SUBJECT TEACHING GUIDE

G817 - Communication of Data

Degree in Telecommunication Technologies Engineering
First Degree in Telecommunication Technologies Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Telecommunication Technologies Engineering First Degree in Telecommunication Technologies Engineering			Type and Year	Compulsory. Year 2 Compulsory. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Networks and Data Communication Module in Common with the Telecommunications Branch				
Course unit title and code	G817 - Communication of Data				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web	https://aulavirtual.unican.es/				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA DE COMUNICACIONES
Name of lecturer	ROBERTO SANZ GIL
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Other lecturers	MARTA GARCIA ARRANZ

3.1 LEARNING OUTCOMES

- Knowledge of the basic concepts on open network architectures, protocols, entities and communication interfaces.
  Knowledge of basic techniques on data link layer and network layer.

4. OBJECTIVES

Introduce the student to the field of data communication networks and protocol architectures along with the basic concepts related to flow control and error control techniques used in networks to ensure reliable and efficient transfer over data links . Describe the basic principles of operation of Local Area Networks , both wired (LAN) and wireless (WLAN Wi-Fi), as well as the most common Wide Area Networks (WAN). Study the way in which all these types of networks are interconnected. Introduce the Internet protocol architecture based on the TCP/IP stack.

6. SUBJECT PROGRAM

CONTENTS	
1	Chapter 1. Data transmission fundamentals.Communication modes: simplex, semi-duplex, duplex. Bit, character and frame synchronization. Synchronous and asynchronous transmission modes. Flow and error control concepts. Information sources. Source coding. Source compression. Entropy. Compression algorithms. Huffman codes. Facsimile. Cyclic Redundancy Check (CRC). Physical layer interface norms.
2	Chapter 2. Course introduction. Communication architecture concept. Protocol functions. Proprietary communication architectures. Standardization organizations. The OSI reference model. Service primitives. Application oriented layers. Network dependent layers. Internet vs OSI. Error control. Data compression. Universal Communication Interfaces.
3	Chapter 3. Data link definition. Link layer functions. Flow control mechanisms without errors. Stop & Wait Protocol. Sliding window protocols. Error control. Continuous ARQ Protocols. Go-Back N Protocols. Selective rejection protocols.
4	Chapter 4. Local Area Networks (LAN). Topologies and transmission media. Medium access control techniques. Aloha and Slotted Aloha protocols. CSMA, CSMA/CD and CSMA/CA protocols. IEEE 802.x standards. Ethernet and WLANs networks. Ethernet switching.
5	Chapter 5. Wireless Local Area Networks (WLAN). Wireless technologies. The Wi-Fi router. IEEE 802 standards. Media access control (CSMA/CA). Physical layer. Link layer.
6	Chapter 6. The need for interconnecting heterogeneous networks. The Internet. The router concept. Particularization for the IP Protocol. ARP and ICMP Protocols. TCP and UDP Protocols. Application protocols. Practical applications of TCP/IP.
7	Written exam: multiple choice test questions and exercices.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Partial exam 1	Written exam	No	Yes	15,00
Partial exam 2	Written exam	No	Yes	15,00
Final exam	Written exam	No	Yes	45,00
Lab tests	Laboratory evaluation	Yes	No	25,00
TOTAL				100,00

Observations

The final grade of the subject (FINAL) is obtained by applying the following formula:
FINAL = THEORY * 0.75 + PRACTICE * 0.25

a) THEORY Note: the marks from the two midterm tests will be considered together with the final exam so that THEORY will be calculated as:
THEORY = max(EP1 * 0.20 + EP2 * 0.20 + EF * 0.60; EF)
Considering:
EP1, EP2: the grades obtained in each of the two partial exams.
EF: grade obtained in the final exam, which must be at least 4.0.
All calculations are made with notes out of 10 points.

b) PRACTICAL Note: it is the arithmetic average of the practice tests carried out in the laboratory. It does not require a minimum grade.

To pass the subject, two conditions must be met:
EF >= 4.0
FINAL >= 5.0

If both are not met, the final grade for the subject will be, according to Art.35 of the current UC evaluation regulations, the minimum value between the FINAL grade and 4.9.

Observations for part-time students

Part-time students will be examined for the subject in the final exam of the ordinary call or, where appropriate, the extraordinary one.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

F. Halsall, "Data Communications, Computer Networks and Opens Systems" (4ª edición), Addison Wesley, 1996.
F. Halsall, "Computer Networking and the Internet", (5ª edición), Addison Wesley, 2005.
M.S. Gast, "802.11 wireless networks: the definitive guide" (2ª edición), O'Reilly, 2005.