SUBJECT TEACHING GUIDE

1094 - Advanced Communications Techniques

Master's Degree in Telecommunication Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Master's Degree in Telecommunication Engineering			Type and Year	Compulsory. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline					
Course unit title and code	1094 - Advanced Communications Techniques				
Number of ECTS credits allocated	5	Term		Semester based (1)	
Web	http://gtas.unican.es/docencia/tac				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA DE COMUNICACIONES
Name of lecturer	LUIS IGNACIO SANTAMARIA CABALLERO
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Office	Edificio Ing. de Telecomunicación Prof. José Luis García García. Planta: - 2. DESPACHO S270 (S270)
Other lecturers	

3.1 LEARNING OUTCOMES
- The student knows the basic principles of adaptive modulation schemes
- The student know the fundamental limits and the main communication strategies for multi-user MIMO systems.

4. OBJECTIVES
To know the priniciples behind adaptive modulation schemes and resource allocation algorithms in wireless networks.
The know the the fundamentals of point-to-point MIMO systems.
To know the fundamental of MIMO multiuser systems.

6. COURSE ORGANIZATION

	CONTENTS
1	Adaptive modulation and resource allocation schemes. Adpative power and bandwidth schemes in digital communication systems.
2	Point-to-point MIMO systems. Capacity. MIMO Detection. Space-time coding techniques.
3	Multiuser MIMO systems. Transmission techniques for multiple access, broadcast, and Interference channels (MAC, BC, IC).
4	Spectrum sensing and fundamentals of Cognitive Radio.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
The subject will be evaluated through two tests made along the course.	Written exam	No	Yes	50,00
There will be a final assignment to be developed independently by each student.	Work	No	Yes	50,00
TOTAL				100,00

Observations
Remote evaluation of exercises and written tests are foreseen, in case a new health alert by COVID-19 makes it necessary..
Observations for part-time students
Part-time students will follow the same evaluation criteria as regular students

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
A. Goldsmith, "Wireless Communications", Cambridge University Press, 2005.
D. Tse, P. Viswanath, "Fundamentals of Wireless Communications", Cambridge University Press, 2005.
A. Paulraj, R. Nabar, D. Gore, "Introduction to Space-Time Wireless Communications", Cambridge University Press, 2003.
E. Biglieri, et al., "Principles of Cognitive Radio", Cambridge University Press, 2013.