

Low Consumption Wireless Networks

2015/2016

Code: 42852

ECTS Credits: 6

Degree	Type	Year	Semester
4313797 Telecommunication Engineering	OT	2	1

Contact

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Use of languages

Principal working language: english (eng)

Teachers

Alejandro Correa Vila

Prerequisites

None.

Objectives and Contextualisation

The objective of this course is to provide the student with a basic knowledge on the design of low-power communication networks and the ability to generate a Business Model exploiting these kinds of networks in an Internet of Things or Smart City application.

More specifically, the goals are divided into two parts:

- In part 1, the objective is to provide the student with a theoretical framework on the design of low-power communication networks. Concepts on distributed data processing, efficient communication strategies and node positioning techniques will be addressed.

- In part 2, concepts presented in part 1 will be applied to a real application based on Internet of Things and Smart Cities. The objective is to develop a business case based on the use of low-power devices. Business and Entrepreneurship concepts will be reviewed with the aim of providing the student with the ability of generating a Business Model. The technological implementation of the solution will be addressed as well.

Skills

- 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 radionavigation, positioning systems and radar systems.
- Capacity for modelling, designing, introducing, managing, operating, administrating and maintaining networks, services and content.
- Capacity for working in interdisciplinary teams
- 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 communicate their conclusions, knowledge and final reasoning that they hold in front of specialist and non-specialist audiences clearly and unambiguously

Learning outcomes

1. Capacity for working in interdisciplinary teams
2. Classify the advantages and disadvantages of different node positions in a low consumption network for both fixed and mobile nodes.
3. Differentiate and classify the different mechanisms used for the distributed processing of data and cooperative communications used in low consumption sensor networks.
4. Recognise the different resource management and routing strategies in low consumption networks and select the most appropriate solution for the communication scenario.
5. Select and design energy efficient processing and communications techniques.
6. Student should possess the learning skills that enable them to continue studying in a way that is largely student led or independent
7. 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

Part 1 - Basics on Low-Power Network Design

1. Introduction to Low-Power Networks
2. Efficient Communication Strategies
3. Node positioning techniques
4. Distributed Data Processing

Part 2 - Business Application

1. Introduction to Internet of Things and Smart Cities
2. Value Creation and Business Models
3. Cost Analysis
4. Marketing
5. Finance

Methodology

The methodology will combine the following activities:

- Theoretical classes
- Team project: labs, teamwork and oral presentation
- Autonomous work
- Tutoring

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Labs	15	0.6	1, 2, 3, 4, 5, 6, 7
Theoretical classes	30	1.2	2, 3, 4, 5
Type: Supervised			
Tutoring	10	0.4	2, 3, 4, 5
Type: Autonomous			

Autonomous Work	90	3.6	1, 6, 7
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Evaluation

The final grade will be obtained from:

- 40% team project: evaluation of the teamwork performed at classes, labs and the final presentation. The final presentation will be performed in English (both slides and oral presentation).
- 40% project report: evaluation of the final report of the project. This report will be written in English.
- 20% class participation

The final grade should be equal or greater than 5 in order to pass this course.

In the case that the student does not participate in the team project and project report, his qualification will be "No qualification". In the opposite case, his evaluation will be based on the score rules presented above.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Class participation	20%	0	0	1, 7
Project Report	40%	0	0	1, 2, 3, 4, 5, 7
Team Project	40%	5	0.2	1, 2, 3, 4, 5, 6, 7

Bibliography

None.