340263 - INPS-D7P32 - Human-System Interaction

**Coordinating unit:** 340 - EPSEVG - Vilanova i la Geltrú School of Engineering

**Teaching unit:** 732 - OE - Department of Management

**Academic year:** 2017

**Degree:** BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2009). (Teaching unit Optional)

**ECTS credits:** 6  

**Teaching languages:** Catalan

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**Teaching staff**

**Coordinator:** PERE PONSA ASENSIO

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**Opening hours**

**Timetable:** Pere Ponsa: Friday, D-170, 11:00 to 13:00 PM

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**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

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**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 INFORMATION 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.
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. Each project can have a set of Practices

Projects 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.

RESULTS

1. Multidisciplinary project development
2. Rapports
3. Experience in the design of human robot interactive systems

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>30h</th>
<th>20.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group:</td>
<td>15h</td>
<td>10.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>105h</td>
<td>70.00%</td>
</tr>
</tbody>
</table>
## Content

### Module 1 New interactive paradigms

**Learning time:** 32h  
- Theory classes: 8h  
- Practical classes: 0h  
- Laboratory classes: 6h  
- Guided activities: 0h  
- Self study: 18h

#### Description:
1.1 Definitions. Interaction. System. Interactive design  
1.3 Industry 4.0  
1.4 Examples

#### Related activities:
Examples and study cases.

#### Specific objectives:
Understand the role of people in complex systems  
Understand basic principles of interaction between humans and objects

### Module 2 Service for design

**Learning time:** 39h  
- Theory classes: 10h  
- Practical classes: 0h  
- Laboratory classes: 8h  
- Guided activities: 0h  
- Self study: 21h

#### Description:
2.1 Design for service  
2.2 Robotics service  
2.3 Home automation Robot  
2.4 Steps of a project of care service  
2.5 Examples

#### Related activities:

- Report  
- Development of a CD multimedia  
- Oral presentation  

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

#### Specific objectives:
Stablish the links between the design for services with the interaction and the user experience.
# Module 3 Human Robot Collaboration

**Learning time:** 39h
- Theory classes: 10h
- Practical classes: 0h
- Laboratory classes: 8h
- Guided activities: 0h
- Self study: 21h

**Description:**
- 3.1 Ergonomics in the design of workplace
- 3.2 Changes in productive systems
- 3.3 Robotics safety
- 3.4 Current standards in human-robot collaboration
- 3.5 Examples

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

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

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# Module 4 Laboratory Practices

**Learning time:** 14h
- Theory classes: 14h

**Description:**
AL-.116 Interactive Systems Deisng Laboratory
AI-112 Computer room

Project. Design of robotic scenarios with the KUKA Sim Pro software

**Related activities:**
3D Robotic Scenarios with KUKA Sim Pro.

**Specific objectives:**
Learn the basic aspects of this software with the aim to develop future project of simulated robotics environments.
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:**

**Complementary:**

**Others resources:**

**Hyperlink**
- Resource

**Audiovisual material**

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

- http://www.kuka-robotics.com/spain/es/
- Resource