

## SUBJECT TEACHING GUIDE

### G674 - Design and Management of Networks

#### Degree in Computer Systems Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Computer Systems Engineering			Type and Year	Optional. Year 4
Faculty	Faculty of Sciences				
Discipline	Subject Area: Computer Engineering Mention in computer Engineering				
Course unit title and code	G674 - Design and Management of Networks				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web	<a href="https://aulavirtual.unican.es/">https://aulavirtual.unican.es/</a>				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA DE COMUNICACIONES
Name of lecturer	ROBERTO SANZ GIL
E-mail	<a href="mailto:roberto.sanz@unican.es">roberto.sanz@unican.es</a>
Office	Edificio Ing. de Telecomunicación Prof. José Luis García García. Planta: - 2. DESPACHO (S205)
Other lecturers	JOSE ANGEL IRASTORZA TEJA

### 3.1 LEARNING OUTCOMES

- The student will become familiar with the most relevant technology, protocols, specific terminology and recommendations for international public and corporate telecommunications networks. The student will also acquire knowledge about data transmission networks while deepening on both access technologies and services that public telecommunication carriers provide. Those carriers represent support for both the more traditional services (PSTN, leased lines, etc.) and for those more innovative (public Internet, virtual private networks, IP telephony). In addition, the student will learn about the most widely used network management protocols supporting well known OAM techniques.

#### 4. OBJECTIVES

The main objective of this course is that students complete their training on networks of data transmission, making a special emphasis on both access technologies (wired and wireless) and services that public telecommunications carriers offer, which represent support for both traditional services (PSTN, leased lines, etc.) and for those more innovative (public Internet, virtual private networks, IP telephony). In addition, special emphasis on network administration and management, the SNMP protocol and network management platforms is done.

#### 6. SUBJECT PROGRAM

CONTENTS	
1	Chapter 1. Introduction to access technologies. Wired and wireless media. Network topologies. Broadcast vs point-to-point networks. Services: types and requirements.
2	Chapter 2. Wireless access technologies. ISM spectrum. The 802.11 family. Standardization. TCP/IP performance over IEEE 802.11. Management tasks on IEEE 802.11. Security on IEEE 802.11.
3	Chapter 3. IP Telephony. Signaling protocols. VoIP systems. Elements composing an IP Telephony network. Codecs and standards.
4	Chapter 4. Trunk network evolution. Evolution on the logical layer: Frame Relay, ATM and IP. Evolution on the physical layer: SDH/SONET, MPLS, WDM, MetroEthernet.
5	Chapter 5. Introduction to network management Introduction and main concepts. Submodels of a network management architecture. Functional areas of management. Integrated and distributed management.
6	Chapter 6. Abstract Syntax Notation One (ASN.1) - Introduction to ASN.1 - ASN.1 syntaxis - BER coding - Coding examples - Macros coding
7	Chapter 7. Management protocols: SNMP and RMON. SNMP architecture. ASN.1 syntaxis: SMIv1. Internet registry tree. MIB-II(RFC 1213). SNMPv1 message format. Protocol enhancements for SNMP v2 and v3. RMON and MIB RMON.
8	Ordinary final exam.

## 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Lab assignment evaluation.	Laboratory evaluation	Yes	No	30,00
Individual evaluation for Block 1	Written exam	No	Yes	35,00
Individual evaluation for Block 2	Written exam	No	Yes	35,00
TOTAL				100,00
Observations				
<p>The final grade for the subject is obtained by applying the following formula:  <math>FINAL = THEORY * 0.70 + PRACTICE * 0.30</math></p> <p>- THEORY: is the weighted average of the grades obtained in the midterm exams taken during the semester. They will be considered if all of them have been completed and a grade of at least 4.0 has been obtained in all of them. Otherwise, THEORY will be the grade obtained in the final exam, since continuous evaluation is not mandatory.</p> <p>- PRACTICE: it is the arithmetic mean of the scores of the tests carried out in the laboratory.</p>				
Observations for part-time students				
<p>The final grade for the subject is obtained by applying the following formula:  <math>FINAL = THEORY * 0.70 + PRACTICE * 0.30</math></p> <p>- THEORY: is the weighted average of the grades obtained in the midterm exams taken during the semester. They will be considered if all of them have been completed and a grade of at least 4.0 has been obtained in all of them. Otherwise, THEORY will be the grade obtained in the final exam, since continuous evaluation is not mandatory.</p> <p>- PRACTICE: it is the arithmetic mean of the scores of the tests carried out in the laboratory.</p> <p>For part-time students, flexible lab schedule will be negotiated.</p>				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

TANENBAUM, Andrew S., "Computer networks", 4ª edición, Upper Saddle River, Pearson Education International, 2003.  
 SNMP, SNMPv2 and RMON: Practical network managemet, second edition by Stallings William; hardcover 478 pages, published by Addison Wesley, 07/96, ISBN: 02011634791