

SUBJECT TEACHING GUIDE

1098 - Transmission and Propagation

Master's Degree in Telecommunication Engineering

Academic year 2025-2026

1. IDENTIFYING DATA					
Degree	Master's Degree in Telecommunication Engineering			Type and Year	Optional. Year 1
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Optional Subjects				
Course unit title and code	1098 - Transmission and Propagation				
Number of ECTS credits allocated	4	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA DE COMUNICACIONES				
Name of lecturer	OSCAR FERNANDEZ FERNANDEZ				
E-mail	oscar.fernandez@unican.es				
Office	Edificio Ing. de Telecomunicación Prof. José Luis García García. Planta: - 2. DESPACHO (S279)				
Other lecturers	AMPARO HERRERA GUARDADO				

3.1 LEARNING OUTCOMES

- The student acquires the necessary knowledge and skills related to guided propagation and free space propagation, as well as radio frequency subsystems, which allow him/her to deal in optimal conditions with other Master subjects that require this knowledge.

4. OBJECTIVES

The objective of this subject is to complement the knowledge and skills acquired by the student in the Degree, in the field of general theory of waveguides, transmission lines, propagation mechanisms and radio frequency subsystems.

6. SUBJECT PROGRAM	
CONTENTS	
1	<p>SUBJECT 1. TRANSMISSION LINES Introduction. Circuital model of the transmission line. General equations of the transmission line. Solution in the domain of time and in the domain of frequency. Power. Standing waves. Input impedance. Mismatch. Smith Chart.</p> <p>SUBJECT 2. WAVEGUIDES Introduction. General solutions for TEM, TE and TM waves. The rectangular waveguide. The coaxial cable. Planar lines. Introduction to microwave circuits. Scattering parameters</p>
2	<p>SUBJECT 3. RADIOPROPAGATION MECHANISMS Propagation in free space. Flat earth model. Propagation by diffraction. Propagation by surface wave. Influence of the troposphere. Curved earth model.</p>
3	<p>SUBJECT 4. COMMUNICATIONS SYSTEMS General concepts, architectures, classification, magnitudes: Noise, gain, power, IP3. Active and passive components.</p>

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Written exam of problems and issues of subject 1 and 2.	Written exam	No	Yes	37,00
Written exam of problems and issues of subject 3	Written exam	No	Yes	33,00
Deliverable activities corresponding to blocks 1 and 2	Others	No	No	5,00
Continuous evaluation related to block 3	Others	No	Yes	25,00
Final exam of problems and questions	Written exam	Yes	Yes	0,00
TOTAL				100,00
Observations				
The final grade of the subject will be calculated by making the weighted average of the grades obtained in each block. To make the average it is necessary to have, at least, a 4 (out of 10) in blocks 1 and 2.				
Observations for part-time students				
The evaluation of part-time students will be carried out based on the special conditions that each student accredits.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
D. M. Pozar, "Microwave Engineering", 3ª Ed., Wiley, New Jersey, 2005.
Á. Cardama, L. Jofre, J. M. Rius, J. Romeu, S. Blanch y M. Ferrando, "Antenas", 2ª Ed., Edicions UPC, 2002.
W. F. Egan, "Practical RF System Design", Wiley Interscience, 2003.