

804038 - ASXI-M - Architecture and Security of Computer Networks

Coordinating unit: 804 - CITM - Image Processing and Multimedia Technology Centre
Teaching unit: 804 - CITM - Image Processing and Multimedia Technology Centre
Academic year: 2019
Degree: BACHELOR'S DEGREE IN MULTIMEDIA STUDIES (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 6 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: DAVIDE CAREGLIO

Degree competences to which the subject contributes

Specific:

4. (ENG) Analizar las necesidades de seguridad de las comunicaciones.
5. (ENG) Catalogar els tipus de xarxes, el seu funcionament i components.
6. (ENG) Diagnosticar de forma bàsica les prestacions d'un computador i d'una xarxa.
7. (ENG) Diferenciar les tecnologies de les xarxes d'accés.
8. (ENG) Identificar els elements i dispositius de comunicacions (mòdems, commutadors, routers, ...).
9. (ENG) Utilizar las tecnologías de comunicación utilizadas en Internet.

Transversal:

1. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.
3. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

Teaching methodology

1. Teaching of lectures by the teacher: Acquisition of new knowledge.
2. Resolution of exercises interspersed during lectures.
3. Realization of group laboratory practices.

Learning objectives of the subject

1. Understand the fundamental concepts related to computer networks, especially the Internet.
2. Properly install and configure basic communication devices: modems, ethernet switches and Wi-Fi access points.
3. Set up a home or small business network.
4. Apply the necessary resources to guarantee the security, privacy and authenticity of communications over a TCP / IP network.
5. Apply the knowledge gained to the completion of a task based on belonging and importance, deciding how to carry it out and the time it takes to dedicate and selecting the most appropriate sources of information.
6. Plan and use the information necessary for academic work based on a critical reflection on the information resources

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used.

7. Communicate clearly and efficiently in oral and written presentations adapted to the type of audience and the objectives of the communication using appropriate strategies and means.

Study load

Total learning time: 150h	Hours large group:	0h	0.00%
	Hours medium group:	60h	40.00%
	Hours small group:	0h	0.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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Content

Item 1: Introduction and protocols architecture (1.5 weeks)	Learning time: 15h Theory classes: 6h Self study : 9h
Description: (ENG) 1. Explicació del temari i funcionament de l'assignatura. 2. Introducció: - Tipus de xarxes de comunicacions. - Conceptes.	
Item 2: IP networks (3 weeks)	Learning time: 15h Theory classes: 6h Self study : 9h
Description: 1. Introduction 2. Addressing 3. Subnetting 4. IP Header 5. Protocol ICMP 6. Routing Related activities: Lab P1 and P2	

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<p>Item 3: Local Area Networks (2.5 weeks)</p>	<p>Learning time: 25h Theory classes: 10h Self study : 15h</p>
<p>Description:</p> <ol style="list-style-type: none"> 1. Introduction 2. Mechanisms medium access (MAC) 3. Ethernet <ul style="list-style-type: none"> - CSMA / CD - Ethernet frame format - Switched Ethernet - Flow control - Virtual LANs 3. WiFi <ul style="list-style-type: none"> - Frequencies - CSMA / CA - Hidden terminal - Format plot - Scenarios <p>Related activities: Lab P3</p>	
<p>Item 4: Physical layer (1.5 weeks)</p>	<p>Learning time: 15h Theory classes: 6h Self study : 9h</p>
<p>Description:</p> <ol style="list-style-type: none"> 1. Introduction 2. Types of cables and connectors <ul style="list-style-type: none"> - UTP Cable - Optical fiber 	

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<p>Item 5: UDP and TCP protocols (2.5 setmanes)</p>	<p>Learning time: 25h Theory classes: 10h Self study : 15h</p>
<p>Description:</p> <ol style="list-style-type: none"> 1. Introduction 2. UDP protocol 3. TCP Protocol <ul style="list-style-type: none"> - architecture - Concept of confirmations and timer - Information unit MSS - Establishment and termination of a connection - Flow control and congestion and sliding window - TCP header format 	
<p>Item 6: Applications and security in Internet (2 weeks)</p>	<p>Learning time: 20h Theory classes: 8h Self study : 12h</p>
<p>Description:</p> <ol style="list-style-type: none"> 1. DHCP and DNS 2. NAT 3. Firewall and Access Lists 4. Safety data intercanvio: Introduction to cryptography. 5. Security in the TCP / IP protocols: IPSEC, TLS, SSL. <p>Related activities: Lab P5</p>	
<p>Weeks 8 and 15: Evaluation (2 weeks)</p>	<p>Learning time: 20h Theory classes: 8h Self study : 12h</p>
<p>Description: Primer i segon controls.</p>	

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Qualification system

The note of the continuous assessment is calculated as follows:

- 25%: Control theory of the first part of the course.
- 25%: Control theory of the second part of the course.
- 30%: Final exam with the course content.

Then the rest is

- 10%: Activities and exercises.
- 10%: Attitude learning and student participation.

Students who do not pass the subject through the continuous evaluation will have the option of presenting themselves to the re-evaluation exam. With this exam, the two partial examinations and the final exam will be able to re-evaluate (80% of the mark of the subject). If the subject is exceeded, the final grade will be 5.

Regulations for carrying out activities

The controls contain theoretical questions and problems.

Revisions and / or complaints regarding examinations will take place exclusively during the dates and times established in the Academic Calendar.

Bibliography

Basic:

Apunts de l'assignatura.

Complementary:

Stallings, William. Data and computer communications. 9th ed. Upper Saddle River: Prentice Hall, 2011. ISBN 9780132172172.

Kurose, James F.; Ross, Keith W. Computer networking: a top-down approach. 6th ed. Harlow: Pearson Education, 2012. ISBN 9780273768968.

Peterson, Larry L.; Davie, Bruce S. Computer networks : a systems approach. 5th ed. Burlington: Morgan Kaufmann, 2012. ISBN 9780123850591.

Others resources:

Computer material

Packet tracer

Free tool to simulate the actual operation of a network configuration and network equipment like routers, switches and access points.