Course guide
320108 - FXT - Foundations of Telematic Networks

Unit in charge:	Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit:	744 - ENTEL - Department of Network Engineering.

Degree:	BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2023   **ECTS Credits:** 6.0   **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: JOSE LUIS MUÑOZ TAPIA

Others: JUAN JOSE ALINS DELGADO

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE12-ESAUD. Knowledge and use of the fundamentals of programming in networks, systems, and telecommunications services. (Common module for the telecommunications branch)
CE17-ESAUD. Knowledge and use of network architecture concepts, communication protocols, and interfaces. (Common Module in the Telecommunications Branch)
CE18-ESAUD. Ability to differentiate between access and transport networks, circuit and packet switching networks, fixed and mobile networks, as well as distributed network systems and applications, voice, data, audio, video, interactive, and multimedia services. (Common Module in the Telecommunications Branch)
CE19-ESAUD. Knowledge of network interconnection and routing methods, as well as the fundamentals of network planning and sizing based on traffic parameters. (Common Module in the Telecommunications Branch)

Generical:
CG03-ESAUD. Knowledge of basic subjects and technologies, which enables learning of new methods and technologies, as well as providing great versatility to adapt to new situations.

Transversal:
CT05 N2. Effective use of information resources - Level 2. Designing and executing a good strategy for advanced searches using specialized information resources, once the various parts of an academic document have been identified and bibliographical references provided. Choosing suitable information based on its relevance and quality.

TEACHING METHODOLOGY

The hours of directed learning they consist of making theoretical classes (big group) in which the teaching staff makes an exposure to introduce the goals of learning generals related with the basic concepts of the subject. Later and through practical exercises the teacher attempts to motivate and to involve the student so he/she participates actively. They also consist to teaching (medium group) in what from 3 to 4 members, through the resolution of exercises or problems in groups related with the goals to learning of each of the contents of the subject. It is also necessary to consider other hours of autonomous learning like those that dedicate themselves to the directed readings or the resolution of the problems proposed of the different contents through the virtual campus ATENEA.

LEARNING OBJECTIVES OF THE SUBJECT

By finishing the subject the student has to be capable of:
Understanding the concept of protocol of communication, service and layer.
Knowing the main architectures of protocols based on layers.
Understanding the basic concepts related with each of the layers of an architecture of protocols.
Knowing the particular operation of the architecture of protocols TCP/IP in what is based the Internet.

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours small group	15,0	10.00
Hours large group	45,0	30.00

Total learning time: 150 h

CONTENTS

TOPIC 1: Introduction to telematic networks

Description:
Parts of a network.
Transmission media.
Switching modes.
Switching, addressing and routing.
Multiplexing and encapsulation.
Flow and congestion control.
Protocol architectures and the OSI reference model.
Standards, legislation and regulatory bodies.

Related activities:
Problem-based lectures
Activity 1. Mid-semester test
Activity 2. End-of-semester test

Full-or-part-time: 35h
Theory classes: 9h
Practical classes: 4h
Self study : 22h

TOPIC 2: The link level

Description:
Asynchronous and synchronous transmissions
Structure
Access mechanisms for shared media
Ethernet and switched networks

Related activities:
Problem-based lectures
Activity 1. Mid-semester test
Activity 2. End-of-semester test

Full-or-part-time: 20h
Theory classes: 6h
Practical classes: 2h
Self study : 12h

TOPIC 3: The network level. IP

Description:
Interconnected networks
Address resolution at the link level (ARP)
Addressing
Subnetting/supernetting
Static routing
Fragmentation
The IP datagram
The control protocol (ICMP)
Switching versus routing

Related activities:
Problem-based lectures
Activity 1. Mid-semester test
Activity 2. End-of-semester test

Full-or-part-time: 37h
Theory classes: 10h
Practical classes: 4h
Self study : 23h

TOPIC 4: Transport levels. TCP/UDP

Description:
Communication between processes
The client/server model
Unreliable transport: UDP (user datagram protocol)
Reliable transport: TCP (transport control protocol)
Controlling transport flux, errors and congestion

Related activities:
Problem-based lectures
Activity 2. End-of-semester test

Full-or-part-time: 24h
Theory classes: 7h
Practical classes: 2h
Self study : 15h

TOPIC 5: Additional Internet protocols and mechanisms

Description:
Network address translation (NAT)
Domain name system (DNS) translation
Dynamic host configuration protocol (DHCP)

Related activities:
Problem-based lectures
Activity 2. End-of-semester test

Full-or-part-time: 19h
Theory classes: 5h
Practical classes: 2h
Self study : 12h

TOPIC 6: World Wide Web

Description:
Fundamentals of HTML.
HTTP protocols: 1.0 and 1.1.
Dynamic applications.

Related activities:
Problem-based lectures
Activity 2. End-of-semester test

Full-or-part-time: 10h
Theory classes: 3h
Practical classes: 1h
Self study : 6h

ACTIVITIES

(ENG) PROVA PARCIAL (CONTINGUT 1, 2 I 3)

Full-or-part-time: 2h
Theory classes: 2h

(ENG) PROVA FINAL (CONTINGUT 1, 2, 3, 4, 5 I 6)

Full-or-part-time: 3h
Theory classes: 3h

GRADING SYSTEM

1st stage: partial control 25%
2a prova: laboratory control 25%
3a prova: final control 50%

If the end note is greater than the average of the notes of the individual controls, the note of the final control will be the final grade.
For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.
If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.

BIBLIOGRAPHY

Basic:
- Tanenbaum, Andrew S. Computer networks. 4th ed. New Jersey: Prentice Hall, 2003. ISBN 0130661023.

Complementary:
- Spurgeon, Charles. Ethernet: the definitive guide [on line]. Sebastopol: O'Reilly, 2014 [Consultation: 17/06/2022]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=1651722. ISBN 9781449363017.
- Perlman, Radia. Interconnections: bridges, routers, switches, and internetworking protocols. 2nd ed. Reading, MA: Addison-Wesley, 2000. ISBN 0201634481.

- Stevens, W. Richard. TCP/IP illustrated (vol. 1: the protocols). Reading, MA: Addison-Wesley, 1994-1996. ISBN 0201633469.
- Comer, Douglas E. Internetworking with TCP/IP (vol. 1: principles, protocols and architecture). 5th ed. Upper Saddle River: Prentice-Hall, 2006. ISBN 0131876716.
- Stallings, William. Data and computer communications. 5th ed. Upper Saddle River: Prentice-Hall, 1997. ISBN 0135712742.
- Kurose, James F.; Ross, Keith W. Computer networking, a top down approach [on line]. 4th ed. Boston: Addison-Wesley, 2008 [Consultation: 14/06/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=6752. ISBN 9780321497703.