Course guide
340263 - INPS-D7P32 - Human-System Interaction

Last modified: 25/06/2023

Unit in charge:	Vilanova i la Geltrú School of Engineering
Teaching unit:	707 - ESAII - Department of Automatic Control.

Degree:	BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2009). (Optional subject).

Academic year: 2023   **ECTS Credits:** 6.0   **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer:	Muñoz Morgado, Luis Miguel
Others:	Muñoz Morgado, Luis Miguel
	Català Mallofre, Andreu

REQUIREMENTS

Previously passed
MEDI Metodologia del disseny

And jointly with INPS we recommend:
ENUA Enginyeria de la usabilitat i l'accessibilitat
DIDU Disseny inclusiu i disseny centrat en l'usuari

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Transversal:
1. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.
3. ENTREPRENEURSHIP AND INNOVATION - Level 2. Taking initiatives that give rise to opportunities and to new products and solutions, doing so with a vision of process implementation and market understanding, and involving others in projects that have to be carried out.
5. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 2. Using strategies for preparing and giving oral presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and grammatical errors.
7. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.
4. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.

TEACHING METHODOLOGY

Presentation-synthesis

In the sessions the teacher makes a summary of the topic. This presentation is intended as a guide work study students, with the function of introducing the item, propose material for study, clarify doubts and synthesis.

Each topic will be provided with:
- Power Point presentations used in class and other supplementary material will be available on the Digital Campus.
- Bibliography indicating specific location, preferring to material in electronic format.

Working activities and exercises

- Problems and Exercises for fixing the concepts introduced in the presentation.

- Approach of situations that allow the group builds a shared experience that will serve to advance in the understanding of content (eg, group dynamics, effective communication experiences.) They are based on experience different situations in which the experience serves as a study material.

Casework and articles

The work on cases or article will be based on questions raised by the professor. These works must to be delivered on date at the beginning of the session where will be discussed in class. The deadline to submit is specified in calendar. The teacher may show in the Digital Campus some of the best works delivered to be used as a reference.

The casework seeks to promote the following capabilities:

- Understanding of the situation presented and the ability to synthesize the most relevant issues
- Apply the concepts to practical cases.
- Capturing the complexity of real life situations, different points of view and various dimensions of the organizational and management issues
- Ability to exchange views and discuss, and ability to learn from the debate

Projects
En this subject: projectone and projecttwo. Easch project can have a set of Practices

Projectes are held in groups of up to three members, to be established at the beginning of the course and will be maintained.Throughout the course there will be 2 projects that should be developed applying the knowledge acquired. These projects serve as the backbone of learning, following the principles of project-based learning. For each practice it will provided a dossier that shall include the objectives, description, date of delivery, and criteria assessment. Each practice will consist of a report and a presentation at pp.

Oral presentations

Each student will present oral argument at least once during the term. The days of presentation are announced at the beginning of the course. The day of the presentation the teacher a designate the groups that will carried out the presentation.

Small group and individual tutoring

The teacher will follow up the student progress and supervise their practices and work, providing feedback on their progress, the degree of achievement of the objectives of their work, giving directions for improvement.

LEARNING OBJECTIVES OF THE SUBJECT

OBJECTIVES

1. Analysis requirements of users, machines and systems.

2. Industrial Context of use in the development of products and services.

3. Apply Robotic Tools.

RESULTS

1. Multidisciplinary project development

2. Rapports

3. Experience in the design of human robot interactive systems

STUDY LOAD

Type	Hours	Percentage
Hours small group	15,0	9.09
Hours large group	45,0	27.27
Self study	105,0	63.64

Total learning time: 165 h

CONTENTS

Module 1 New interactive paradigms

Description:
1.1 Definitions. Interaction. System. Interactive design
1.2 Paradigms. Desktop computer. Virtual reality. Augmented reality. Ubiquitous computing. Gestural interaction
1.3 Human Factors
1.4 Examples

Specific objectives:
Understand the role of people in comple systems

Understand basic principles of interaction between humans and objects

Related activities:
Examples and study cases.

Related competencies :
06 URI N1. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.
07 AAT N2. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

Full-or-part-time: 32h
Theory classes: 8h
Laboratory classes: 6h
Self study : 18h

Module 2 Methodology of interaction

Description:
2.1 Metaphors
2.2 Evaluation
2.3 Standards
2.4 Experimentation

Specific objectives:
Stablish the links between the design for services with the interaction and the user experience.

Related activities:
Examples and case studies. Home automation scenarios. Report.

Report

Oral presentation
Evaluation:
work in class: (20%)
Oral presentation (20)
final rapport (60%)

Related competencies :
01 EIN N2. ENTREPRENEURSHIP AND INNOVATION - Level 2. Taking initiatives that give rise to opportunities and to new products and solutions, doing so with a vision of process implementation and market understanding, and involving others in projects that have to be carried out.

Full-or-part-time: 39h
Theory classes: 10h
Laboratory classes: 8h
Self study : 21h

-Module 3 Interaction technologies

Description:
3.1 Interaction with conventional devices
3.2 Interaction with voice and sound
3.3 Interaction with image
3.4 Virtual and augmented reality
3.5 Other technologies (Brain machine interfaces)

Specific objectives:
Know basic aspects of human factors and new robots models that allow an effective collaboration between humans and robots.

Related activities:
Examples and Study cases. Collaborative robots examples. Laboratory Practices.

Related competencies :
06 URI N1. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.

Full-or-part-time: 39h
Theory classes: 10h
Laboratory classes: 8h
Self study : 21h

Module 4 Laboratory Practices

Description:
Interactive Systems Deisng Laboratory
Computer room
Project. Design, development and experimentation on interfaces
Project. Design of robotic scenarios with the Coppeliasim software

Specific objectives:
Learn how to develop human machine interface systems
Learn the basic aspects of this software with the aim to develop future project of simulated robotics environments.

Related activities:
Interface design
3D Robotic Scenarios with Coppeliasim.

Related competencies :
04 COE N2. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 2. Using strategies for preparing and giving oral presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and grammatical errors.
05 TEQ N2. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.

Full-or-part-time: 14h
Theory classes: 14h

GRADING SYSTEM

In the evaluation of the student will consider both the work done in groups such as the achievement of valued content individual written tests (tests). This exam (Module 1 and 2) will consist of a part of short questions or multiple choice, and another open questions or development. Students will also have a note obtained from the raport (module 2) and the lab practices

NF = exam_1 * 0.3 + raport*0,4 + project * 0.3

BIBLIOGRAPHY

Basic:
- Pratt, Andy; Nunes Jason. Diseño interactivo : teoría y aplicación del DCU. Barcelona: Océano, 2013. ISBN 9788475568324.
- Weinschenk, Susan. Diseño inteligente : 100 cosas sobre la gente que todo diseñador necesita saber. Madrid: Anaya Multimedia, 2021. ISBN 9788441543362.

Complementary:
- Human-Robot interaction [Recurs electrònic] [on line]. Rijeka: inTech, 2010 [Consultation: 24/03/2022]. Available on: https://www.intechopen.com/books/3632. ISBN 9789533070513.

RESOURCES

Audiovisual material:
- http://www.kuka-robotics.com/spain/es/. Resource
- http://www.aipo.es/libro/libroe.php />

- http://www.epsevg.upc.edu/hcd/ />

Hyperlink:
- http://www.infocop.es/pdf/LibroErgonomia.pdf. Resource