populations (e.g., blind, motion-impaired) • Interfaces for differently-aged population groups (e.g., children, 80+)	• Create and conduct a simple usability test for an existing software application [Familiarity]
Readings: Dix et al. (2004), Stone et al. (2005), Rogers and Sharp (2011), Mathis (2011), Norman (2004)	

UNIT 3: User-centered design and testing (16)

Competences:

Content	**Generales Goals**
• Approaches to, and characteristics of, the design process • Functionality and usability requirements • Techniques for gathering requirements, e.g., interviews, surveys, ethnographic and contextual enquiry • Techniques and tools for the analysis and presentation of requirements, e.g., reports, personas • Task analysis, including qualitative aspects of generating task analytic models • Consideration of HCI as a design discipline – Sketching – Participatory design – Sketching – Diseño participativo • Prototyping techniques and tools, e.g., sketching, storyboards, low-fidelity prototyping, wireframes • Low-fidelity (paper) prototyping • Quantitative evaluation techniques, e.g., keystroke-level evaluation • Evaluation without users, using both qualitative and quantitative techniques, e.g., walkthroughs, GOMS, expert-based analysis, heuristics, guidelines, and standard • Evaluation with users, e.g., observation, think-aloud, interview, survey, experiment • Challenges to effective evaluation, e.g., sampling, generalization • Reporting the results of evaluations • Internationalization, designing for users from other cultures, cross-cultural	• Conduct a quantitative evaluation and discuss/report the results [Familiarity] • For an identified user group, undertake and document an analysis of their needs [Familiarity] • Discuss at least one national or international user interface design standard [Familiarity] • Explain how user-centred design complements other software process models [Familiarity] • Use lo-fi (low fidelity) prototyping techniques to gather, and report, user responses [Usage] • Choose appropriate methods to support the development of a specific UI [Assessment] • Use a variety of techniques to evaluate a given UI [Assessment] • Compare the constraints and benefits of different evaluative methods [Assessment]

Readings: Dix et al. (2004), Stone et al. (2005), Rogers and Sharp (2011), Mathis (2011), Buxton (2007)

UNIT 4: Designing Interaction (8)	
Competences:	
Content	**Generales Goals**
• Principles of graphical user interfaces (GUIs) • Elements of visual design (layout, color, fonts, labeling) • Handling human/system failure • User interface standards • Presenting information: navigation, representation, manipulation • Interface animation techniques (e.g., scene graphs) • Widget classes and libraries • Internationalization, designing for users from other cultures, cross-cultural • Choosing interaction styles and interaction techniques	• Create a simple application, together with help and documentation, that supports a graphical user interface [Usage]
Readings: Dix et al. (2004), Stone et al. (2005), Rogers and Sharp (2011), Johnson (2010), Mathis (2011), Leavitt and Shneiderman (2006)	

UNIT 5: New Interactive Technologies (8)

Competences:

Content	Generales Goals
• Choosing interaction styles and interaction techniques • Approaches to design, implementation and evaluation of non-mouse interaction – Touch and multi-touch interfaces – Shared, embodied, and large interfaces – New input modalities (such as sensor and location data) – New Windows, e.g., iPhone, Android – Speech recognition and natural language processing – Wearable and tangible interfaces – Persuasive interaction and emotion – Ubiquitous and context-aware interaction technologies (Ubicomp) – Bayesian inference (e.g. predictive text, guided pointing) – Ambient/peripheral display and interaction • Output – Sound – Stereoscopic display – Force feedback simulation, haptic devices • System architectures – Game engines – Mobile augmented reality – Flight simulators – CAVEs – Medical imaging	• Describe when non-mouse interfaces are appropriate [Familiarity] • Understand the interaction possibilities beyond mouse-and-pointer interfaces [Familiarity] • Discuss the advantages (and disadvantages) of non-mouse interfaces [Usage] • Describe the optical model realized by a computer graphics system to synthesize stereoscopic view [Familiarity] • Describe the principles of different viewer tracking technologies [Familiarity] • Determine the basic requirements on interface, hardware, and software configurations of a VR system for a specified application [Assessment]

Readings: Dix et al. (2004), Stone et al. (2005), Rogers and Sharp (2011), Wigdor and Wixon (2011), Mathis (2011)

UNIT 6: Collaboration and communication (8)	
Competences:	
Content	**Generales Goals**
• Asynchronous group communication, e.g., e-mail, forums, social networks • Social media, social computing, and social network analysis • Online collaboration, 'smart' spaces, and social coordination aspects of workflow technologies • Online communities • Software characters and intelligent agents, virtual worlds and avatars • Social psychology	• Describe the difference between synchronous and asynchronous communication [Familiarity] • Compare the HCI issues in individual interaction with group interaction [Familiarity] • Discuss several issues of social concern raised by collaborative software [Usage] • Discuss the HCI issues in software that embodies human intention [Assessment]
Readings: Dix et al. (2004), Stone et al. (2005), Rogers and Sharp (2011)	

8. Methodology

El profesor del curso presentará clases teóricas de los temas señalados en el programa propiciando la intervención de los alumnos.

El profesor del curso presentará demostraciones para fundamentar clases teóricas.

El profesor y los alumnos realizarán prácticas

Los alumnos deberán asistir a clase habiendo leído lo que el profesor va a presentar. De esta manera se facilitará la comprensión y los estudiantes estarán en mejores condiciones de hacer consultas en clase.

9. Assessment

Continuous Assessment 1 : 20 %

Partial Exam : 30 %

Continuous Assessment 2 : 20 %

Final exam : 30 %

References

Buxton, Bill (2007). *Sketching User Experiences: Getting the Design Right and the Right Design*. Morgan Kaufmann Publishers Inc.

Dix, Alan et al. (2004). *Human-computer Interaction*. 3 ed. Prentice-Hall, Inc.

Johnson, Jeff (2010). *Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules*. 3 ed. Morgan Kaufmann Publishers Inc.

Leavitt, M. and B. Shneiderman (2006). *Research-Based Web Design & Usability Guidelines*. Health and Human Services Dept.

Mathis, Lukas (2011). *Designed for Use: Create Usable Interfaces for Applications and the Web*. Pragmatic Bookshelf.

Norman, Donald A. (2004). *Emotional Design: Why We Love (or Hate) Everyday Things*. Basic Book.

Rogers, Y. and J Sharp H. & Preece (2011). *Interaction Design: Beyond Human-Computer Interaction*. 3 ed. John Wiley and Sons Ltd.

Stone, D. et al. (2005). *User Interface Design and Evaluation*. Morgan Kaufmann Series in Interactive Technologies.

Wigdor, D. and D. Wixon (2011). *Brave NUI World: Designing Natural User Interfaces for Touch and Gesture*. Morgan Kaufmann Publishers Inc.