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340003 - SOAC-O1O40 - Sustainability and Accessibility

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

Teaching unit: 744 - ENTEL - Department of Network Engineering
713 - EQ - Department of Chemical Engineering
707 - ESAII - Department of Automatic Control
710 - EEL - Department of Electronic Engineering
729 - MF - Department of Fluid Mechanics

Academic year: 2018

Degree: BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)

ECTS credits: 6 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: Maria Antonia Majó i Roca

Others: Jaume Miret i Tomàs
Daniel Guasch i Murillo
Jordi Segalàs i Coral
Maria Antonia Majó i Roca
Joaquím Olive Duran
Rafael Morillas Varón
Olga León Abarca

Prior skills

No

Requirements

No requirements

Degree competences to which the subject contributes

Specific:

2. CE16. Basic knowledge and application of environmental technologies and sustainability.

Generical:

1. Accessibility: Know and apply criteria of universal design in different products, environment and services.

Transversal:

02 SCS N1. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 1. Analyzing the world¿s situation critically and systemically, while taking an interdisciplinary approach to sustainability and adhering to the principles of sustainable human development. Recognizing the social and environmental implications of a particular professional activity.
02 SCS N2. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.
02 SCS N3. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 3. Taking social, economic and environmental factors into account in the application of solutions. Undertaking projects that tie in with human development and

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sustainability.
02 SCS. SUSTAINABILITY AND SOCIAL COMMITMENT. Being aware of and understanding the complexity of social and economic phenomena that characterize the welfare society. Having the ability to relate welfare to globalization and sustainability. Being able to make a balanced use of techniques, technology, the economy and sustainability.
05 TEQ N1. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

Teaching methodology

The course consists of two thematic modules: accessibility and sustainability. The two modules are independent although they are complementary. The course is structured using two methodological lines: project-based learning and adult learning theory.

Module 1- accessibility.
The module consists of two parts: theoretical presentations to the students, and the realization of project along the course inside a working team. The theoretical presentation module focuses its activities to present design strategies and best practices, the group working develops a practical case study.
All documentation of the module will be given to the students the first day of class, through the intranet, accessible in Adobe Acrobat format. The work in groups will in parallel with the exposition of the theoretical. The format of the documentation is in Adobe Acrobat, with the accessibility requirements incorporated correctly.

Cooperative work groups of 4-5 students will be formed. This number has been chosen because different issues will be analyzed: user needs, alternatives on the market today, available technical solutions and business viability. Each member will assume the role and functions assigned by the group, providing a sufficient degree of freedom for a correct integration of student and group cohesion.

Sustainability Module 2
Large group. Lectures presenting the contents. The sessions of presentation of the contents will enable knowledge of the theoretical basis, concepts, methods and results.

Small group. In the working sessions in small groups, students will perform an exercise in groups of 2 people beginning in the class and ending with the delivery of a small dossier with the proposed problem analysis. This analysis will require a complete search for updated technical information. The work will be uploaded to the Digital Campus as a conceptual diagram-poster plus a brief report all in accessible PDF format.

Learning objectives of the subject

The course aims to provide students with a range of knowledge, skills and ethical values in the context of accessibility, universal design and sustainability. Thus, the subject is conceptually divided into two thematic modules: accessibility and sustainability.

Accessibility module.
It presents the generic concept of accessibility. It seeks to lay the theoretical foundations, such as providing design guidelines and show examples of good practice in the design of tools, environments and services. The course will focus its efforts on the strategies of Universal Design, User Experience, Design Thinking and Emotional Design.
After completing this module, the student should be able to:
- Understanding human diversity as an added value in the design of products, environments and services.
- Know the main concepts of accessibility and design strategies focused on the user.
- Know how to apply design guidelines for everyone in a professional environment.
- Know the main policy and legislative sources.

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Sustainability module.
At the end of the course the student should be able to:
- Observe and analyze the complex reality of the world from the perspective of sustainability.
- Knowing the causes that have led to the current situation of non sustainability and in particular about the role of technology.
- Know the basics of the paradigm of human development and sustainability.
- Develop the ability to apply the concept of sustainability in their engineering activities.
- Introduce the practical tools and methodologies for applying industrial ecology, eco-design, waste management and cleaner production in different contexts.
- Know the environmental technologies and their application in the field of engineering.
- Develop critical thinking about environmental problems and its solutions.
- Know the main problems of water pollution, air and waste.
- Understand and know how to apply the balance of energy and matter.

Study load

Total learning time: 150h	Hours large group:	45h	30.00%
	Hours medium group:	0h	0.00%
	Hours small group:	15h	10.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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Content

Mòdul Accessibilitat - Tema 1 ? The user

Learning time: 3h

Theory classes: 1h
Self study : 2h

Description:
The user: in the first chapter the student is introduced to the social, institutional and legislative environment where is necessary to apply the concepts of accessibility and universal design. The chapter concludes by contacting the student with one of the key points in the design phase of any product or service: the end user and their experience. The purpose of this point is to highlight that restrictions on the activities that one can find, as well as deficits of human body parts, are not the central issue under study. Only justify the need for equitable criteria and egalitarian design in mind, and should not divert attention from the central object of study: the application of universal design in all products and services. It consists of:

- Foreword
- Social dimension
- Institutional Framework
- Preliminary Thoughts on the user experience
- Disability

