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| Design of interactive systems |
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**Academic Year: ( 2023 / 2024 )**                                          **Review date: 30-06-2021**

**Department assigned to the subject: Computer Science and Engineering Department**

**Coordinating teacher: MARQUEZ SEGURA, ELENA**

**Type: Compulsory  ECTS Credits : 6.0**

**Year : 5 Semester :**

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

User Interfaces (Year 3 / Term: 1)

## OBJECTIVES

LEARNING OUTCOMES
R1. Knowledge and understanding: Have basic knowledge and understanding of scientific and technological foundations in Computer Science and Engineering, as well as specific knowledge from Computer Science, Computer Engineering, and Information Systems.
R2. Analysis in Engineering: Be able to identify problems in Computer Science and Engineering, to recognise specifications, to establish different solution methods and select the most appropriate one, bearing in mind applicable social, health, environmental, and commercial limitations.
R4. Research and Innovation: Be able to use appropriate methods to conduct research and make innovative contributions in the domain of Computer Science and Engineering.
R5. Applications in Engineering: Graduate students will be able to apply their knowledge and understanding to solve problems, lead research and create designs or processes in the domain of Computer Science and Engineering according to criteria of cost, quality, security, efficiency, respect towards the environment, and ethical implications. These abilities include knowledge, use, and limitations of computer systems, process engineering, computer architecture, computing models, equipment, practical work, technical bibliography, and information sources.

COMPETENCES:
CECC1. Ability to have deep knowledge on fundamental principles and computational models, and to apply them to interpret, select, assess, model, and create new concepts, theories, uses, and technological solutions related to Computer Science and Engineering.

CECC3. Capacity to design and assess interactive systems and present complex information, as well as apply them to solve human-computer interaction design problems.

Basic and general:
CG2. To be able to generate new ideas (creativity) and anticipate new situations, as well as to get used to working within a team and engaging with others, while at the same time being able to work autonomously.

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to designing and studying interactive systems
1.1. Multidisciplinary influence in Interaction Design (IxD) and Human-Computer Interaction (HCI)
1.2. Phases and paradigms in HCI: concepts, methods, contributions, and specific values.
1.3. Goals in interaction design: Usability, User Experience (UX), security, ergonomics, and accessibility.
1.3. Key concepts (e.g. affordance, mapping).
1.5. Introduction to a user-centered design (UCD) process.

2. Study of the design context and field work
2.1. Techniques: documentation, interviews, questionnaires, observation techniques, focus groups.
2.2. Study design: protocol, best practices and key considerations.
2.3. Documentation and data collection techniques.

3. Data analysis.
3.1. Data and analysis types: quantitative, qualitative, mixed.
3.2. Introduction to quantitative and qualitative analysis techniques.
3.3. Obtaining and presenting results and insights.

4. Requirements and design drives.
4.1. Requirements: characteristics and types.
4.2. Other design tools: Stories, scenarios, personas, user stories, use cases, story boards.

5. Interaction design and prototyping.
5.1. Double diamond design model for the design process: divergent and convergent design.
5.2. Traditional and innovative techniques to generate and conceptualize designs.
5.3. Prototypes, sketches, wireframes, mockups, Wizard of Oz technique.

6. Advanced concepts and techniques in Interaction Design
6.1. Embodied design methods
6.2. Persuasive design (gamification)

7. Evaluation.
7.1. Benefits and impact.
7.2. Evaluation objects, kinds, and environments.
7.3. Evaluation methods and techniques with and without users.

## LEARNING ACTIVITIES AND METHODOLOGY

- Theoretical lectures: 1.5 ECTS
Lectures presenting theoretical concepts and techniques to design and study interactive systems.
- Practical lectures: 1.0 ECTS
Labs to work on, and put to practice, the concepts and techniques learnt in class. Guidance to solve the project will be provided.
- Tutoring sessions and follow-up meetings: 0.5 ECTS
Split into work groups, students will attend supervision meetings in the lab to review the development of the project.
- Individual study: 0,5 ECTS
Study of theoretical and practical concepts for the design and study of interactive systems.
- Project development: 2.5 ECTS
Project-based learning. Analyzing, designing, and evaluating an interactive system in a work group. As a result, students will create and submit different design products, and publicly present and defend their work.

## ASSESSMENT SYSTEM

Weight of the exam, assessing theoretical and practical knowledge: 40%
Weight of the project: 60%

Students will finish the course being able to investigate the design context and to conceptualize, design, develop and evaluate functional and non-functional design prototypes. These will be designed and studied centered on the user experience, and applying concepts and methods from Interaction Design (IxD) and Human-Computer Interaction (HCI). For this, students will work in groups in the different phases of a user-centered design (UCD) process: study of the design context and field study; analysis and establishing requirements; design; evaluation. The project will be divided in three submissions that will be evaluated:

P1 Study of the design context and field study
P2 Ideation, design, and prototyping
P3 Evaluation

Grades for each of these deliverables are as follows:
P1 (2p) + P2 (3p) + P3 (1p) = 6p

To pass the continuous assessment, it is mandatory to obtain a MINIMUM GRADE of 3 over 10 in the exam and 3 over 6 in the project.

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| **% end-of-term-examination:** | 40 |
| **% of continuous assessment (assigments, laboratory, practicals…):** | 60 |

## BASIC BIBLIOGRAPHY

- Alan Bryman Social Research Methods , Oxford University Press, 2015

- Alan Cooper, Robert Reimann, David Cronin, & Christopher Noessell About Face: The Essentials of Interaction Design, Wiley, 2014

- Bill Buxton Sketching User Experiences: Getting the Design Right and the Right Design., Morgan Kaufmann, 2007

- Don Norman The Design Of Everyday Things, Basic Books, 2013

- Helen Sharp, Jennifer Preece, & Yvonne Rogers. Interaction Design: Beyond Human-Computer Interaction, John Wiley & Sons, Inc., 2019

- Jakob Nielsen Designing Web Usability: The Practice of Simplicity, New Riders, 1999

- James Kalbach Mapping Experiences: A Complete Guide to Creating Value through Journeys, Blueprints, and Diagrams, O'Reilly Media, 2016

- Jeffrey Rubin, & Dana Chisnell Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests , Wiley, 2008

- Paul Dourish Where the Action Is: The Foundations of Embodied Interaction, The MIT Press, 2001

- Steve Krug Don't Make me Think. A Common Sense Approach to Web Usability, Pearson, 2013

- William Lidwell, Kritina Holden, & Jill Butler Universal Principles of Design, Revised and Updated: 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach Through Design., Rockport, 2010