



Universitat de Lleida

DEGREE CURRICULUM
**INFORMATION SYSTEMS
NETWORKS**

Coordination: FERNANDEZ CAMON, CESAR

Academic year 2023-24

Subject's general information

Subject name	INFORMATION SYSTEMS NETWORKS		
Code	102031		
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION		
Typology	Degree	Course	Character
	Double bachelor's degree: Degree in Computer Engineering and Degree in Business Administration and Management	4	OPTIONAL
			Modality Attendance-based
Course number of credits (ECTS)	6		
Type of activity, credits, and groups	Activity type	PRALAB	TEORIA
	Number of credits	3	3
	Number of groups	1	1
Coordination	FERNANDEZ CAMON, CESAR		
Department	COMPUTER ENGINEERING AND DIGITAL DESIGN		
Teaching load distribution between lectures and independent student work	6 ECTS = 25x6 = 150 working hours 40% --> 60 working hours at class/lab rooms 60% --> 90 non guided working hours		
Important information on data processing	Consult this link for more information.		
Language	Catalan/English Teaching materials: english		
Distribution of credits	Enric Guitart Baraut 6		

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
FERNANDEZ CAMON, CESAR	cesar.fernandez@udl.cat	6	

Subject's extra information

The subject deeply analyzes the following concepts; routing, service load balancing and network management. A theoretical and practical approach is proposed, using several real scenario cases, deployed by the student using simulation tools.

Learning objectives

- To understand the concepts and mechanisms related to unicast and multicast routing
- To develop and configure routing devices in OSPF, RIP, BGP and multicast scenarios
- To understand redundancy and load balancing in routing networks
- To design and configure fault tolerant and load balancing communication networks
- To understand network management concepts
- To learn about SNMP protocol
- To design management tools based on SNMP

Competences

University of Lleida strategic competences

- Mastering a foreign language, especially English.
- Training Experience in the use of the new technologies and the information and communication technologies.

?Degree-specific competences

- Capacity to integrate information and communication technology solutions and business to satisfy the needs of information of the organisations, allowing them to reach their aims effectively and efficiently, giving them a competitive advantage.
- Capacity to determine the requirements of the information and communication systems of an organisation taking into account security issues and fulfillment of the rules and regulations.
- Capacity to actively participate in the specification, design, implementation and maintenance of information and communication systems.

Competències transversals de la titulació

- Capacity to take part in the structure of a company.

Subject contents

- Advanced Routing

- Routing basic concepts. Algorithms and protocols
- Routing Information Protocol (RIP)
- Open Shortest Path First (OSPF)
- Border Gateway Protocol (BGP)
- Multicast Routing
- Tunnels
- Redundancy and Balancing
 - Virtual Redundancy Routing Protocol (VRRP)
 - Load Balancing
 - Server Load Balancing
- Network Management
 - Basic concepts
 - Simple Network Management Protocol (SNMP). Architecture, details and tools
 - Abstract Syntax Notation (ASN)

Methodology

This subject is splitted into three parts; Routing, Redundancy and Balancing and Network Management. Besides the corresponding master class and problem resolution sessions, for each part a practical exercise is proposed and developed in laboratory sessions.

Development plan

- 11/2 - 25/2. **Theme 1. Advanced Routing. (Basic concepts, RIP, OSPF)**
- 26/2 - 27/2. **Lab tools setup**
- 4/3 - 14/3. **Theme 1. (BGP, Multicast)**
- 19/3. **Practice 1 (Routing)**
- 20/3. **Theme 1. (Tunnels)**
- 25/3 - 8/4. **Theme 2. Load Balancing (Redundancy and Load Balancing)**
- 10/4. **Partial exam 1 (Theme 1) . Practice 1 validation**
- 22/4- 25/4 **Theme 2 (Server load balancing)**
- 28/4 - 9/5. **Practice 2 (Redundancy and Balancing)**
- 12/5 - 23/5. **Theme 3 (Network Management)**
- 26/5 - 30/5. **Practice 3. (SNMP)**
- 11/6. Tema 4 .**Partial exam 2 (Themes 2 and 3). Practices 2 and 3 validation**

Evaluation

- Practice 1. Weight: 14%
- Parcial exam 1. Validation P1. Weight: 29%
- Practice 2. Weight: 14%
- Practice 3. Weight: 14%
- Final exam. Validation P2 and P3. Weight: 29%

Each of the above items are not mandatory. More than a 50% required to pass the subject. No remedial exam

Bibliography

- TCP/IP Illustrated, Vol 1. W. Richard Stevens. Addison-Wesley, 1994.

- Network Warrior 2nd Ed. Gary A. Donahue. O'Reilly, 2011
- Server Load Balancing. Tony Bourke. O'Reilly, 2001
- Essential SNMP. Douglas Mauro, Kevin Schmidt. O'Reilly, 2001.