Course guide
230699 - SHORT - Short Range Communications

Last modified: 25/05/2023

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: 2023 **ECTS Credits:** 5.0 **Languages:** English

LECTURER

Coordinating lecturer: Consultar aquí / See here: https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/responsables-assignatura

Others: Consultar aquí / See here: https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/professorat-assignat-idioma

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