

DATA COMMUNICATIONS

Degree in Computer Systems

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Code: 10303

Main Scientific Area: Computer Architecture, Distributed Systems and Cybersecurity

Lecturer: José Miguel Guedes Nunes

Language of Instruction: Portuguese

Regime: S2

Contact Hours: 61h Total Workload: 99h

ECTS: 6,0

Objectives

This curricular unit aims to advance the knowledge of the protocols used for communication between computing devices on the Internet and the protocols used by applications.

The main goal is to give students the ability to understand the used mechanisms for communication in computer networks, with emphasis on TCP/IP protocol.

Furthermore, it is also a goal for students to learn how data is exchanged between two applications on the Internet.

Learning Outcomes

Students that conclude this curricular unit should be capable of:

1. Understand the basic principles of computer networks, especially the fundamental concept of protocol encapsulation and layered structure.
2. To identify all the necessary protocols for achieving a correct communication between devices, namely the encapsulation principle and layer architecture.
3. To identify and understand the operation of auxiliary devices like switches and routers for data communication.
4. Planning a network architecture with security solutions.
5. Develop applications for data communications on the Internet.

Course Contents

1. Transport Protocols:

- TCP, UDP

- Flow Control and Multiplexing

2. Application Protocols

- Name resolution (DNS);

- e-mail (POP,IMAP,SMTP);

- web (HTTP);

3. Network Security:

- Firewalls;

Recommended Bibliography

F. Boavida, M. Bernardes, TCP/IP Teoria e Pratica, FCA, 2012.

Walter Goralski, The Illustrated Network: How TCP/IP Works in a Modern Network, Second Ed., MorganKaufmann, 2017.

William Stallings, Cryptography and Network Security: Principles and Practice, 7th edition, Pearson, 2016.

Learning and Teaching Methods

The integrated and progressive approach of the UC program will allow students to develop the knowledge and skills set out in the objectives, ensuring consistency between the syllabus. The goals achieved will allow the understanding of the concepts concerning mechanisms used in computer networks communication, with emphasis in TCP/IP architecture protocols.

Assessment Methods

The assessment consists of two components: a theoretical component and a practical component. The theoretical component has a weight of 40%, and the practical component of a weight of 60% (including 10% individual component). The practical component is made of two practical assignments which can only be delivered in the normal period and are mandatory. It is required to obtain a score of 7 on each of the components.