

## 30239 - Network Design and Administration

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 30239 - Network Design and Administration

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura  
326 - Escuela Universitaria Politécnica de Teruel

**Degree:** 439 - Bachelor's Degree in Informatics Engineering  
443 - Bachelor's Degree in Informatics Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject type:**

**Module:**

### 1. General information

The purpose of this subject is to enable the student to design and administer TCP/IP networks. Must be able to analyze experimentally the requirements and characteristics of network communications and the communications protocols of the applications and services offered in an organization. To be able to configure and manage equipment for building networks and Internet access, integrating different networks with each other in an automatic and robust way. Build controlled environments of network integration and services where you apply management procedures for equipment and access technologies.

To know and use in an autonomous and correct way the tools, instruments and software applications available in the laboratories. And correctly carry out the analysis of the data collected.

### 2. Learning results

In order to pass this subject, the students shall demonstrate they has acquired the following results:

Study and analyze the requirements and characteristics of quality and cost of network communications and the communications protocols of the applications and services offered in an organization.

Analyze the characteristics of IP network construction equipment (switch, router, access points, etc.) and Internet access infrastructures (ADSL, HFC, WIFI, etc.) and relate them to communications requirements and protocols so as to be able to select the most suitable equipment and infrastructures.

Configure and manage network building and Internet access equipment, being able to integrate different networks with each other in an automatic and robust way.

Evaluate the parameters that characterize communications, equipment and access technologies, estimating and monitoring end-to-end quality and cost parameters from the equipment where the applications are located.

Design and integrate IP networks and services on controlled laboratory environments in which you apply evaluation procedures of quality and cost characteristics of communications, equipment and Internet access infrastructures that allow the selection of the best alternatives.

### 3. Syllabus

Block 0. Introduction. Overview of the subject. Necessity of network design and administration.

Block 1. Interconnection of IPv4 networks. NAT: Network Address Translation. Routing protocols. RIP and OSPF.

TCP/IP network management.

Block 2. Interconnection of IPv6 networks. Addressing. PDU: Extension headers. Autoconfiguration. Functions of control.

Block 3. Network construction using switched Ethernet technologies. Structure of a switch.

Routing. Switching. Multicast. Virtual LANs. SDN (Software Defined Network). Problems.

Block 4. Wireless access technologies. Mechanisms of access to the environment. 802.11 WLAN networks.

Block 5. Network infrastructure analysis and planning. Practical examples.

## 4. Academic activities

Type 1 activity (lectures) 20 hours. Following the syllabus.

Type 2 activity (problem classes) 10 hours.

Type 3 activity (practical classes) 30 hours. Introduction to GNS3. Configuration of an IPv4 scenario. Configuration of an IPv4-NAT scenario. Design and management of IPv6 scenarios. Design and Management of LANC Technologies. Configuration of a WIFI scenario.

### En la EINA:

Type 6 activity (teaching assignments) 08 hours. Development of an application for element management of concentration through SNMP.

Type 7 activity (self-study) 78 hours.

Final assessment activity Type 8 activity (written test) 04 hours.

### At EUPT:

Type 7 activity (self-study) 87 hours.

Final assessment activity Type 8 activity (written test) 3 hours.

## 5. Assessment system

The student will have a global test in each of the exams established throughout the term.

E1: Final exam (100%). Scoring from 0 to 10 points. It consists of two parts: E1A: Theoretical/practical content exam (50%). In this test, questions and/or problems related to the program taught in the subject will be posed.

Minimum score of 5 out of 10 points. E1B: Laboratory practices (50%). The realization of the practices in controlled laboratory scenarios is mandatory for all students. There is the possibility of continuous assessment of the practices.

Obtaining a minimum grade of 7 in this continuous assessment will exempt the student from taking a final practice test Minimum score of 5 out of 10 points. If a 5 is not exceeded in any of the above parts, the final grade will be failed.

## 6. Sustainable Development Goals

8 - Decent Work and Economic Growth

9 - Industry, Innovation and Infrastructure