

30388 - Network Design and Evaluation

Syllabus Information

Academic year: 2023/24

Subject: 30388 - Network Design and Evaluation

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

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

ECTS: 6.0

Year: 4

Semester: Second semester

Subject type: Optional

Module:

1. General information

The Network Design and Evaluation subject aims to enable the student to design and evaluate more complex TCP/IP-based network interconnection scenarios by developing the skills to configure and manage network construction equipment in an autonomous manner as well as identifying the monitoring and analysis mechanisms necessary for the correct evaluation of the proposed solutions.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the 2030 Agenda of United Nations (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning results of the subject will contribute to some extent to the achievement of targets 8.2 of Goal 8 and targets 9.5, 9.c and 9.1 of Goal 9.

2. Learning results

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

- Be able to experimentally analyze the requirements and characteristics of network communications and the communications protocols of the applications and services offered in an organization.
- Be able to analyze the characteristics of network construction equipment and network access technologies and relate them to communications requirements and protocols such that they are able to select the most suitable equipment and technologies.
- Be capable of configuring and managing network building and Internet access equipment, integrating different networks with each other in an automatic and robust way.
- know how to evaluate the parameters that characterize communications, equipment and network technologies, making estimates and end-to-end monitoring from the equipment where the applications are located.
- Build controlled environments of network and service integration, applying procedures for the evaluation of communications, equipment and access technologies.
- 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.
- 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.
- Develop the habit (and above all the ability) to consult the technical documentation of the manufacturers of the devices used in practice. Include manuals and product specifications.
- Develop the ability to work as a team to carry out the designs and configurations considered, sharing the workload to face complex problems, exchanging information among different groups, in a coordinated and organized way.
- 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.
- Identify, model and pose problems from open situations. Explore and apply alternatives for its resolution. Handle approximations.
- To develop a critical spirit before the proposed solutions and the ability to select the best technological option, justifying the selection based on technical, economic and usability parameters.

3. Syllabus

- Block 1. General Concepts
 - Network architectures and new design paradigms
 - Performance evaluation
- Block 2. Business network
 - Topic 2.1. NAT and firewall.
 - Topic 2.2. DHCP(Dynamic Host Configuration Protocol)
 - Topic 2.3. DNS(Domain Name System)
- Block 3. Wide area networks
 - Topic 3.1. Intra-AS Routing or IGP (Interior Gateway Protocol)
 - Topic 3.2. Inter-AS or EGP (Exterior Gateway Protocol) Routing
- Block 4. Access and distribution networks
 - Topic 4.1. Switched Ethernet and VLAN.
 - Topic 4.2. SDN(Software Defined Networks)

4. Academic activities

Lectures (16 hours). Teacher's exposition of the theoretical-practical contents.

Problem solving and case studies (8 hours). Problem solving and case studies in the classroom.

Laboratory practices (36 hours). Supervised hands-on sessions for configuration and analysis of network scenarios. These activities must necessarily be complemented with the students' autonomous work.

Assessment tests (6 hours) Includes continuous assessment tests on laboratory scenarios.

Personal study and work of the student (84 hours). Hours of personal work dedicated to the study of theoretical concepts, as well as and to the configuration and detailed analysis of practical scenarios.

5. Assessment system

The subject will be evaluated by the continuous assessment system by means of the following activities:

Laboratory practicals (40% of the grade, minimum 4 out of 10). It will consist of the presentation of previous assignments when these are necessary for the development of the practice, the follow-up report of the same and the delivery of results on the scheduled deadlines.

Theoretical-practical questionnaires (60% of the grade, minimum 4 out of 10). These are exams developed at the end of each practical , where theoretical questions will be asked, as well as problem solving or questions on configuration or monitoring aspects , related to the development of the practical sessions.

The final grade will be the average of the grades of both activities, with the percentages indicated, always that the minimum grade required is exceeded in both. 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).**