Universitat Autònoma de Barcelona

2023/2024

Communications Systems Design

Code: 42837
ECTS Credits: 6

Degree	Type	Year	Semester
4313797 Telecommunication Engineering	OB	1	1

Contact

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Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject.
Please note that this information is provisional until 30 November 2023.

Teachers

Aitor Sanchez Abellan

External teachers

Aitor Sánchez Abellán

Prerequisites

It is required background on Digital Communications and Communication Systems.

Objectives and Contextualisation

System design requirements and functionalities are oriented to customer requirements and can become highly in
Design alternatives and system validation are part of the design process,

Unlike the usual teaching in an engineering course, the general objective

Detailed objectives include familiarizing students with systems thinking th

The content provides work guidelines but never exact rules, which deper
Examples of real systems will be described that will inspire students in th

Competences

- Capacity for applying theory of information methods, adaptative modulation and channel coding as well as advanced techniques for digital signal processing in telecommunications and audiovisual systems.
- Capacity for designing and dimensioning transport, diffusion and distribution networks for multimedia signals.
- Capacity for implementing systems using cable, lines, satellite in fixed and mobile communications environments.
- Capacity for modelling, designing, introducing, managing, operating, administrating and maintaining networks, services and content.
- Capacity for planning, decision-making and packaging of networks, services and applications considering the quality of service, direct and operating costs, the implementation plan, supervision, security procedures, scaling and maintenance and for managing and ensuring quality in the development process.
- Demonstrate an entrepreneurial, creative and innovative spirit
- Student should possess the learning skills that enable them to continue studying in a way that is largely student led or independent
- Students should know how to apply the knowledge they have acquired and their capacity for problem solving in new or little known fields within wider (or multidisciplinary) contexts related to the area of study
- Students should know how to communicate their conclusions, knowledge and final reasoning that they hold in front of specialist and non-specialist audiences clearly and unambiguously

Learning Outcomes

1. Demonstrate an entrepreneurial, creative and innovative spirit
2. Design and obtain coding and modulation techniques in communications systems.
3. Design communications systems considering quality requirements and the services offered.
4. Design systems considering quality requirements and communications services.
5. Identify and classify multimedia diffusion and distribution mechanisms in radio access networks.
6. Recognise design strategies for mechanisms to assign resources in radio access networks.
7. Student should possess the learning skills that enable them to continue studying in a way that is largely student led or independent
8. Students should know how to apply the knowledge they have acquired and their capacity for problem solving in new or little known fields within wider (or multidisciplinary) contexts related to the area of study
9. Students should know how to communicate their conclusions, knowledge and final reasoning that they hold in front of specialist and non-specialist audiences clearly and unambiguously

Content

Clases teóricas:

1. Introducción: sistema de pensamiento.
2. Diseño de sistemas de ingeniería.
3. Elementos de sistemas de comunicación y sistemas embebidos.
4. Fases de diseño: planteamiento del problema y requisitos.
5. Fases de diseño: arquitectura funcional y física.

6. Fases de diseño: Verificación y validación del sistema (V&V).
7. Codiseño de hardware y software: compensaciones.
8. Definición y estimación de recursos.
Laboratorio:
Sesión 0. Ideación del sistema.
Sesión 1. Declaración del problema y reunión de requisitos.
Sesión 2. Diseño del sistema: arquitectura funcional y física.
Sesión 3. Verificación y validación del sistema (V&V).
Sesión 4. Presentaciones de los proyectos por parte de los alumnos.

Methodology

The methodology will consist of lectures and study cases.

The students will be given two examples of requirements-driven full design study cases after which, teams of students will work on their own (interdisciplinary) design cases.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Supervised	45	1.8	2, 4, 3, 5, 8, 7, 6
Type: Supervised			
Student's work	15	0.6	1, 2, 4, 3, 5, 8, 9, 7, 6
Type: Autonomous			
Lectures	86	3.44	1, 2, 4, 3, 5, 8, 9, 7, 6

Assessment

Evaluation

- Theory: 50% (individual evaluation)
    - 50% Concepts questionnaire
    - 50% System Functional Analysis
- Laboratory: 50% (team evaluation)
    - 50% Lab Sessions deliverables
    - 50% Final Report and Presentation

The option to improve the grades obtained will be offered both in case of error or low score (<7).

This will be done by providing a set of specific potential improvements to

The grade will be "NOT SUBMITTED" as long as there are no grading re

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
A	A	1	0.04	1, 2, 4, 3, 5, 8, 9, 7, 6
B	0.25	1	0.04	4, 3, 8
C	0.25	1	0.04	1, 2, 4, 3, 5, 8, 9, 7, 6
D	0.25	1	0.04	1, 2, 4, 3, 5, 8, 9, 7, 6

Bibliography

1. Alan Dennis, Barbara Haley Wixom, David Tegarden, "Systems Analysis and Design: An Object Oriented Approach with UML", 5th Edition, Wiley April 2015.
2. Dennis M. Buede, "The Engineering Design of Systems: Models and Methods", Wiley 2009.

Software

Not required.