Communications Systems and Protocols

Academic Year: (2022 / 2023) **Review date: 14/05/2022 14:10:32**

Department assigned to the subject: Telematic Engineering Department

Coordinating teacher: CEREZO MARTIN, JUAN PEDRO

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

No previous requirements

OBJECTIVES

BASIC COMPETENCES

CB7   That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study

CB8   That students are able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments

CB9   That students know how to communicate their conclusions and the knowledge and ultimate reasons that sustain them to specialized and non-specialized audiences in a clear and unambiguous way

CB10 That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous

GENERAL COMPETENCES

CG5   Capacity to use the fundamental knowledge in networks, protocols and architectures so as to have the ability to propose integrated, scalable and secure solutions to monitor, analyse and optimise distributed processes

CG6   Ability to identify the requirements in devices, sensors, communications and computation in different domains of networks and applications

SPECIFIC COMPETENCES

CE5 Know, understand and know how to apply knowledge about the TCP/IP stack including routing IP, IPv6 and basic transport protocols

LEARNING RESULTS

After studying this subject the student will be able to identify and know the communication protocols applied to the Connected Industry 4.0. Skills of selection, design and application of general communications and their protocols. Understand the layer model design to analyse current communication system and procolos. Understand Internet layer model. Understand network technologies and devices fundamentals including the access layer, the network layer and the transport layer

DESCRIPTION OF CONTENTS: PROGRAMME

This is a basic course on network communication that presents the basic technologies used in the Internet to enable communication between computers.

The programme has five parts:

1. Introduction to packet networks.
· Layer model for communication systems
· TCP/IP reference model (Internet).
2. Application layer in the Internet.
· Study of specific application level protocols.
3. Transport layer in the Internet.
· Congestion control in packet networks.
· UDP services.
· TCP services.
4. Network layer in the Internet.
· IP packet format.
· IP addressing.
· IP network design.
· NATs.
· Manual configuration and DHCP based configuration.
5. Link layer.
· Shared medium technologies.
· Addressing.
· Frame format.
· Link layer devices.

LEARNING ACTIVITIES AND METHODOLOGY

FORMATIVE ACTIVITIES AS DECLARED IN THE STUDY PLAN
AF1   Theoretical sessions
AF2   Practical sessions
AF4   Laboratory sessions
AF5   Tutorial
AF6   Work in groups
AF7   Individual work by the student
AF8   Exams

TEACHING METHODOLOGY
MD1   Theoretical sessions by the teacher with audiovisual support where the main concept of the course will be developed and where bibliography will be provided so as to complete the student education
MD3   Use cases resolution, exercises, etc. provided by the teacher, individually or in groups
MD5   Prepare homework or reports individually or in groups

ASSESSMENT SYSTEM

% end-of-term-examination/test:	40
% of continuous assessment (assigments, laboratory, practicals…):	60

SE1   Participation in class. 20%
SE2   Work in groups and individual. 40%
SE3   Final exam. 40%

The extraordinary assessment will be carried out with the same criteria as the ordinary one, with the value of the extraordinary exam being 40% of the final mark (20% class participation and 40% work done during the course). Alternatively, this assessment scheme may be replaced only (100%) by the grade obtained in the extraordinary final exam (whichever is more favourable to the student).

BASIC BIBLIOGRAPHY

- KUROSE, JAMES F., Keith W. Ross Computer Networking, a top-down approach. 8th Edition, Pearson, 2022

ADDITIONAL BIBLIOGRAPHY

- COMER, DOUGLAS E. Internetworking with TCP/IP. Vol I: Principles Protocols, and Architecture, Prentice Hall.

- COMER, DOUGLAS E. Internetworking with TCP/IP. Vol I: Principles Protocols, and Architecture, Prentice Hall.

- STALLINGS, WILLIAM Data and Computer Communications, Prentice Hall International.

- STEVENS,W.R TCP/IP illustrated. Vol 1. The protocols, Addison. Wesley..

- TANENBAUM, ANDREW S Computer Networks, Prentice Hall International..

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