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| Course Unit | Communication Networks III | Field of study | Network and Computer Systems |
| Bachelor in | Informatics and Communications | School | School of Public Management, Communication and Tourism |
| Academic Year | 2023/2024 | Year of study | 3 |
| Type | Semestral | Semester | 2 |
| Level | 1-3 | ECTS credits | 6.0 |
| Code | 9188-320-3203-00-23 | | |
| Workload (hours) | 162 | Contact hours | T 15 TP - PL 45 TC - S - E - OT 20 O - |

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) João Pedro Carneiro Borges Gomes

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. plan and implement dynamic routing, using OSPF routing protocol;
2. know the options of WAN access technologies that allow to satisfy the organizational requirements;
3. learn to identify and protect a network against cybersecurity threats;
4. use network management protocols;
5. know the characteristics of scalable networks and with quality of service;
6. know the key concepts of software-defined networking, including controller-based architectures and network automation mechanisms.

Prerequisites

Before the course unit the learner is expected to be able to:

1. know the fundamentals of communication networks (course unit: Communication Networks I);
2. understand TCP/IP architecture and IP addressing (course unit: Communication Networks I);
3. know how to configure routers and switches (course unit: Communication Networks II).

Course contents

Dynamic Routing Protocols. Network Security. WAN technologies. Optimize, Monitor, and Troubleshoot Networks. Network Virtualization and Automation.

Course contents (extended version)

1. Dynamic Routing Protocols
 - OSPF features and operation
 - OSPF configuration and verification
2. Network Security
 - Network security concepts
 - Access Control Lists (ACL)
 - ACL for IPv4 configuration
 - Network Address Translation (NAT) for IPv4
3. WAN technologies
 - Description and operation
 - Virtual Private Network (VPN) and IPsec
4. Optimize, Monitor, and Troubleshoot Networks
 - Quality of Service (QoS)
 - Network Management
 - Network design
 - Network Troubleshooting
5. Network Virtualization and Automation
 - Network Virtualization
 - Network Automation

Recommended reading

1. Enterprise Networking, Security, and Automation Companion Guide (CCNAv7). (2020). Cisco Press. ISBN-13: 978-0-13-663432-4
2. Odom, W. (2019). CCNA 200-301 Official Cert Guide, Volume 2. Cisco Press. ISBN-13: 978-0-13-526273-3
3. Empson, S. (2019). CCNA 200-301 Portable Command Guide 5th Edition. Cisco Press. ISBN-13 : 978-0135937822

Teaching and learning methods

Lectures, demonstrations, case analysis and discussion, interactive multimedia activities, laboratorial activities, practical assignments, self-guided learning. Will be used computer network laboratories, simulators and e-learning.

Assessment methods

1. Continuous - (Regular, Student Worker) (Final)
 - Intermediate Written Test - 40% (Two tests. Minimum global grade: 35%. Alternative: Tests (20%) + Networking Academy (20%))
 - Practical Work - 60% (Minimum global grade: 35%)
2. Final exam - (Regular, Student Worker) (Supplementary, Special)
 - Final Written Exam - 40% (Minimum grade: 35%. Alternative: Exam (20%) + Networking Academy (20%))
 - Laboratory Work - 60% (Minimum grade: 35%. Admission requirement for the final exam.)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

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| João Pedro Carneiro Borges Gomes | Elisabete da Anunciacao Paulo Morais | Anabela Neves Alves de Pinho | Luisa Margarida Barata Lopes |
| 03-03-2024 | 04-03-2024 | 04-03-2024 | 12-03-2024 |