Course guide
230699 - SHORT - Short Range Communications

Last modified: 11/04/2025

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

Degree: MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN ADVANCED TELECOMMUNICATION TECHNOLOGIES (Syllabus 2019). (Optional subject).

Academic year: 2025 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: JOSE PARADELLS ASPAS

Others:

PRIOR SKILLS

The course assumes some basics about radio frequency concepts and trasmission techniques such modulation and coding.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

Introduce students to the short-range communications technologies presenting and justifying its operation

STUDY LOAD

Type	Hours	Percentage
Self study	86,0	68.80
Hours large group	39,0	31.20

Total learning time: 125 h

CONTENTS

Contents and organisation

Description:
Introduction to the subject, content motivation
Organisation of the subject, contents and evaluation

Full-or-part-time: 1h
Theory classes: 1h

RFID

Description:
Basics principles
Applications
Examples of usage: Mifare Ultralight

Full-or-part-time: 6h
Theory classes: 6h

NFC

Description:
Physic Layer
Information structure
Example of usage
Home Lab: NFC

Full-or-part-time: 3h
Theory classes: 3h

Bluetooth

Description:
Evolution
Protocol architecture (physical layer, link layer, HCI, SDP, profiles,..)
Connection procedures
Bluetooth Low Energy
Home Lab: BLE

Full-or-part-time: 9h
Theory classes: 9h

Personal area networks IEEE802.15.4

Description:
Channels and access mechanisms (includes IEEE802.15.4e)
Capacity and power consumption performance
Channel
Procedures
Example of channel Ultra Wide Band (UWB) IEEE802.15.4a
Distance ranging and location
Home Lab: Usage of an UWB system

Full-or-part-time: 12h
Theory classes: 12h

Wireless Area Networks IEEE802.11

Description:
Architecture and roles
Physical channels: 11, 11b, 11g/a, 11ac, 11ad
Access Mechanisms and performance
Service quality (IEEE802.11e)
Power saving
Security
Mesh networks (IEEE802.11s)
Deployment and optimization
Home Lab: Trace analysis of system IEEE802.11

Full-or-part-time: 6h
Theory classes: 6h

Testx

Description:
Intermediate tests

Full-or-part-time: 2h
Theory classes: 2h

GRADING SYSTEM