Syllabus
2025 - 2026

GENERAL INFORMATION

Data of the subject

Subject name	Computer Network Architecture
Subject code	DTC-GITT-321
Mainprogram	Bachelor's Degree in Engineering in Telecommunication Technologies
Involved programs	Grado en Ingeniería en Tecnologías de Telecomunicación [Third year] Grado en Ingeniería en Tecnologías de Telecom. y Grado en Análisis de Negocios/Business Analytics [Third year]
Level	Reglada Grado Europeo
Quarter	Semestral
Credits	7,5 ECTS
Type	Obligatoria (Grado)
Department	Department of Telematics and Computer Sciencies
Coordinator	Alejandro García San Luis

Teacher Information

Teacher

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DESCRIPTION OF THE SUBJECT

Contextualization of the subject

Prerequisites

Course:: Network Technologies

Course contents

Contents

Topic 1: Basic Concepts

Network functions and services, protocols and protocol architecture, a simplified communications model, the OSI reference model, introduction to network interconnection.

Topic 2: Network Layer

Network layer functionality, addressing, routing protocols, modes of operation, network header addressing, route selection by class of service, congestion control, fragmentation and reassembly, network layer addresses and subnet addresses, network layer protocols, support for mobile stations.

Topic 3: TCP/IP Overview

Introduction to TCP/IP, TCP/IP structure, elements of IP networks, IP addressing, IP address classes, special IP addresses, IP addressing issues, addresses and names.

Topic 4: Routing Tables and Subnets

IP routing and routing tables, subnets, routing tables, management of public and private addresses.

Topic 5: IP and ICMP Protocols

Main functions of the IP layer, IP layer header, Internet Control Message Protocol (ICMP).

Topic 6: Address Resolution Protocols

ARP protocol, RARP protocol, InARP protocol.

Topic 7: TCP/IP Routing Protocols

Introduction, types of route calculation algorithms, Internet structure, Routing Information Protocol (RIP), OSPF routing protocol, BGP routing protocol.

Topic 8: Multicast Routing

Multicast message transmission, multicast addresses, host modifications for multicast support, IGMP protocol, multicast routers, multicast routing and the MBONE network.

Topic 9: IP Version 6

History and initial problems with IPv4, IPv6 development, IPv6 addresses and their representation, ICMPv6.

Topic 10: Transport Layer: UDP Protocol

UDP header format, datagram routing between layers, UDP process communication, IP address restrictions, UDP sockets.

Topic 11: Transport Layer: TCP Protocol

General TCP characteristics, TCP header format, TCP logic, congestion control, TCP connections.

Topic 12: Application Layer

TCP/IP applications: DNS, HTTP, and FTP.

Topic 13: Network Management

Introduction to network management, management elements, management protocols, remote monitoring, management tools.

EVALUATION AND CRITERIA

The use of AI to produce full assignments or substantial parts thereof, without proper citation of the source or tool used, or without explicit permission in the assignment instructions, will be considered plagiarism and therefore subject to the University's General Regulations.

Evaluation activities	Evaluation criteria	Weight
Exams: Inter-semester test (15%) Final Exam (50%)	• Understanding of concepts. • Application of concepts for problem solving. • Analysis and interpretation of the results obtained in the resolution of problems.	65
Continuous assessment: Tests and exercises (5%) Final Project (15%)	• Understanding of concepts • Application of concepts for problem solving • Analysis and interpretation of the results obtained in problem solving • Application of concepts to the design, configuration and administration of a network infrastructure that integrates various network technologies dealt with in the practices of the course • Integration and implementation of the knowledge, skills and abilities acquired in the subject	20
Evaluation of the experimental work: Final Laboratory Exam	• Understanding of concepts • Application of concepts to the design, configuration and administration of a network infrastructure that integrates various network technologies discussed in the course practices. • Integration and implementation of the knowledge, skills and abilities acquired in the subject.	15

Grading

To pass the course, students must achieve at least 5 out of 10 points on both the final theory exam and the final laboratory exam, in both the regular and supplementary sessions. In the supplementary session, it is possible to retain the grade from the theory or laboratory part

if it has been passed.

