

Academic Year/course: 2022/23

30313 - Introduction to Computer Networks

Syllabus Information

Academic Year: 2022/23

Subject: 30313 - Introduction to Computer Networks

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 330 - Complementos de formación Máster/Doctorado

438 - Bachelor's Degree in Telecommunications Technology and Services Engineering

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

ECTS: 6.0

Year: 581 - Bachelor's Degree in Telecommunications Technology and Services Engineering: 1

438 - Bachelor's Degree in Telecommunications Technology and Services Engineering: 2

330 - Complementos de formación Máster/Doctorado: XX

Semester: Second semester

Subject Type: 581 - Compulsory

438 - Compulsory

330 - ENG/Complementos de Formación

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process for this subject is based on the following:

This subject is presented with a practical approach, it arises by using strategies on problem-based learning (PBL). Students know the existing problems and seek solutions, encouraging critical thinking and self-evaluation of results. The theory sessions expose the fundamental contents of communications networks. The laboratory sessions enhance the knowledge with an experimental analysis and the ability to address new situations or problems.

Students are expected to participate actively in the class throughout the semester.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials, including a discussion forum.

Further information regarding the course will be provided on the first day of class.

4.2. Learning tasks

The course syllabus includes the following activities:

1.- **Theory sessions** whose main contents are organized in 3 units.

2.- **Practice sessions.** The student will be given a collection of problems that aims to help strengthen the concepts presented in the theoretical sessions. In addition, the sharing of problem-solving commits the student to be critical in the

presentation of the results, as well as the proposals made by other students. This activity combines a part of personal study, in which each student presents solutions to the proposed problems, along with another part of the work which brings together the responses of all the students.

3.- **Laboratory sessions.** Their objective is the development of techniques and procedures seen in theoretical and problem sessions, and its application in the field of communications networks.

The approximate distribution (in ECTS) of the activities undertaken is 3 ECTS for theory sessions (30 hours), 1 ECTS for practice sessions (10 hours) and 2 ECTS for laboratory sessions (20 hours)

4.3. Syllabus

The course will address the following topics:

Theory sessions

Topic 1. Introduction to communications networks.

Introduction and justification of communications networks. Classification of networks. Topologies. Concepts: multiplexing, switching, routing and management. Classification of applications and services. Network architectures: protocols. OSI models and TCP / IP. IP addressing.

Topic 2. Physical and Data Link level.

Transmission modes. Synchronization. Standards for serial communication transmission of data. Datalink level. Flow control and error control: efficiency analysis. Data Framing. Medium Access Control: techniques. Local Area Networks: topologies and transmission mediums. IEEE 802.x. Evolution of Ethernet.

Topic 3. Wide Area Networks.

Concept and functions. Evolution to an integrated services digital network. Models of organization of the network layer. Network layer functions: routing, congestion control, internetworking and quality of service. Evolution of packet switching networks.

Computer lab sessions

Session #1. Analysis of levels 1 and 2 of OSI: communications point-to-point and multipoint. Asynchronous and synchronous communications. Data framing. Interfaces: RS-232, RJ-45, modem. Flow control and error control. Capture and analysis of data link layer protocols. LAN networks: configuration, management and analysis of the physical and data link layers.

Session #2. WAN networks: switching and routing. Configuration and management. Internetworking. Monitoring and analysis protocols in wide area networks.

4.4. Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the EINA website.

4.5. Bibliography and recommended resources

As own subject material is provided:

- Notes (slides)
- Laboratory Notes
- Collection of problems.

The course bibliography will be available on website:

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30313>