INSTITUTO POLITÉCNICO DE BRAGANÇA

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	2021/2022	Year of study	3	Level	1-3	ECTS credits	6.0						
Type	Semestral	Semester	2	Code	9188-320-3203-00-21								
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 assignements, 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%)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

João Pedro Carneiro Borges Gomes	Vítor José Domingues Mendonça	Elisabete da Anunciacao Paulo Morais	Luisa Margarida Barata Lopes
22-02-2022	10-03-2022	16-03-2022	18-03-2022

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