SUBJECT TEACHING GUIDE

G817 - Communication of Data

Degree in Telecommunication Technologies Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Telecommunication Technologies Engineering			Type and Year	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

The main aim is to introduce data communication networks to students, as well as protocol architectures. Also, basic concepts about data circuit and data links will be shown, applying a special point on the technics and protocols which are used to achieve a free error transmission between two or more devices. Finally, Local Area Network (LAN) and Wide Area Network (WAN) operation modes and their interconnection will be explained, as well as introducing the Internet protocol architecture based on the TCP/IP stack.

6. COURSE ORGANIZATION	
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. Data link control protocols. Character-oriented and bit-oriented protocols. File transfer protocolos: X-modem and Kermit. The BSC of IBM protocol. ISO HDLC protocol. Operation modes: NRM and ABM. HDLC subclasses.
5	Chapter 5. Local Area Networks. 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.
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	30,00
Partial exam 3	Written exam	No	Yes	30,00
Laboratory practices	Laboratory evaluation	Yes	No	25,00
TOTAL				100,00

Observations

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

- THEORY: if the student reaches the minimum mark in the three evaluation tests corresponding to the partial exams, THEORY will be the weighted average of said partial exams. Otherwise, you must attend the final exam (ordinary and/or extraordinary call) in which you will be evaluated on all the contents of the subject. In this case, THEORY will be calculated as max (EF, EF*0.6+EP*0.4), being:
- EP: weighted average mark of the partial exams.
- EF: grade obtained in the final exam, which must be at least 5.0.

- PRACTICE: is the arithmetic mean of the practical tests carried out in the laboratory. It does not require a minimum grade.

If the minimum grade is not reached in any of the assessment tests (including EF), the final grade for the subject will be, according to Art.35 of the current UC assessment 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