Course guides
230162 - PAEST - Advanced Project in Network Systems Engineering

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Unit in charge:	Barcelona School of Telecommunications Engineering
Teaching unit:	744 - ENTEL - Department of Network Engineering.

Degree:	BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Optional subject).

Academic year: 2020   **ECTS Credits:** 12.0   **Languages:** Catalan, English, Spanish

LECTURER

Coordinating lecturer: Pegueroles Valles, Josep Rafael

Others:

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)

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:

Is able to build, operate and manage the telecommunication networks, services, processes and applications, that is, systems for acquisition, transport, representation, processing, storage, management and presentation of multimedia information from the point of view of network systems.

Is able to apply the techniques in which telematic networks, services and applications are based, such as management systems, signaling and switching, routing, security (cryptographic protocols, tunnels, firewalls, payment mechanisms, authentication and content protection), traffic engineering (graph theory, queuing theory and teletraffic), pricing and service quality and reliability in both fixed and mobile environments, for personal, local or long distance communication, with different bandwidths, including telephony and datatransmission.

Is able to build, operate and manage telematics services using analytical tools for planning, sizing and analysis.

Is able to describe, program, validate and optimize communication protocols and interfaces at different levels of a network architecture.

Is able to follow the technological process of transmission, switching and process for improving networks and telematic services.

Is able to design network architectures and telematics services.

Is able to program services and telematic applications in distributed networks.

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

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

Applies sustainability criteria and ethic codes of the profession in designing and evaluating technologic solutions. Identifies the need for legislation, regulations and standards.

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

Studies with books and articles in English and writes a report in English and participates in a technical meeting conducted in that language.

Conducts an oral presentation in English and answers questions from the audience.

Uses 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.

Communicates 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.

Plans and reaches agreements on the objectives, operating rules, responsibilities, schedule and review procedures work.

Identifies the roles, skills and shortcomings of the different group members, recognizing and / or assuming the role of leader. Negotiates and manages conflicts within the group.

Identifies user needs and develops a definition of product-process-service and its initial specifications. Follows the process management model based on a standard. Evaluates the application of laws and regulations that apply.

Identifies needs and market opportunities. Collects information that would allow elaborating specifications for a new product, process or service. Elaborates a basic business plan.

STUDY LOAD

Type	Hours	Percentage
Hours large group	26,0	7.98
Hours small group	78,0	23.93
Self study	222,0	68.10

Total learning time: 326 h

CONTENTS

Lectures

Description:
Specific aspects of economics and business. Business plan.
Regulations
Contents related to the specific project

Full-or-part-time: 35h 20m
Theory classes: 15h 20m
Self study : 20h

Seminars:

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

Full-or-part-time: 22h 30m
Theory classes: 10h
Self study : 12h 30m

Specific math concepts

Description:
Additional math content for the specific projects developed in this course: statistics, optimization, modeling, numerical calculation.

Full-or-part-time: 37h 30m
Theory classes: 16h 30m
Self study : 21h

Project

Description:
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.
- 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)
Examples of possible topics:

- 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

Full-or-part-time: 234h 40m
Guided activities: 99h 10m
Self study : 135h 30m

ACTIVITIES

(ENG) Presentació oral

(ENG) Presentació oral

(ENG) Proves de resposta curta (Control)

(ENG) Proves de resposta llarga (Examen Final)

GRADING 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)

EXAMINATION RULES.

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