

230123 - PAESEL - Advanced Project in Electronic Systems Engineering

Coordinating unit:	230 - ETSETB - Barcelona School of Telecommunications Engineering		
Teaching unit:	710 - EEL - Department of Electronic Engineering		
Academic year:	2019		
Degree:	BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Teaching unit Optional)		
ECTS credits:	12	Teaching languages:	Catalan, Spanish, English

Teaching staff

Coordinator:	Bragós Bardia, Ramon
Others:	Oliveras Verges, Albert Pegueroles Valles, Josep Rafael Camps Carmona, Adriano Alarcón Cot, Eduard Torres Urgell, Lluís Vallverdú Bayés, Francesc

Prior skills

You must have passed Basic Engineering Project
You must have passed Economics and Business

Degree competences to which the subject contributes

Generical:

11 CDIO N3. They will be able to apply a comprehensive view of the entire life cycle (conception, design, implementation and operation) of a product, process or service in the ICC field, and identify users' needs and develop a set of requirements for the product, process or service and a set of initial specifications. They will be able to explore possible solutions and select the best one. They will be able to carry out a design process following a standardised methodology. They will know how to evaluate and propose improvements to the design. They will take into account economic and social aspects of the project or product.

Transversal:

1. ENTREPRENEURSHIP AND INNOVATION - Level 3. Using knowledge and strategic skills to set up and manage projects. Applying systemic solutions to complex problems. Devising and managing innovation in organizations.
2. 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 sustainability.

Teaching methodology

Directed activities

Lectures

Team work (autonomous learning)

Homework (individual autonomous learning)

oral presentation

Short answer tests (Control)

Long answer test (Final Exam)

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Learning objectives of the subject

The course aims to achieve a double impact:

1. Consolidation and extension of the content of previous or parallel courses
2. Acquisition of generic skills at an advanced level. The course deals with almost all generic skills, with emphasis on:
 - Teamwork, leadership
 - Oral and written communication
 - Communication in 3rd language (English)
 - Entrepreneurship and innovation
 - Sustainability and social commitment
 - Ability to conceive, design, implement and operate complex systems in the ICT field

Learning outcomes:

Depending on the subject and scope of the project presented in this course, the student achieves the following learning outcomes:

Specification, implementation and documentation of electronic instrumentation and control equipments and systems, including both the technical considerations and the regulations that apply.

Application of electronic technology to other fields, and not only to ICT and Communications.

Design of integrated circuits and discrete analog, digital and mixed-mode electronics, analog-digital and digital-to-analog conversion, RF, optoelectronics and photonics, power supply and electric power conversion for telecommunication, computing and other applications.

Design of interface devices, data capture and storage and terminals for telecommunications systems and services.

Specification, design and use of electronic instrumentation and measurement systems.

Analysis and solution of reliability problems, including interferences and electromagnetic compatibility.

Taking initiatives that create new opportunities and solutions with vision of implementation, process and market

Using knowledge and strategic skills to create and manage projects with an innovative approach. Applying systemic solutions to complex problems.

Applying sustainability criteria and ethic codes of the profession in designing and evaluating technologic solutions.

Identifying the need for legislation, regulations and standards.

Understanding the concept of life cycle of a product and applying it to the development of ICT products and services, using suitable standards and legislation.

Studying with books and articles in English and writing a report in English and participating in a technical meeting conducted in that language.

Conducting an oral presentation in English and answering questions from the audience.

Using strategies to prepare and carry out oral and written texts and documents with consistent content, structure and style, appropriate level and good spelling and grammar.

Communicating clearly and effectively in oral and written presentations on complex subjects, adapting to the situation, to the audience and to the objectives of the communication.

Planning and reaching agreements on the objectives, operating rules, responsibilities, schedule and review procedures work.

Identify the roles, skills and shortcomings of the different group members, recognizing and / or assuming the role of leader. Negotiating and managing conflicts within the group.

Identifying user needs and developing a definition of product-process-service and its initial specifications. Following the process management model based on a standard. Evaluating the application of laws and regulations that apply.

Identifying needs and market opportunities. Collecting information that would allow elaborating specifications for a new product, process or service. Elaborating a basic business plan. Performing the planning and execution of a design process.



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Study load

Total learning time: 326h	Hours large group:	26h	7.98%
	Hours small group:	78h	23.93%
	Self study:	222h	68.10%

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Content

<p>Lectures</p>	<p>Learning time: 35h 20m Theory classes: 15h 20m Self study : 20h</p>
<p>Description: Specific aspects of economics and business. Business plan. Regulations Contents related to the specific project</p>	
<p>Seminars:</p>	<p>Learning time: 22h 30m Theory classes: 10h Self study : 12h 30m</p>
<p>Description: Critical thinking System thinking Research in specialized databases of business information Research in specialized databases of patents Patent preparation strategy Teamwork, leadership Environmental impact Advanced project management methodology</p>	
<p>Specific math concepts</p>	<p>Learning time: 37h 30m Theory classes: 16h 30m Self study : 21h</p>
<p>Description: Additional math content for the specific projects developed in this course: statistics, optimization, modeling, numerical calculation.</p>	

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<p>Project</p>	<p>Learning time: 234h 40m Guided activities: 99h 10m Self study : 135h 30m</p>
<p>Description:</p> <p>Project with high technical complexity, carried out by a large group of people (9-12) that divide the work into subgroups (3-4) and which are coordinated at different levels.</p> <ul style="list-style-type: none"> - Each degree performs a different project and there may be different projects within the same degree, with the possibility of transversal projects between tracks and between degrees - Incorporates different parts (theoretical, HW, SW, measures economic study ...) - Projects with different profiles, focusing on a specific aspect (Research, Technical Development, Economic study / business plan) <p>Examples of possible topics:</p> <ul style="list-style-type: none"> - Telemedicine - biomedical sensor - communications link - Database - Payload for a picosatellite - Coin Sorter - Fleet Management (GPS, communications, databases, maps) - Access control: card readers, LAN, DB - Viterbi decoder chip - RFID - Monitoring system for endangered species - System for remote relay - Internet TV 	

Planning of activities

(ENG) Presentació oral

(ENG) Presentació oral

(ENG) Proves de resposta curta (Control)

(ENG) Proves de resposta llarga (Examen Final)

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Qualification system

- Continuous assessment of the activities carried out in the case studies of training sessions and seminars
- Continuous assessment, documentation and oral presentation of the project reports.
- Cross-assessment and co-assessment of the project

60% of the score corresponds to the project mark

40% of the score is based on the individual assessment of the evidences collected at the progress meetings, seminars and the co-assessment of the team colleagues

This course will assess at least the following generic skills:

- Entrepreneurship and innovation (high)
- Sustainability and social commitment (high)
- Ability to conceive, design, implement and operate complex systems in the field of ICT (High Level)

Regulations for carrying out activities

A clear failure performing the tasks assigned by the team can mean the failure of the course regardless of the grade given to the group project

Bibliography