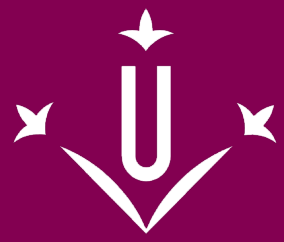

Universitat de Lleida

DEGREE CURRICULUM

INFORMATION SYSTEMS NETWORKS

Coordination: FERNÁNDEZ CAMÓN, CÈSAR

Academic year 2021-22

Subject's general information

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

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
FERNÁNDEZ CAMÓN, CÈSAR	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 participante 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 developend 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.