Teaching Plan

1. Descriptive Information on the Subject

- **Name of the subject:** Interaction Engineering
- **Academic Year:** 2011/12 **Year:** 1st **Quarter:** 1st
- **Degree/ Course:** Computer Engineering; Audiovisual Systems Engineering
- **Number of credits (ECTS):** 4 **Total number of hours committed:** 100
- **Teaching language(s):** Catalan, Spanish
- **Teaching staff:** Josep Blat, Narcís Parés, Patricia Santos, Ayman Moghnieh

2. Presentation of the subject

Computer and audiovisual systems engineers have to finish their studies with some professional abilities that can easily and relatively fast be put into practice.

This course aims to provide the students with some basic knowledge that allows them to design and implement quality user interfaces.

To achieve this goal, we need to consider the relation between the person (user) and the computer (devices, graphic elements,...) and to understand and to implement interaction engineering processes and methodologies.

3. Competences to be obtained in this subject[1]

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A. Generic Skills

To achieve the goals of this course students need to develop the practical part above all and to start with the project work quickly, which is essentially about developing a prototype interface and evaluating it with respect to its usability. Therefore the assessment covers these aspects as well as the success of the design and the implementation of the project from the very beginning.

A.1 Work on a project of the design of an interface prototype

1. Capacity to understand wordings (i).
2. Capacity to express the chosen solutions in written (i).
3. Capacity to adopt the methodologies suggested in this course (s)
4. Capacity to plan the work of the project and to organise oneself (s).
5. Capacity to take into account the users' point of view (s).
6. Capacity to evaluate the results one gets (s).
7. Capacity to learn how to learn (s).

A.2 Work in groups

1. Capacity to communicate with the group colleagues, expressing and sharing ideas (ip).
2. Capacity to find an appropriate group (s).
3. Capacity to find one's role within the group (s, ip).
4. Capacity to evaluate the suggestions other group colleagues make (s).
5. Capacity to explain the solutions to problems in public (s).

B. Specific Skills

1. Understanding of the context of interfaces design: science and technique of person-computer interfaces, Usability Engineering and some aspects on Software Engineering;
2. Understanding of the dimensions of interface variability and the relation with the user's characteristics;

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[1] i: instrumental, s: systematic, ip: interpersonal

3. Understanding how to implement interaction methodologies and some concepts about how to programme/implement user interfaces.

4. Contents

Theory Block (T)

1. Introduction and some aspects on interfaces' and interactions' quality
2. Understanding the user and Contextual Design methodology
3. User Centred Design (UCD) methodology
4. Interface and interaction variability
5. Usability evaluation
6. Prototyping tools

Practical Block (P)

1. Choosing an interface to design it and an existing one that is similar to the previous one
2. Evaluating the similar existing interface using a usability questionnaire and identifying contextual requirements
3. Usage Centred Design
4. Building alternative models and selection
5. Designing an interface prototype
6. Evaluating the prototype's usability
7. Final report and oral presentation

Seminar Block (S)

1. Designing the questionnaire and contextual design
2. Usage Centred Design
3. Prototyping tools
4. Help seminar for exercise (*pràctica*) 5
5. Help seminar for exercise (*pràctica*) 7

5. Grading

The exercises or *pràctiques* (their realization, corresponding reports and final presentation) correspond to 2/3 of the mark. Specific criteria for some of the exercises are to be found in their explanations.

Partial tests, before the interface's design and after its evaluation, correspond to 1/3 of the mark.

There is no theoretical exam.

In order to pass the course, students need to obtain a passing grade for both parts (practical sessions and partial seminar tests).

Partial marks may be kept for the September session at request of the interested student.

6. Bibliography and didactic resources

Recommended readings are:

- Rogers, Y., Sharp, H. and Preece, J. Interaction design: beyond human-computer interaction. Second edition. The book's website is http://www.id-book.org
- Ben Shneiderman: Designing the User Interface (Strategies for Human-Computer Interaction), 3rd and 5th editions, Addison Wesley, Reading, Massachusetts.
- Jakob Nielsen: Usability Engineering, Academic Press, Boston, 1993.
- Hugh Beyer, Karen Holtzblatt: Contextual Design. Defining Customer-Centered Systems, Morgan Kaufmann, San Francisco, 1998.
- Larry L. Constantine, Lucy A. D. Lockwood: Software for use. A practical guide to the models and methods of Usage-Centered design, Addison Wesley, Reading, Massachusetts, 1999.
- Jeffrey Rubin: Handbook of Usability Testing. How to plan, design, and conduct effective tests, John Wiley & Sons, New York, 1994.
- Preece, J., et al.: Human-Computer Interaction, Addison-Wesley, Harlow, England, 1994.