The grade for the course in the regular session will be calculated as follows:

Final Exam: 50%, Mid-term Exam: 15%, Final Laboratory Exam: 15%, Final Project: 15%, Intermediate Follow-up Tests: 5%

The grade for the course in the supplementary session:

The same criteria as in the regular session will be applied, retaining the 20% obtained from the intermediate tests during the course.

Use of AI Tools

In the course *Network Architecture*, the use of Artificial Intelligence (AI) tools—such as ChatGPT or similar platforms—is specifically regulated depending on the type of task to be carried out. This regulation aims to ensure that the evaluation faithfully reflects the competencies acquired by the student, while respecting the practical, technical, and conceptual nature of each activity.

The following conditions apply:

Theoretical exams, problem-solving tasks, reports, and regular lab work
For all standard evaluation tasks (guided lab exercises, intermediate assignments, technical reports, written essays, quizzes, or any other regular submission), the use of AI tools is **not permitted**.

The evaluation must be completed entirely without the assistance of AI in a controlled environment, ensuring that students rely solely on their own knowledge, understanding, and skills. AI must not be used at any point during the evaluation, and students must demonstrate their basic competencies and understanding independently.

Final Laboratory Exam
In this specific case, the use of all types of resources is allowed, both digital and printed, including access to the Internet and Artificial Intelligence tools. Students may use such tools to explore solutions, consult references, verify configurations, or validate procedures—always from an active and autonomous learning perspective.

AI tools may be used for preliminary activities such as brainstorming, outlining, and initial research. At this level, AI is employed for planning, synthesis, and idea generation; however, the assessment must focus on the student's ability to develop and refine these outputs independently. In other words, AI may be used to plan, generate ideas, and consult command structures, but the core execution must be their own.

Final Project / Network Simulation Model
The use of tools such as ChatGPT is allowed **only during the design and planning phase**, for the purpose of exploring solutions, consulting technologies, or generating ideas related to the development of the network simulation model.

However, the project documentation (technical report) **must be produced without any AI assistance**. The content must reflect exclusively the student's individual knowledge, reasoning, and competencies.

The evaluation must be completed entirely without the assistance of AI in a controlled environment, ensuring that students rely solely on their own knowledge, understanding, and skills. AI must not be used at any point during the evaluation, and students must demonstrate their basic competencies and understanding independently.

Regarding the final simulator file (functional model), it must clearly demonstrate the student's autonomous application of acquired knowledge. Therefore, its structure, network logic, configuration, and parameter settings must be the direct result of the student's own work. While AI may have been used during the planning phase, it **must not contribute to the generation of the final submitted file**.

WORK PLAN AND SCHEDULE

Activities	Date of realization	Delivery date
Reading and studying the theoretical content in the course notes After each class	After each class	
E-learning platform	After each class	
Exercises After the class in which they are proposed	Next theory class day	
Preparation for laboratory practices	Two days before each practice	
Partial submissions of the practice document	After each practice	The week after the practice is conducted
Submission of the final course practice	April	Last day of class
Preparation for Final Theory Exam	April/May	
reparation for Final Laboratory Exam	April/May	

BIBLIOGRAPHY AND RESOURCES

Basic References

Course Notes: Transparencies on Moodle. 2025.

Cisco e-learning platform: http://cisco.netacad.net

Paul W Browning, Farai Tafa, Daniel Gheorghe, Dario Barinic. "Cisco CCNA in 60 Days", ISBN-13: 978-0992823986. Reality Press Ltd., 2020.

In compliance with current regulations on the **protection of personal data**, we would like to inform you that you may consult the aspects related to privacy and data that you have accepted on your registration form by entering this website and clicking on "download"
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