

30313 - Networking Fundamentals

Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	438 - Bachelor's Degree in Telecommunications Technology and Services Engineering 330 - Complementos de formación Máster/Doctorado
ECTS	6.0
Year	XX
Semester	Indeterminate
Subject Type	ENG/Complementos de Formación, Compulsory
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

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

5.Methodology, learning tasks, syllabus and resources

5.1.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

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classroom lectures expose the fundamental contents of communications networks. The laboratory sessions enhance the knowledge with experimental analysis and the ability to address new situations or problems.

5.2.Learning tasks

The course syllabus includes the following activities:

1.- **Theoretical sessions and seminars** which main contents are organized in 3 units.

2.- **Problem solving sessions** . The student will be given a collection of problems which 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 work which brings together the responses of all the students.

3.- **Laboratory classroom 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 theoretical sessions, 1 ECTS for problem solving sessions and 2 ECTS for laboratory classroom sessions

5.3.Syllabus

The theoretical sessions and seminars are organized in the following units:

Unit 1. Introduction to communications networks .

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

Unit 2. Physical and Data Link level .

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

Unit 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.

Laboratory classroom sessions are organized in the following practices:

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Practical 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.

Practical session #2. Packet switching networks . Configuration and management. Internetworking. Monitoring and analysis protocols in wide area networks.

5.4.Course planning and calendar

The timetable of the subject will be published by the EINA in the academic calendar of the corresponding course.

Scheduled dates of the activities will be indicated in advance by the professor.

5.5.Bibliography and recommended resources

- As own subject material is provided:
 - o Notes (slides)
 - o Laboratory Notes
 - o Collection of problems.
- As basic bibliography is recommended:
 - o W. Stallings, "Data and Computer Communications", 9^a ed., MacMillan.
 - o F. Halsall, "Data Communications, Computer Networks and Open Systems", 4^a ed., Addison Wesley.
 - o Andrew S. Tanenbaum, David J. Wetherall, "Computer Networks", 5^a ed., Prentice-Hall.