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230075 - TCGI - Internet Transport, Control and Management

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering

Teaching unit: 744 - ENTEL - Department of Network Engineering

Academic year: 2019

Degree: BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN TELECOMMUNICATIONS SCIENCE AND TECHNOLOGY (Syllabus 2010). (Teaching unit Optional)
BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Teaching unit Optional)

ECTS credits: 6 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: Muñoz Tapia, Jose Luis

Others: Esparza Martin, Oscar

Prior skills

Basic Linux.

Requirements

Have a basic knowledge about networking concepts (subjects IXT and AST).

Degree competences to which the subject contributes

Transversal:

06 URI N3. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

Teaching methodology

Guided activities
lectures
Laboratory Classes
Individual work (distance learning)
Short answer tests (Control)
Multiple choice tests
Laboratory practices

Learning objectives of the subject

The goal of this course is to teach the most relevant aspects concerning routing protocols, transport and control in telecommunications networks, in particular, in the Internet.
Based on the knowledge about static routing acquired in previous courses, will present the different algorithms and dynamic routing protocols, both unicast and multicast. In addition, we will discuss certain protocols necessary for the Internet operation and some typical applications such as WWW.

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Learning outcomes:

- It has capacity to build, operate and manage networks, services, processes and telecommunications applications from the point of view of telematic services.
- Is able to apply the techniques of switching and routing in fixed and mobile environments.
- Understands and applies the most appropriate protocols to transport information correctly and keep the sessions during transmission.
- Use the tools necessary to easily build, operate and manage ICT services, especially those related to the Internet, web and multimedia.
- Be familiar with the protocols and communication interfaces at different levels of the network architecture and be able to describe them, program them, validate them and optimize them.
- Know the technological progress of transmission, switching and the process to improve networks and online services.

- Design and implement a good strategy for searching specialized information. Identify the relevance and quality of this information.
- Perform tasks based on the guidelines set by the teacher, taking the time and the resources necessary. Assesses own strengths and weaknesses and act accordingly.

Study load

Total learning time: 150h	Hours large group:	39h	26.00%
	Hours small group:	26h	17.33%
	Self study:	85h	56.67%

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Content

Chapter1. Switching review

Learning time: 10h

Theory classes: 3h
Laboratory classes: 2h
Self study : 5h

Description:
Basic switching concepts review. Switches, spanning tree and VLANs with Linux.

Related activities:
Laboratory practice. Evaluation of the practice.

Tema 2. IP Review

Learning time: 10h

Theory classes: 3h
Laboratory classes: 2h
Self study : 5h

Description:
IP basics review and static routing.

Related activities:
Laboratory practice. Evaluation of the practice.

Chapter 3. Network Applications

Learning time: 10h

Theory classes: 3h
Practical classes: 2h
Self study : 5h

Description:
Network applications and their relationship to the operating system. File descriptors and client server architecture. Use of the netcat tool.

Related activities:
Laboratory practice. Evaluation of the practice.

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Chapter 4. DNS	Learning time: 10h Theory classes: 3h Laboratory classes: 2h Self study : 5h

Description:
Explanation of the name to IP translation system.

Related activities:
Laboratory practice. Evaluation of the practice.

Chapter 5. DHCP and WWW	Learning time: 10h Theory classes: 3h Laboratory classes: 2h Self study : 5h

Description:
Dynamic address assignment (DHCP). WWW including basic HTML and HTTP.

Related activities:
Laboratory practice. Evaluation of the practice.

Chapter 6. Firewalls and address translation	Learning time: 10h Theory classes: 3h Laboratory classes: 2h Self study : 5h

Description:
Firewall rules with iptables and dynamic address translation (NAT).

Related activities:
Laboratory practice. Evaluation of the practice.

Chapter 7. Tunnels	Learning time: 9h Theory classes: 1h 30m Laboratory classes: 3h Self study : 4h 30m

Description:
Description of networking technologies for tunnels.

Related activities:
Laboratory practice. Evaluation of the practice.

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Chapter 8. Multicast	Learning time: 10h Theory classes: 2h Laboratory classes: 3h Self study : 5h

Description:
Description of multicast technologies.

Related activities:
Laboratory practice. Evaluation of the practice.

Chapter 9. Unicast dynamic routing	Learning time: 36h Theory classes: 12h Laboratory classes: 6h Self study : 18h

Description:
Algorithms of shortest path Bellman-Ford and Dijkstra. Protocols RIP, OSPF, BGP and MPLS.

Related activities:
Laboratory practice. Evaluation of the practice.

Chapter 10. Introduction to IPv6	Learning time: 12h Theory classes: 6h Self study : 6h

Description:
Introduction to IPv6

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Planning of activities

Laboratori exam with short answers	Hours: 1h Laboratory classes: 1h
Description: Partial exam of laboratory	

Final exam	Hours: 2h Theory classes: 2h
Description: Final exam	

Qualification system

5 Test assesments: 14% x 5 = 70%
Laboratory control: 30%

Bibliography

Basic:

Huitema, C. Routing in the Internet. Prentice, 2000. ISBN 0130226475.

Duato, J.; Yalamanchili, S.; NI, L.M. Interconnection networks: an engineering approach [on line]. Revised printing. San Francisco: Morgan Kaufmann Publishers, 2003 [Consultation: 30/01/2015]. Available on: <http://lib.myilibrary.com/Open.aspx?id=107179>. ISBN 1558608524.