Course guide
320113 - SAT - Telematic Applications and Services

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: JUAN JOSE ALINS DELGADO
Others: JOSE LUIS MUÑOZ TAPIA

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)

General:
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

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

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
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</tbody>
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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

Basic:

Complementary: