

**Disseny de Sistemes de Comunicacions****2014/2015**

Codi: 42837

Crèdits: 6

Titulació	Tipus	Curs	Semestre
4313797 Enginyeria de Telecomunicacions / Telecommunication Engineering	OB	1	1

**Professor de contacte**

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**Utilització de llengües**

Llengua vehicular majoritària: anglès (eng)

Grup íntegre en anglès: No

Grup íntegre en català: Sí

Grup íntegre en espanyol: No

**Prerequisites**

Se requieren conocimientos de comunicaciones digitales y sistemas.

**Objectius**

Systems engineering design is an interdisciplinary field towards the conceptualization, optimization and realization of successful engineering systems.

Requirements and functionalities are customer-driven and can become highly interdisciplinary and complex. Design alternatives and system validation are part of the design process, which requires interdisciplinary team efforts.

Differently to what an undergraduate engineering student learns, the general objective of this subject is about how to think rather than about what to think.

A taxonomic view of the communications systems within systems engineering will be given to contextualize communications system design.

Real examples of large and very large communications systems design will be lectured by system design engineers so that students get inspiration for their own design to be developed in the practical work.

**Competències**

- 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

## Resultats d'aprenentatge

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 communications systems considering the quality requirements and the services offered
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

## Continguts

### 1. Engineering System Design.

- What is a System?.
- What is Systems Design?.
- What is Engineering System Design?.
- Innovation: how to think (instead of what to think).

### 2. Design Examples.

- Enterprise communications system..
- Large scale communications system.

### 3. Design frameworks.

- Layered/cross-layer. DVB Case Study.
- Top/down bottom/up. IETF Case Study.

### 4. Invited lectures.

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Two additional sessions will be devoted to interaction/discussion/brainstorming.

## Metodologia

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.

### Activitats formatives

Títol	Hores	ECTS	Resultats d'aprenentatge
Tipus: Dirigides			
Lectures	30	1,2	2, 3, 4, 5, 6, 7, 8
Tipus: Supervisades			
Practical activities	25	1	1, 2, 3, 4, 5, 6, 7, 8, 9
Tipus: Autònomes			
Students's work	91	3,64	1, 2, 3, 4, 5, 6, 7, 8, 9

### Avaluació

•EVALUATION:

25% MID-TERM + 75% STUDENT'S DESIGN (25% LAB + 50% FINAL REPORT)

For each evaluated activity, the aspects to be specifically evaluated are:

- Creativity: 25%
- Technical applied knowledge: 25%
- Communication skills: 25%
- Multidisciplinary level: 25%

### Activitats d'avaluació

Títol	Pes	Hores	ECTS	Resultats d'aprenentatge
Final report	Final report	2	0,08	1, 2, 3, 4, 5, 6, 7, 8, 9
Mid-term presentation	Presentation	2	0,08	1, 2, 3, 4, 5, 6, 7, 8, 9

### Bibliografia

1. The Engineering Design of Systems: Models and Methods - Dennis M. Buede. Wiley 2009.
2. Jeffrey Wheat et All, "Designing a Wireless Network", Syngress; 1st edition 2001.