COMPUTER NETWORKS

Code: 322091

Main Scientific Area: Computer networks and architecture

Lecturer: José Carlos Miranda Nova Arnaud

Language of Instruction: Portuguese

Regime: S2

Contact Hours: 60h Total Workload: 90h

ECTS: 6,0

Objectives

This curricular unit aims to present the basic concepts of computer networks, namely the technologies, architectures and applications that serve as the basis for the communication of devices on the Internet and to design, develop and implement network infrastructures in IPv4 and IPv6.

Learning Outcomes

Obtain a global view on the various elements of a communications system, its function and relationship;

Know the various types of telecommunications networks, with special emphasis on local Ethernet networks;

Know the main means of transmission and the main communication devices;

Understand the relationship between the OSI model, the TCP/IP architecture and the main technologies of local networks;

Explain and define addressing in IPv4 and IPv6 networks;

Develop and implement network infrastructure projects in IPv4 and IPv6.

Course Contents

Introduction to Networks
Type of signals
Principles of data transmission
Network type and architecture
Network topologies
Local Network Technologies
Media Access Control
Components of a network
OSI model and TCP/IP architecture
Internetworking
ARP and ICMP network protocols
IPv4 protocol
IPv4 fragmentation and reassembly
IPv4 addressing, address classes and masks
Subnetting CIDR and VLSM
VLANs
Forwarding

Introduction and study of the IPv6 protocol
Implementation and configuration of a network infrastructure (practical work)

Recommended Bibliography

Edmundo Monteiro, Fernando Boavida, Engenharia de RedesInformáticas, 109 edição atualizada e aumentada, FCA, Fevereiro2011, ISBN 978-972-722-694-8
William Stallings, Data and Computer Communications, 10th Edition, Prentice-Hall, 2013
Andrew S. Tanenbaum David J. Wetherall, Computer Networks, 5th Edition, Prentice-Hall International Editions, 2011
Paulo Loureiro, TCP/IP em Redes Microsoft, FCA, 2003

Learning and Teaching Methods

By acquiring the knowledge taught in the syllabus, students will be able to obtain a global view on the various elements of a communications system, its function and relationship, to know the various types of communication networks, with special emphasis on local networks Ethernet, to know the main means of transmission and the main communication devices, as well as to understand the relationship between the OSI model and the TCP / IP architecture.

At the level of TCP / IP protocols, students will be able to explain and implement addressing and routing over IP networks and master subnetting CIDR / VLSM and Vlans. They will understand and implement the main network protocols present in the lower layers of the TCP / IP architecture.

Assessment Methods

Two Written Tests (25% + 25%)
Practical component (40%) - mandatory for all students
Attendance + Participation (10%)
Presence of at least two thirds of contact hours
It is required to obtain 7.5 values for each of the components, the final average must be greater than or equal to 10 values, for approval.