

Academic Year: (2024 / 2025)

Review date: 16-09-2024

Department assigned to the subject: Telematic Engineering Department

Coordinating teacher: SERRANO YAÑEZ-MINGOT, PABLO

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

OBJECTIVES

The course aims to provide students with a comprehensive understanding of modern wireless communication technologies and their application in the connected industry. The course introduces the fundamentals of wireless networks and covers up to the latest innovations in 5G systems, including 802.11 standards and the evolution of mobile systems. The fundamentals of wireless network design are presented, including both access and core networks, preparing students to face the challenges and opportunities in the field of advanced wireless communications.

DESCRIPTION OF CONTENTS: PROGRAMME

Common themes of the subjects:

- Connection of industrial elements, robots, machines, etc. to the network
- Wireless networks engineering
- Properties and trade-offs in the design of wireless access technologies
- Distributed computing and industrial networked applications
- Transport and application protocols for limited devices

Specific themes of the subjects:

5G and wireless networking:

- Principles of wireless networking and connected industry
- WLAN standards
- 5G in IoT and industry
- Wireless network design
- New access and core technologies for 5G

LEARNING ACTIVITIES AND METHODOLOGY

Training activities:

Activity	Total Hours	On-site Hours	% Student On-site Attendance
AF1	36	36	100
AF2	18	18	100
AF4	9	9	100
AF5	6	6	100
AF6	75	0	0
AF7	75	0	0
AF8	6	6	100
TOTAL SUBJECT	225	75	33%

- AF1 Theoretical class
- AF2 Practical classes
- AF4 Laboratory practices
- AF5 Tutorials
- AF6 Group work
- AF7 Individual student work

AF8 Partial and final exams

These training activities are based on a combination of the following Teaching Methodologies:

MD1 Teacher's classroom presentations supported by computer and audiovisual media, in which the main concepts of the subject are developed and bibliography is provided to complement the students' learning.

MD2 Critical reading of texts recommended by the course teacher: articles, reports, manuals and/or academic articles, either for subsequent discussion in class or to expand and consolidate the knowledge of the subject.

MD3 Resolution of case studies, problems, etc. posed by the teacher individually or in groups

MD4 Presentation and discussion in class, under the teacher's moderation, of topics related to the content of the subject, as well as practical cases

ASSESSMENT SYSTEM

% end-of-term-examination: 60

% of continuous assessment (assignments, laboratory, practicals...): 40

Evaluation systems:

Evaluation	Weighting (%)
SE2	40
SE3	60

SE2 Individual or group assignments completed during the course

SE3 Final exam

BASIC BIBLIOGRAPHY

- Chris Johnson Long Term Evolution in Bullets, CreateSpace Independent Publishing Platform; 2nd ed, 2012

- Matthew S. Gast 802.11 Wireless Networks: The Definitive Guide, O'Reilly, 2002

- Sassan Ahmadi 5G NR: Architecture, Technology, Implementation, and Operation of 3GPP New Radio Standards, Academic Press, 2019

ADDITIONAL BIBLIOGRAPHY

- Matthew S. Gast 802.11ac: A Survival Guide: Wi-Fi at Gigabit and Beyond , O'Reilly Media, 2013

- Patrick Marsch (Editor), Ömer Bulakci (Editor), Olav Queseth (Editor), Mauro Boldi (Editor) 5G System Design: Architectural and Functional Considerations and Long Term Research, Wiley, 2018