Mòdul Accessibilitat - Tema 2 ? Basic concepts

Learning time: 8h 30m

Theory classes: 2h
Guided activities: 0h 30m
Self study : 6h

Description:
Basics: In this chapter are presented the key definitions with illustrative examples and reflections. It consists of:
- Early Reflections
- Key definitions
- Examples

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Mòdul d?Accessibilitat - Tema 3 ? Design strategies

Learning time: 10h 30m

Theory classes: 3h
Guided activities: 0h 30m
Self study : 7h

Description:
This is one of the central chapters. Universal Design, User Experience, Design Thinking and Emotional Design: It covers the main design strategies. The actual regulations are presented as a paradigm and basis for reflection as well as examples of good practice in implementation. It consists of:
- Universal Design
- User experience
- Design Thinking
- Emotional Design
- UNE rules
- Good practices

Mòdul d?Accessibilitat - Tema 4 - Codes

Learning time: 10h 30m

Theory classes: 3h
Guided activities: 0h 30m
Self study : 7h

Description:
This topic presents a set of rules on accessibility issues. The goal is to become a real practical application of the concepts in the design strategies. It consists of:
- Working definitions
- UNE rules

Mòdul Accessibilitat - Tema 5 ? Architecture accessibility

Learning time: 9h 30m

Theory classes: 2h
Guided activities: 0h 30m
Self study : 7h

Description:
This chapter covers specific aspects of the area of architecture that must be taken into account by the engineers in multidisciplinary teams. It provides methodology for analyzing an architectural environment and to properly analyze the Universal Design. It consists of:
- Basic concepts
- Integration with technology

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Mòdul Accessibilitat - Tema 6 ? Accessibility in the transportation

Learning time: 9h 30m

Theory classes: 2h
Guided activities: 0h 30m
Self study : 7h

Description:
Through transport it is clearly established the interrelation between engineering and architecture, referred in the previous chapter. The thread used is the analysis of the current legislation itself, in order to bring the student to the extensive use of standards. It consists of:
- Overall analysis
- Actual regulations

title english

Learning time: 15h

Practical classes: 15h

Description:
The practical works will be done by groups of 4-5 students. Each group will prepare a work (draft) to be presented at the end of the course. In the practice sessions students can exchange opinions between the groups and the teacher. The draft report will be delivered through the Campus Digital and may make an oral presentation of the results to the rest of the class and teachers. The practices will analyze each of three areas involved: user requirements, state of the art technical solutions and proposals.

Related activities:
Practice 0: Definition of draft accessibility.
Practice 1: Draft - User needs.
Practice 2: Draft - Proposed design.
Practice 3: Draft - Drafting of technical report

Mòdul sostenibilitat. Tema 1. The state of the world

Learning time: 15h

Theory classes: 6h
Self study : 9h

Description:
The course begins with an introduction to what is sustainability. The basic concepts to assess the current world from this point of view are given. Basic environmental and social problems affecting our society are listed.

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Mòdul sostenibilitat. Tema 2. The sustainability paradigm and the sustainable politics	Learning time: 15h Theory classes: 6h Self study : 9h

Description:
This subject develops the concept of sustainable development from different points of view and multidisciplinary definitions. The principles of sustainability are enunciated. What is quality of life? The relationship between technology and sustainable development is established taking into account the limits of growth. The subject ends by explaining the role of the engineer in sustainable development.

Mòdul sostenibilitat. Tema 3. Systemic and sustainable development models	Learning time: 15h Theory classes: 6h Self study : 9h

Description:
This topic focuses sustainability as a concept to be applied to a real case from many points of view, i.e. systemically. A description of the environmental tools which evaluate and could improve the impact of a product or service is provided. Special mention is made to eco-design methodologies.

Mòdul sostenibilitat. Tema 4. Energy	Learning time: 15h Theory classes: 6h Self study : 9h

Description:
This topic is related to the relation between energy and development, analyzing global and local energy use. How much conventional energy "is there" in the world? Environmental impacts of energy are analyzed, focusing on emissions of pollutants. Proposed solutions at technological and governmental level are evaluated. The concept of efficiency and the role that engineers and governments have in their implementation are analyzed. Renewable energies are evaluated. Can be ?the renewables? the solution for a sustainable development.

Mòdul sostenibilitat. Tema 5. Resources and waste	Learning time: 15h Theory classes: 6h Self study : 9h

Description:
The global use, the environmental and social issues related to mineral resources are evaluated. The use of water in the world is analyzed: in agriculture, industry and households with special mention of contamination. Waste management is evaluated in the first world from the point of view of their classification and responsibilities. The management of municipal and industrial waste in Catalonia is evaluated. Cleaner production concept is introduced with real examples.

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Qualification system

The score for the course of SOAC is calculated from the partial notes of accessibility and sustainability at 50%. Conducting both modules it is considered a prerequisite to be able to pass the course.

Accesibilidad
This module follows project-based learning methodologies. Groups of 4 students must complete a project-draft at the end of the course. Each group will perform a series of partial work (TP) along the course and assessment tests (EX). Finally, these partial works will be incorporated in a draft technical report (MT), which will be defended orally before a panel of teachers of the subject.

Nota_Accesibilidad = 0.5 EX + 0.3 MT + 0.2 TP

Sostenibilidad
The evaluation of this module is calculated from the personal examination (EX) and the practical work (TP) to be held in small groups.
Nota_ Sostenibilidad = 0.7 EX + 0.3 TP

The final grade will be calculated as

NOTA_ SOAC = 0.5 Nota_Accesibilidad+ 0.5 Nota_ Sostenibilidad

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