# SUBJECT TEACHING GUIDE

## 1087 - Signal Processing and Communications

## Master's Degree in Telecommunication Engineering

Academic year 2023-2024

| 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 | 1087 - Signal Processing and Communications | | | | |
| Number of ECTS credits allocated | 4 | Term | | Semester based (1) | |
| Web | http://gtas.unican.es/docencia/psc | | | | |
| Language of instruction | Spanish | English Friendly | Yes | Mode of delivery | Face-to-face |

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|---|---|
| Department | DPTO. INGENIERIA DE COMUNICACIONES |
| Name of lecturer | JAVIER VIA RODRIGUEZ |
| E-mail | javier.via@unican.es |
| Office | Edificio Ing. de Telecomunicación Prof. José Luis García García. Planta: - 2. DESPACHO S274 (S274) |
| Other lecturers | |

| 3.1 LEARNING OUTCOMES |
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| - Signal space as a tool for analysis and design of digital communications systems. |
| - Influence of channel and noise in the performance of communications systems. |
| - Optimization of digital communication systems |
| - Knowledge of the characteristics, technics and algorithms of digital communications systems, with special focus on diversity and multicarrier modulations. |
| - Application of statistical techniques to solve classification problems, estimation problems, prediction problems, and optimal / adaptive filtering problems with focus on communication systems. |

| 4. OBJECTIVES |
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| Solving of classification and detection problems. |
| Solving estimation problems. |
| Solving optimal filtering problems. |
| Analysis and design of digital communications systems using signal space in AWGN and fading channels. |
| Channel diversity techniques to enhance the performance of digital communications systems. |
| Physical layer aspects of some communication standards: WiFi, DVB, Bluetooth, ZigBee, UMTS, LTE, etc |

| 6. COURSE ORGANIZATION | |
|---|---|
| CONTENTS | |
| 1 | Detection and classification<br>Estimation |
| 2 | Stochastic processes<br>Optimum filtering and adaptive filtering |
| 3 | Signals space.<br>Communication channels.<br>Diversity. |
| 4 | Multicarrier modulations |

| 7. ASSESSMENT METHODS AND CRITERIA | | | | |
|---|---|---|---|---|
| Description | Type | Final Eval. | Reassessn | % |
| Quiz 1 | Written exam | No | Yes | 50,00 |
| Quiz 2 | Written exam | No | Yes | 50,00 |
| Final exam | Written exam | Yes | Yes | 0,00 |
| TOTAL | | | | 100,00 |
| Observations | | | | |
| The final score is that of the final exam, except if the mean of the two partial exams is above 5.0 and the student do not want to take the final exam. In that case, the score is the mean of the partial exams. | | | | |
| Observations for part-time students | | | | |
| Part-Time Students can take the three exams | | | | |

| 8. BIBLIOGRAPHY AND TEACHING MATERIALS |
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| BASIC |
| S. M. Kay, Fundamentals of statistical signal processing, vol. I, Estimation theory, Prentice Hall, 1993 |
| S. M. Kay, Fundamentals of statistical signal processing, vol. II, Detection theory, Prentice Hall, 1998 |
| B. Sklar, Digital Communications. Fundamental s and Applications, 2ª edición, Prentice-Hall 2001 |
| A. Goldsmith, Wireless Communications, Cambridge University Press, 2005 |