Other very interesting readings are:

- Ronald M Baecker et al: Readings in Human-Computer Interaction (Toward the Year 2000), Morgan Kauffman, 1995. (Reading the author's preceding book is equally interesting as the intersection between the two books is small).
- Don A Norman: The Psychology of Everyday Things, Basic Books, New York, 1988. (also edited as The Design of Everyday Things)
- Don A Norman: The Invisible Computer (Why Good Products Can Fail, the Personal Computer Is So Complex and Information Appliances Are the Solution), The MIT Press, Cambridge, Massachusetts, 1998.
- Stuart K. Card, Thomas P. Moran, Allen Newell: The Psychology of Human-Computer Interaction, Lawrence Erlbaum Associates Publishers, Hillsdale, New Jersey, 1983.
- Apple Computer Inc.: Macintosh Human Interface Guidelines, Addison Wesley, Reading, Massachusetts, 1992.
- Mark van Harmelen (edited): Object Modeling and User Interface Design, Addison-Wesley, Boston, 2001.
- James D Foley, Andries van Dam, Steven K Feiner, John F Hughes: Computer Graphics: Principles and Practice (Chapters 8, 9, 10), Addison Wesley Systems Programming Series, Reading, Massachusetts, 1990.
- Jakob Nielsen: Usabilidad. Diseño de sitios web, Prentice Hall, Madrid, 2000.

Other interesting sources:

- A general reference source on HCI (Human Computer Interaction) is: http://www.hcibib.org/

- An example of a website with resources of an HCI introduction course: Web Resources from the course CS 3041 - Human Computer Interaction taught at the Worcester Polytechnic Institute.

- Other interesting courses:

    - CS160 taught at the University of California at Berkeley (different versions of the last academic years can be found)
    - The course taught at the University of Lleida, in which there are contributions of different Spanish groups working on Human-Computer Interaction.

7. Methodology

The theoretical and the practical component are interrelated and are taught in a parallel way, in which the practical component determines how sessions are structured.

Practical sessions consist of the different design and development stages (of the first prototype) of an interface.

Seminars aim to consolidate some aspects which are specially challenging about the practical component. Partial tests are designed to motivate a deeper thought on some theory aspects when put into practice.

Designing an interface is a process and it is essential that is a correct one (not only if the final result is). Designing is an iterative process. This means there must be an analysis of its results in relation with users, which must feedback the redesign. This feedback is the main objective of the practical sessions planned.

Students have to be acquainted with the basic point of view of the course: engineers must be aware that the way in which users act is very different to how we may think they do.

Iterative evaluation is a key aspect to be acquainted with the last point of view: understanding the user's point of view.

Students need to think as engineers and to understand that quality comes from the different processes and from following an appropriate methodology.

Working in groups, documenting the work one does and following the deadlines are essential for engineers.

Hours committed by students

Content Blocks	Hours in class			Hours after class
	Big group	**Medium group**	**Small group**	
T1.	2 hours			2 hours
T2.	2 hours			2 hours
T3.	2 hours			2 hours
T4.	4 hours			4 hours
T5.	2 hours			2 hours
T6.	2 hours			2 hours
P1.		1 hour		2 hours
P2.		2 hours		5 hours
P3.		2 hours		3 hours
P4.		1 hour		3 hours
P5.		2 hours		7 hours
P6.		2 hours		5 hours

S1.			1 hour	2 hours	
S2.			1 hour	2 hours	
S3.			2 hours	4 hours	
S4.			2 hours	2 hours	
S5.			2 hours	3 hours	
Exam 1	2 hour			6 hours	
Exam 2	2 hour			6 hours	
Total	18 Hours	10 hours	8 hours	64 hours	ECTS * 25