INDUSTRIAL COMMUNICATION NETWORKS

Mestrado em Engenharia Eletrónica e de Computadores

Code: 26201

Main Scientific Area: Intelligent Systems and Control

Lecturer: João Luís Araújo Martins Vilaça

Language of Instruction: Portuguese

Regime: S2

Contact Hours: 30h Total Workload: 138h

ECTS: 6,0

Objectives

The goal of this course is to provide students with the fundamental concepts of local area networks and industrial,main applications, protocols used, and the means used.

Learning Outcomes

Students who successfully complete this course should be able to:

- Understand the structure, equipment, how to operate and use local networks and networks particularly focused onthe environment from industry and services, to enable the understanding and integration of multiple devices withcommunication capability.

- You should also know the protocols, equipment and terminology used in communication networks and industriallocation.

Course Contents

Local Area Networks: Introduction; topologies (bus, ring, star, mesh); LANs (Ethernet - IEEE 802.3, Token-Ring - IEEE 802.5, Token-Bus);

Network Equipment (HUB, Switch, Router); The OSI Model, Main protocols used in the Internet: IP;

TCP Protocol, UDP protocol); Most common TCP / IP Services; Otherprotocols; Network Applications.

Industrial Networks: Introduction, The Production Process; Use of Networks in Industrial Environment;Requirements for Industrial Networks; Transmission Medium,Modbus; Modbus-TCP ; RS232 ; RS232 ; RS485 ; RS422 ; Socket UDP; Socket TCP ;Profibus; DeviceNet; CAN; EthernetIndustrial; Ethernet-IP, EtherCat ; management and maintenance of industrial networks.

Recommended Bibliography

Wolfhard Lawrenz, “CAN Systems Engineering: From Theory to Practical Applications”, Springer-Verlag, NewYork, 1997.

Spurgeon, C., "Ethernet: the definitive guide", O´Reilly, 2000

Geier, Jim, "Wireless Lans: implementing interoperable networks", MacMillan, 1999

Zurawski Richard; The industrial communication technology handbook. CRC Press 2005

Steve Mackay, Edwin Wright, Deon Reynders, Jonh Park; Practical Industrial Data Networks: Design, Installation

and Troubleshooting. Newnes 2004

Donald Sterling, Steven Wissler; The Industrial Ethernet Networking Guide, Thomson Delmar Learning, 2002.

Learning and Teaching Methods

The syllabus of this course will enable the student to acquire a set of skills in an area of ??strong spread in theindustrial environment, with great opportunities in the public and private sectors.

Thus, this course will enable students to know and understand the characteristics of different topologies andnetworks local industries. Understand how they are designed, configured and managed. After this foray theoretical,students will be confronted with a set of real problems, and will be encouraged to find solutions to solve them.

Through discussion of these will be presented to the student, different networks, allowing you to achieve yourresolution. Simultaneously, the student will also stimulated demand autonomous information and more advancedsettings in the existing literature.

Assessment Methods

Learning outcomes will be assessed individually by a test of theoretical (50% of the final note) and practical workrelated course of study (50% of the final note).