

## 30373 - Network Interconnection

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 30373 - Network Interconnection

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 581 - Bachelor's Degree in Telecommunications Technology and Services Engineering

**ECTS:** 6.0

**Year:** 2

**Semester:** First semester

**Subject type:** Compulsory

**Module:**

### 1. General information

The purpose of this subject is for the student to learn the basics of the Internet, being able to configure and analyze basic network interconnection scenarios. To this end, the subject covers the study of the functions and protocols of the different levels of TCP/IP architecture, Internet services and applications and the necessary security mechanisms, with the practical support of configuration and analysis of laboratory scenarios.

### 2. Learning results

The student, in order to pass this subject, must demonstrate the following results...

- R1. Know and understand the main network level functions and protocols of the TCP/IP architecture. Know the problematic and limitations of his protocols.
- R2. Know how to define an IP numbering plan for a network, correctly configure the network level of the equipment terminals and interconnection equipment and configure Internet routing protocols.
- R3. Know the Internet transport layer protocols and be able to analyze their behavior in various interactive traffic and congestion situations.
- R4. Describe the main Internet services and applications.
- R5. Know the need to manage and secure networks and services as well as the tools and architectures to protect them.
- R6. Correctly pose the problem from the proposed statement and identify the options for its resolution. Apply the appropriate solving method and identify the correctness of the solution.
- R7. Know and use in an autonomous and correct way the tools, instruments and software applications available in the laboratories and correctly perform the analysis of the collected data.
- R8. Know how to apply the concepts learned in the commercial laboratory equipment acquiring autonomy in the work and getting in touch with technologies widely used in the business world.

### 3. Syllabus

- Block 0. Introduction.
  
- Block 1. End-to-end communications: IP-based services
  - Topic 1.1. General concepts and architectural paradigms
  - Topic 1.2. Study of applications
  - Topic 1.3. Transport layer protocols: General Concepts, TCP and UDP Protocols
  
- Block 2. Network interconnection: IP layer
  - Topic 2.1. IPv4 protocol: addressing, PDU, fragmentation and reassembly, routing, control functions.
  - Topic 2.2. IPv6 protocol: addressing, PDU and extension headers, control functions, autoconfiguration, routing, coexistence / transition

- Block 3. Network security
  - Topic 3.1. Communications security: introduction, types of threats, security tools and basic practices

## 4. Academic activities

**Lectures (30 hours).** Presentation of theoretical-practical contents by the teacher.

**Problem solving and case studies (10 hours).** Problem solving and case studies in the classroom.

**Laboratory practices (20 hours).** Practical sessions on configuration and analysis of network scenarios.

**Assessment tests (6 hours)**

**Personal study and work of the student (84 hours).** Hours of personal work dedicated to the study of theoretical concepts, problem solving and preparation and analysis of the results of the practical sessions.

## 5. Assessment system

The subject will be evaluated as follows:

- **Theoretical-practical test (75% of the grade, minimum 4 out of 10).** Individual written theoretical-practical test, carried out on the date of the official exam.
- **Laboratory practicals (25% of the grade, minimum 4 out of 10).** There will be a **continuous** assessment of the practices, consisting of the presentation of studies or previous works when these are necessary for the development of the practice, the follow-up report of the same and the delivery of results on the dates marked in the planning. This assessment requires mandatory attendance to the sessions established by the faculty.

The final grade will be the average of the grades of both tests, with the percentages indicated, provided that exceeds the minimum grade required in both tests. In order to pass the subject, a grade of **5 out of 10** must be obtained..

If the student has not passed any of these activities, or the average of both, during the semester, they will have the opportunity to pass the subject by means of a **global test in the two official exams (5 out of 10)**.

## 6. Sustainable Development Goals

9 - Industry, Innovation and Infrastructure