COURSE SYLLABUS 2019-20

Basic information on the course

Course:	Interactive System

Course code:	71095217	Plan:	Master in Technologies and Applications in Computer Engineering
Academic Year:	2018-19	Undergraduate/Graduate:	Official University Master
Degree Year:	1	Type:	Optional
Duration:	Semester		

TIME DISTRIBUTION ACCORDING TO REGULATIONS

Credits:	4
Total time:	100

USE OF LEARNING PLATFORM:	Multimodal

TEACHERS

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OTHER IMPORTANT INFORMATION

Content justification

Today, ICT (Information and Communication Technology) allows people to interact with each other and with different devices to perform routine tasks. This subject aims to give insight into the key aspects in a process of multimodal interaction where several devices and people are able to interact in an auditory, visual, tactile and gestural way together from any place and at any time. Methodologies for the development of interactive systems using virtual and augmented reality will be evaluated. Virtual, augmented and mixed reality are fundamental elements in the contribution of new technologies to new forms of interaction. The interaction style will be analyzed and evaluated from different areas such as people with functional diversity, smart homes, public centers, offices, industrial environments, or automotive among others.

Courses related in Study Plan

- Multimedia Systems

Pre-required knowledge

- Programming
- User interface design

COMPETENCES

Basic and general competences

Basic competences

- Application of knowledge

General competences

Key competences University of Almeria

- Teamwork

Specific competences

- CE01 - Ability to project, calculate and design products, processes and facilities in all areas of computer engineering.

- CB7 - That the students know how to apply the acquired knowledge and their problem solving capacity in new or little known environments within broader (or multidisciplinary) contexts related to their area of study.
- CT04 - Teamwork.
- TI10 - Ability to use and develop methodologies, methods, techniques, specific use programs, norms and standards of graphic computing.
- TI11 - Ability to conceptualize, design, develop and evaluate the human-computer interaction of computer products, systems, applications and services.
- TI12 - Ability to establish and operate virtual environments, and for the creation, management and distribution of multimedia content.

LEARNING OUTCOMES

OBJECTIVES:

1. To know that it is an interactive system and the main types.
2. To understand multimodal interaction.
3. To know how to define a methodology for the development of interactive systems.
4. To implement a scenario based on virtual reality.
5. To design user interfaces for augmented reality.
6. To know the mechanisms of analysis and evaluation of the interaction within an interactive system for a particular case.

LEARNING OUTCOMES:

1. The student is able to apply the acquired knowledge and solve problems in new or little known environments within broader (or multidisciplinary) contexts related interactive systems.
2. The student is able to design, calculate and design products, processes and facilities in the field of interactive systems
3. That the student is able to work as a team
4. The student is able to use and develop methodologies, methods, techniques, specific use programs, norms and standards of computer graphics
5. The student is able to conceptualize, design, develop and evaluate the human-computer interaction of computer products, systems, applications and services
6. That the student is able to carry out the creation and exploitation of virtual environments and augmented reality, and for the creation, management and distribution of multimedia contents.

CONTENTS

This course focuses on the development of a website using the methodology of ProjectBased Learning starting from a series of sub-problems (SP) that will facilitate the development of the project.

Topics are:

- Interactive systems. (SP3)
- Multimodal interaction. Dispositives. Haptic, gestual, locomotion, auditory and olfactory interfaces (SP4)

- Methodologies of development of interactive systems. (SP5)
- Virtual reality systems, augmented and mixed reality. – Blender, Unity 3D and Vuforia - (SP6 and SP7)
- Analysis and evaluation of the interaction.

Module I: Problem definition and solution planning

- SP 1: What is Problem Based Learning? How do you work as a team?
- SP 2: Who is my client? What is the problem?

Module II: Interactive systems

- SP 3: What steps should I take to develop a professional interactive system?
- SP 4: How is an interactive system designed? What methodology is used?
- SP 5: What devices are used in multimodal interaction? Which technology best suits the client's problem environment? Which applications allow for natural interaction? Module III: Environments
- SP 6: What technologies are used to design a Virtual Reality environment? How do you implement a Virtual Reality system? What types of immersive reality environments are most appropriate?
- SP 7: When is it convenient to use Augmented Reality? What technologies currently allow us to develop an environment based on Augmented Reality?

