

Academic Year/course: 2021/22

30159 - Communication Networks and Services

Syllabus Information

Academic Year: 2021/22

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.

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)

The assessment of the course is carried out through the following activities:

Midterm written test on theoretical, practical or theoretical-practical aspects of lessons 1-4 (25%).

Final written exam, at the gate set by the centre, about theoretical, practical or theoretical-practical aspects of lesson 5 (35%)

Exercises on traffic capture, switch operation and IP addressing (40%)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

If this teaching could not be done in person for health reasons, it would be done telematically.

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.

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. Classes start at the end of September, the first term. 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>