

## SUBJECT TEACHING GUIDE

G841 - Diffusion and Radiolink Systems

Degree in Telecommunication Technologies Engineering

Academic year 2020-2021

1. IDENTIFYING DATA					
Degree	Degree in Telecommunication Technologies Engineering			Type and Year	Optional. Year 4
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Telecommunications Systems				
Course unit title and code	G841 - Diffusion and Radiolink Systems				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA DE COMUNICACIONES
Name of lecturer	SERGIO MIGUEL SANCHO LUCIO
E-mail	sergio.sancho@unican.es
Office	Edificio Ing. de Telecomunicación Prof. José Luis García García. Planta: - 1. DESPACHO (S128)
Other lecturers	MARIA ISABEL PONTON LOBETE

### 3.1 LEARNING OUTCOMES

- The student applies professional strategies to solve technical problems
- The student can work in a team, sharing knowledge, procedures, results and ideas related to the telecommunications and electronic areas
- The student is able to solve real life problems attached to the radio-communications industry
- The student understands the foundations of radio-communication systems and their application to horizontal analogic and digital radio-links.
- The student can calculate a radio-link both analogic and digital following the ITU recommendations, specifying the parameters of the used system and components (antennas, amplifiers, filters, modulators, demodulators, encoders and decoders, etc) in FM analogic systems and digitals PSK, QAM
- The student applies the techniques which the networks, services and telecommunication applications are based on. These techniques are applied in fixed, mobile, personal, local or long distance environments, with different bandwidths, including telephony, broadcasting, television and data, from the point of view of the transmission systems.

### 4. OBJECTIVES

- To know the foundations of radio communication systems and their application to horizontal radio links both analogic and digital, using the electromagnetic spectrum, frequency plans and channel models.
- To learn to calculate a radio link, both analogic and digital following the ITU recommendations, specifying the parameters of the used system and components (antennas, amplifiers, filters, modulators, demodulators, encoders and decoders, etc) in FM analogic systems and digitals PSK, QAM
- To know the foundations of the television transmitters and the transport system in digital TV.

### 6. COURSE ORGANIZATION

CONTENTS	
1	Review of radio wave propagation concepts
2	Profile sketching and fading.
3	Radio-link block diagram
4	Analysis of signals and noise in a radio-link
5	Digital radio-links.
6	Interferences in radio-links
7	Television

## 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Written exam	Written exam	Yes	Yes	50,00
It consist on carrying out a project. The project will be evaluated after its oral exposition by the student, including answering the teacher and other students' questions.	Work	No	No	50,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
<p>The evaluation will be online in the case of health alert due to COVID-19</p> <p>The students can choose between a continuous assessment system and a unique written exam. In order to access the continuous assessment system, the student must attend at least 80% of the classes. The final mark in this case will be calculated as <math>0.5 CA + 0.5 E</math>            CA: Continuous assessment mark            E: Written exam mark</p> <p>The students who are not evaluated through the continuous assessment system will be evaluated through a written exam (80 %) and an exam in the laboratory with Radio Mobile software (20 %)</p>				
<b>Observations for part-time students</b>				
<p>Part-time students:            The final grade is calculated as follows:            Written exam: 80 %            Laboratory exam: 20%</p>				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

- J.M. Hernando Rábanos, Transmisión por radio, Editorial Universitaria Ramón Areces, 2008
- S. Saunders, A. Aragón, Antennas and propagation for wireless communications, Wiley. 2007.
- Blair Benson, K. Television Engineering Handbook, McGraw-Hill Book Co. 1986.
- G.W. Collins: Fundamentals of Digital Television Transmission, John Wiley & Sons, Inc. 2001
- J. Griffiths, Radiowave propagation and antennas, Prentice-Hall. 1985