

# Course guide

## 320113 - SAT - Telematic Applications and Services

**Last modified:** 19/04/2023

**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

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**Coordinating lecturer:** JUAN JOSE ALINS DELGADO

**Others:** JOSE LUIS MUÑOZ TAPIA

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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#### 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:

CG04. AUD: Ability to solve problems with initiative, decision making, creativity and communicate and transmit knowledge and skills, understanding the ethical and professional responsibility of the activity of Technical Telecommunications Engineering.

CG04-ESAUD. Ability to solve problems with initiative, decision-making, creativity, and to communicate and transmit knowledge, skills, and abilities, understanding the ethical and professional responsibility of the Technical Telecommunications Engineer's activity.

CG05-ESAUD. Knowledge for the realization of measurements, calculations, valuations, appraisals, expert opinions, studies, reports, task planning, and other similar work in their specific field of telecommunications.

#### Transversal:

CT03 N2. Efficient oral and written communication - Level 2. Using strategies for preparing and giving oral presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and grammatical errors.

### TEACHING METHODOLOGY

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Face-to-face lecture sessions.

- Face-to-face practical work sessions.
- Face-to-face laboratory work sessions.
- Independent learning and exercises.
- Preparation and completion of group activities subject to assessment.

### LEARNING OBJECTIVES OF THE SUBJECT

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In this subject, students will gain an understanding of inter-process communications by means of telematic networks. We will cover the various communication architectures and take an in-depth look at the transport layer, as this is the interface with the applications. We also learn the concepts and tools for network programming. Another of the objectives of the subject is the analysis of networks, to do so, the analysis of data traffic through networks is studied, using packet capture tools.



## STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours small group	30,0	20.00
Hours large group	30,0	20.00

**Total learning time:** 150 h

## CONTENTS

### TOPIC 1: Inter-process communication

**Description:**

- 1.1. Client-server applications.
- 1.2. Input/output.
- 1.3. Pipes and signals.
- 1.4. Synchronisation between processes.
- 1.5. BSD Sockets

**Related activities:**

five two-hour practical sessions on communication between processes, using the Linux operating system.

**Full-or-part-time:** 50h

Theory classes: 10h

Laboratory classes: 10h

Self study : 30h

### Transport Layer

**Description:**

- 2.1 UDP
- 2.2 TCP
  - 2.2.1 Flow control. TCP sliding window.
  - 2.2.2 TCP error control.
  - 2.2.3 TCP congestion control.

**Related activities:**

Three two-hour practical sessions on TCP/UDP transmission, with analysis of losses.

**Full-or-part-time:** 26h

Theory classes: 5h

Laboratory classes: 6h

Self study : 15h



## DNS - DHCP

### Description:

- 2.1 DNS
  - 2.1.1 Domains and Zones
  - 2.1.2 Implementation
  - 2.1.3 Request-Reply mechanism
  - 2.1.3 DNS protocol
- 2.2 DHCP
  - 2.2.1 Component and architecture
  - 2.2.2 DHCP allocation mechanisms
  - 2.2.3 DHCP Protocol
  - 2.2.4 DHCP in Linux

**Full-or-part-time:** 24h

Theory classes: 5h

Laboratory classes: 4h

Self study : 15h

## TOPIC 4: Security services: Firewalls and NAT

### Description:

- 4.1. Firewalls and packet filtering
- 4.2. Network address translation

### Related activities:

three two-hour sessions on network structure configuration with DMZ including firewall and NAT.

**Full-or-part-time:** 34h

Theory classes: 7h

Laboratory classes: 6h

Self study : 21h

## HTTP and HTML

### Description:

- 5.1. HTTP
- 5.2. HTML

**Full-or-part-time:** 16h

Theory classes: 3h

Laboratory classes: 4h

Self study : 9h

## GRADING SYSTEM

- First examination: 25%
- Second examination: 35%
- Laboratory: 40%

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

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### Basic:

- Schwartz, Mischa. Redes de telecomunicaciones: protocolos, modelado y análisis. Argentina: Addison-Wesley Iberoamericana, 1994. ISBN 0201629240.
- Stallings, William. Data and computer communications. Upper Saddle River: Pearson Education International, 2007. ISBN 0132433109.
- Stevens, W. Richard. TCP/IP illustrated, vol. 1, The protocols. Reading: Addison-Wesley, 1994-1996. ISBN 0201633469.
- Kleinrock, Leonard. Queueing systems, vol. 1, Theory. New York: John Wiley & Sons, 1975-1976. ISBN 0471491101.

### Complementary:

- Held, Gilbert. Understanding data communications: from fundamentals to networking. 3rd ed. Chichester: John Wiley & Sons, 2000. ISBN 0471627453.
- Flood, J. E. Telecommunications switching, traffic and networks. New York: Prentice Hall, 1995. ISBN 0130333093.