Module IV: Evaluation of Interactive Systems

- SP 8: How is the interaction in an interactive system analyzed and evaluated?

METHODOLOGIES

- Problem-based learning
- Active Master Class.
- Laboratory Practices.
- Writing of Reports.
- Problem solving.

FORMATIVE ACTIVITIES

- Active Master Class.
- Theorical-practical class.
- Autonomous or group work.

COMPETENCY ASSESSMENT

Criteria and assessment tools

The competencies will be evaluated:

- Knowledge of a second language by information searching, report and presentation of the activities in English.
- Teamwork through the activities, tutorials and group follow-up reports made in the course.
- Application of knowledge through the development of an interactive system with a real client. Since the methodology applied to the subject is Problem Based Learning (PBL).

The assessment of competencies will be evaluated the process of exposition in class and the report presented to solve each sub-problem (20% final score). Solution of global problem (80% final score) will be evaluated the effectiveness of the designed system, the process of exposure and defense and the report presented describing the solution.

In any case, the student can pass the subject if the score is higher tan 50% of the final score in the global problem solution.

The evaluation system involves a group score calculated from the selfassessment of the group, the coevaluation of the remaining groups and the evaluation of the teacher based on previously published criteria. An individual score will be established based on individual self-assessment, the co evaluation of the rest of the group members and teacher assessment.

Competencies of the Royal Decree of the Master's Degrees: CB7: This competence is evaluated through the project presented. Specific competences of the Master's Degree in Computer Engineering: CE01: This competency is evaluated in the final system presented as Project. CT04: This competency is evaluated through the project presented. Modular competences of the Master's Degree in Computer Engineering: TI10, TI11 and TI12: These competences are evaluated in the final system based on virtual or augmented reality project.

Follow-Up Mechanisms

- Attendance and participation in seminars
- Delivery of activities in class
- Delivery of activities in e-learning platform
- Participation in online discussion forums

Functional diversity / Functional disability.

- Those students with disabilities or special educational needs can get in contact with the Delegation of the Rector for the Functional Diversity (http://www.ual.es/discapacidad) to receive the appropriate guidance and advice in order to facilitate their instructional, learning and training processes. Likewise, these students may request the implementation of the necessary and suitable adaptations of content, methodology and evaluation that guarantee equal opportunities in their academic development. The processing of any personal data or aggregated information regarding these aforementioned students, in fully compliance with the GDPR, is strictly confidential. Faculties and academic staff lecturing the course referenced by this guide/document will be in charge of applying the recommended adaptations approved by the Delegation of the Rector for the Functional Diversity, this fact will be, therefore, notified to the School or Faculty as well as to the coordinator of the academic course.

COURSE MATERIALS

Recommended course materials

- Benyon, David. Designing interactive systems : a comprehensive guide to HCI and interaction design / David Benyon. Harlow, England ; New York : Pearson. 2014.
- Matjaz Mihelj, Domen Novak, Samo Begus. Virtual Reality Technology and Applications. Dordrecht : Springer,. 2014.
- Juan Jesus Ojeda-Castelo, Jose Antonio Piedra-Fernandez, Luis Iribarne, Cesar Bernal-Bravo. KiNEEt: application for learning and rehabilitation in special educational needs. Springer US. 2018.

Complementary

- Wigdor, Daniel.. Brave NUI world [Recurso electrónico] : designing natural user interfaces for touch and gesture / Daniel Wigdor, Dennis Wixon.. Burlington, Mass. : Morgan Kaufmann. 2011.
- Helen Sharp, Jennifer Preece y Yvonne Rogers. Interaction Design: Beyond Human-Computer Interaction. Wiley. 2019.
- Jesse Schell. The Art of Game Design. A K Peters/CRC Press. 2017.

Other materials

Couse materials available in UAL's library

http://almirez.ual.es/search/e?SEARCH=SISTEMAS INTERACTIVOS

WEBSITE

- https://unity3d.com/es Unity 3D
- http://dis2018.org/toc.html DIS '18- Proceedings of the 2018 on Designing Interactive Systems Conference 2018
- https://aipo.es/   Asociación Española Interacción Persona-Ordenador.