

Academic Year/course: 2022/23

30159 - Communication Networks and Services

Syllabus Information

Academic Year: 2022/23

Subject: 30159 - Communication Networks and Services

Faculty / School: 179 - Centro Universitario de la Defensa - Zaragoza

Degree: 563 - Bachelor's Degree in Industrial Organisational Engineering

ECTS: 6.0

Year: 4

Semester: First semester

Subject Type: Optional

Module:

1. General information

1.1. Aims of the course

The course Networks and Communication Services is intended for students to acquire the basic concepts of operating a computer network. For this purpose, the different layers that make up the architecture of TCP/IP protocols are presented in the course.

These approaches and objectives are in line with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/>): "Decent work and economic growth" and "Industry, innovation and infrastructure," in such a way that the acquisition of the course learning outcomes provides training and competence to contribute to their achievement to some degree.

1.2. Context and importance of this course in the degree

Networks and Communication Services is an optional course of the Degree in Industrial Organization Engineering, although it is taught compulsorily by all students in the specialty of Transmissions. This subject is part of the training corresponding to the specialty of Transmissions, and serves as a basis for other courses that are taken later.

1.3. Recommendations to take this course

The subject is mainly theoretical, thus making attendance to theoretical sessions, active participation in them, as well as presentation of different tasks for homework in the indicated date is highly recommended. Previous knowledge required to be able to properly follow the subject are basic concepts of binary numbering.

2. Learning goals

2.1. Competences

- Ability to plan, budget, organise, manage and monitor tasks, people and resources.
- Ability to solve problems and take decisions with initiative, creativity and critical reasoning.
- Ability to communicate knowledge and skills in Spanish.
- Ability to work in a multidisciplinary group and in a multilingual setting.
- Ability to continue learning and develop self-learning strategies.
- Knowledge of the basic principles and architectures of networks and communication services; and knowledge of the telephone networks, mobile networks, and public data networks; and network-related problem-solving skills.

2.2. Learning goals

In order to pass this course, the students will have to show that they are able to:

- Define the basic principles and describe the architectures of communication networks and services.
- Identify and describe the telephone network, mobile networks, public data networks and solve problems related to

the network level.

2.3. Importance of learning goals

The learning results are essential to successfully pass the rest of the subjects of the fundamental speciality of Transmissions, since they serve as a basis for understanding the functioning and being able to configure in the future the communications equipment that constitute a tactical communications network.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

FIRST CALL

Continuous assessment:

The students will be able to pass the total of the subject by the continuous assessment procedure. To do this, they must demonstrate that they have achieved the expected learning outcomes by passing the assessment instruments indicated below, which will be carried out throughout the semester:

1. Written exam on theoretical, practical or theoretical-practical aspects of lessons 1-4. Its weight in the final grade is 25%.
2. Written exam on theoretical, practical or theoretical-practical aspects of lessons 5-6. Its weight in the final grade is 35%.
3. Exercises on several topics of the subject such as traffic capture, switch operation and IP addressing. Its weight in the final grade is 40%.

In the final mark of the continuous assessment (100%) all the assessment instruments carried out throughout the course and its weight will be taken into account. To pass the subject, the student's final grade must be equal to or greater than 5.

Final Exam:

The students who do not pass the subject by continuous assessment or who would like to improve their grades, will have the right to take the Final Exam set in the academic calendar, prevailing, in any case, the best of both grades. This global assessment will be equivalent to the continuous assessment test described and will have the 100% weight in the final grade. This Final Exam will consist of a written exam on all the topics of the subject. To pass the subject, the student's final grade must be equal to or greater than 5.

SECOND CALL

Final Exam:

The students who do not pass the subject in the first call may take the Final Exam set in the academic calendar for the second call. This Final Exam will consist of a written exam on all the topics of the subject. To pass the subject, the student's final grade must be equal to or greater than 5.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed for the teaching-learning process is mainly based on masterclasses exposing the main theoretical concepts of each topic. These theoretical concepts will be complemented by problem sessions that apply those concepts in realistic situations. Lab sessions and autonomous traffic capture exercises are also carried out so that students can configure real but simple networking equipment. In all the cases, active participation of the students will be promoted planning and solving topics proposed in class.

The approach, methodology and assessment of this course is prepared to be equivalent in any teaching scenario. It will be adjusted to the socio-sanitary conditions of each moment, as well as to the indications given by the competent authorities.

4.2. Learning tasks

Learning activities are mainly the study of the learning material given in lectures, the realization of practical exercises provided for each topic and the realization of several laboratory sessions to configure networking equipment and to capture real network traffic traces.

4.3. Syllabus

The course will address the following topics:

1. INTRODUCTION: Communications networks introductions and protocol architectures: OSI and TCP/IP model
2. PHYSICAL LAYER: Synchronous and asynchronous transmission. Transmission media. DTE/DCE interface
3. LINK LAYER: Link-layer functions. Flow control. Error control. HDLC protocol
4. LAN NETWORKS: Medium access mechanisms. Ethernet. Ethernet devices. Virtual LANs
5. NETWORK LAYER: IPv4 protocol. Addressing. Auxiliar protocols: ICMP and ARP. Routing. IPv6 protocol
6. TRANSPORT LAYER: Services of the Transport Layer. UDP. TCP. Network Address Translation.

4.4. Course planning and calendar

The schedule of the course will be defined by the centre in the academic calendar of the corresponding year. Dates for exams and other scheduled activities will be indicated by the teacher in class and in Moodle.

The activities of the course can be consulted in the Syllabus. The key dates of the course, related to the different activities that are developed throughout the course, as well as the orders or works that students must present will be indicated in the Digital Teaching Ring (ADD).

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30159>