SUBJECT TEACHING GUIDE

G661 - Introduction to Computer Networks

Degree in Computer Systems Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Computer Systems Engineering			Type and Year	Compulsory. Year 3
Faculty	Faculty of Sciences				
Discipline	Subject Area: Computer Systems and Networks Compulsory Module				
Course unit title and code	G661 - Introduction to Computer Networks				
Number of ECTS credits allocated	6		Term	Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA
Name of lecturer	ENRIQUE VALLEJO GUTIERREZ
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3.1 LEARNING OUTCOMES
- Know the fundamentals of computer networks and the different network topologies and most used protocols.
- Understand the concept of communication protocol and protocol architectures.
- Know the different transmission media and technologies employed for information transmission.
- Know the different devices used for network interconnection.
- Be able to define, select and evaluate hardware and software platforms for the development of network systems.
- Be able to design, implement and configure a LAN network.

4. OBJECTIVES

Starting from the fundamentals of protocol architecture, the student will obtain a general overview of the mechanisms employed for data transmission in communication networks, with a special focus on TCP/IP.

The student will understand how transmission occurs on a physical medium, and why some mechanisms are required to share and control such medium. Different alternatives to access the medium and transmit data will be studied for networks with multiple devices, wired or wireless. This study will focus on the most employed technologies, both wired Ethernet and wireless WiFi networks. This will enable the student to take decisions for the design, deployment, configuration and managing of a wired or wireless local area network.

6. COURSE ORGANIZATION

	CONTENTS
1	Section 1: Introduction - Introduction to the basic concepts of computer networks: communication, computer network, protocol. - Communication protocol architectures. OSI and TCP/IP models.
2	Section 2: Physical layer - Signal concepts. Time and frequency characterization. - Transmission media. - Structured cabling installations. - Propagation of signals and transmission errors. - Signal coding and modulation. - Analog data transmission.
3	Section 3: Link level - Synchronous and asynchronous transmission. - Flow control: Stop and wait, sliding window. - Error detection and ARQ-based error control. - Frequency and time (synchronous and statistic) multiplexing. - Application examples: HDLC, cable-modems and ADSL modems.
4	Mid-term exam
5	Section 4: Wired Local Area Networks - IEEE 802 protocol architecture. - MAC and LLC sublayers. - CSMA/CD in Ethernet. - Hub and switch devices. - Evolution of wired local area networks.
6	Section 5: Wireless networks - Types of wireless area networks and protocols employed. - 802.11: Variants and characteristics. - Security in wireless networks.
7	Final exam

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
FInal exam	Written exam	Yes	Yes	60,00
Lab sessions	Laboratory evaluation	No	Yes	30,00
Mid-term exam	Written exam	No	Yes	10,00
TOTAL				100,00
Observations				
Observations for part-time students				
Part-time students can embrace the continuous evaluation model. Otherwise, they will have a single evaluation in the ordinary and extraordinary examination periods. This will consist of an exam with both theoretical and practical (problems) questions and another part relative to the lab sessions.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
William Stallings: "Data and Computer Communications", 10th ed. Pearson, 2014.
James F. Kurose, Keith W. Ross: "Computer networking : a top-down approach" 6th ed. Addison-Wesley, 2013.