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| <i>Course</i> | Mechanical and Industrial Informatics | | | <i>Academic year</i> | 2021/2022 | | |
| <i>Subject</i> | Computer Networks | | | ECTS | 6,5 | | |
| <i>Type of course</i> | Compulsory | | | | | | |
| <i>Year</i> | 3rd | <i>Semester</i> | 2nd | <i>Student Workload:</i> | | | |
| <i>Professor(s)</i> | Fernando José dos Santos Melo Rodrigues | | | <i>Total</i> | 175,5 | <i>Contact</i> | 60 |
| <i>Area Coordinator</i> | Fernando José dos Santos Melo Rodrigues | | | | | | |

Planned SD

1. LEARNING OBJECTIVES

- O1 Describe the TCP/IP model compared to the OSI model.
- O2. Define an IP addressing scheme for a communication network using fixed and variable size subnetting schemes.
- O3. Classify the various physical media: copper, optical and radio frequency of Ethernet and industrial Ethernet technology.
- O4. Know Switching and VLAN equipment.
- O5. Design and configure a network solution using Cisco IOS Appliances.
- O6. Learn to plan, design and supervise the implementation of a communication network.

2. PROGRAMME

- C1. Introduction to communications networks.
- C2. Communications networks.
- C3. Application Layer.
- C4. Transport Layer.
- C5. Network Layer.
- C6. IPv4 e IPv6 addressing.
- C7. Data link Layer.
- C8. Physical Layer.
- C9. Ethernet, Ethernet Industrial and Fieldbus technologies.
- C10. Network design and implementation.
- C11. Routing.
- C12. Switching.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

Objective 1 (O1) is reached through content C3 to C8. Concepts on data networks are presented in C1 and C2 and then the protocol pillars of OSI and TCP/IP are presented. C6 and C11 present addressing schemes for IP to complete O2. O3 is carried out through the Technologies of equipment interconnection in C9. O4 refers to C7 and C12 whereas O5 refers to the IOS operating system, presented in C11 and C12, and the application of a number of transversal contents like C6, C11 and C12. Finally, O6 refers to the content in C10.

4. MAIN BIBLIOGRAPHY

Redes Cisco - Para Profissionais, Mário Véstias, FCA, 7ª Edição, 2016. ISBN: 9789727228287

Engenharia de Redes - E. Monteiro, F. Boavida, FCA 10ª Edição, 2011. ISBN: 978-972-722-694-8

TCP/IP – Teoria e Prática, Fernando Boavida e Mário Bernardes, FCA, 2011. ISBN: 978-972-722-745-7

Introduction to Networks v6 Companion Guide, 1/e Cisco Networking Academy, Pearson Education, 2016. ISBN-13: 978-1-58713-360-2

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Teaching methodologies:

1. Lectures.
2. Troubleshooting.
3. Simulation.
4. Case Studies.
5. Project development.

Assessment criteria:

Ongoing Assessment

1. Written test (60%).
2. Practical tasks (labs) (10%).
3. Practical project work which can be done as homework (30%), carried out during the semester, but evaluated only once, with no possibility of improvement. This is valid for all assessment phases.

Exam, Recourse Exam and Special Exam:

1. Written Assessment. With practical part (70%).
2. Practical project work (30%), which can be done as homework or in the recourse period, and must be submitted the day before the exam. The work will be presented/defended orally on the day of the exam after the theory is tested.

Mean grade equal to or higher than 10 values to obtain approval, with 20 being the highest grade possible.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

Lectures are transversal to objectives O1, O3, and O4 to introduce the theory.

Problem solving is for O2, involving addressing and subnetworks.

A practical component – with experimental demonstration and simulation - will complement O4 and O5 to create configurations of the equipment.

Case studies and project work will be adopted for O6. Project work is consistent with the objectives as it provides the context for students to consolidate the knowledge and skills they have acquired through the design and implementation of technological solutions to realistic professional life problems.

7. ATTENDANCE

N.A.

8. CONTACTS AND OFFICE HOURS

Professor: Prof. Fernando Melo Rodrigues; fmr@ipg.pt; gabinete n.º 24

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Date: 30/06/2021