# Course guides

## 300048 - XT - Transport Networks

**Unit in charge:** Castelldefels School of Telecommunications and Aerospace Engineering

**Teaching unit:** 744 - ENTEL - Department of Network Engineering.

**Degree:** BACHELOR’S DEGREE IN NETWORK ENGINEERING (Syllabus 2009). (Compulsory subject).

**Academic year:** 2021  
**ECTS Credits:** 4.0  
**Languages:** English

## Lecturer

**Coordinating lecturer:** Definit a la infoweb de l’assignatura.

**Others:** Definit a la infoweb de l’assignatura.

## Degree competences to which the subject contributes

### Specific:

1. CE 17 TELECOM. Conocimiento y utilización de los conceptos de arquitectura de red, protocolos e interfaces de comunicaciones. (CIN/352/2009, BOE 20.2.2009.)
2. CE 25 TEL. Capacidad de seguir el proceso tecnológico de transmisión, conmutación y proceso para mejorar las redes y servicios. (CIN/352/2009, BOE 20.2.2009.)

### Generical:

1. EFFICIENT USE OF EQUIPMENT AND INSTRUMENTATION - Level 3: Design experiments, measurements, subsystems and systems, equipment and tools most appropriate laboratory. Knowing not only benefits but also the limitations of the equipment and resources. Conduct assessments and evaluations critically, making decisions according to the overall system specifications or service.

### Transversal:

1. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
2. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.
3. EFFECTIVE USE OF INFORMATION 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

In the first part of the course, there will be a weekly class theory and / or problems of 2h. In the second half of the course there will be sessions of laboratory of 3h to review the theoretical concepts.

The theory classes are essentially lectures by the professor (encouraging active participation), but also asking the students to work certain parts of the subject (self learning), using materials provided by teachers (slides, documents on use cases / datasheets, book chapters, etc.).

The theoretical concepts will be reinforced through exercises when appropriate. Laboratory sessions will be conducted in groups or individually.
LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course, students should be able to:

- Follow the technological progress of transmission, switching and process for improving network and telematic services.
- Understand the basics concepts of a transport network
- Evaluate a transport network architecture.
- Analyze protocols and mechanisms for the transport networks.
- Know the functionalities of a control plane in a transport network.
- Apply recovery mechanisms in a reliable optical network.
- Understand the evolution of transport networks.
- Understand the network programmability and automation of transport networks.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guided activities</td>
<td>3,0</td>
<td>3.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>17,0</td>
<td>17.00</td>
</tr>
<tr>
<td>Self study</td>
<td>56,0</td>
<td>56.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>24,0</td>
<td>24.00</td>
</tr>
</tbody>
</table>

Total learning time: 100 h

CONTENTS

(ENG) Introduction to Transport Networks

Description:
Introduction to transport networks technologies.

Full-or-part-time: 4h
Theory classes: 2h
Self study: 2h
(ENG) MPLS-based Transport Technologies

**Description:**
Network Evolution. Rationale of packet transport
MPLS
- Introduction
- MPLS Benefits
- Elements of MPLS networks
- MPLS Operation
MPLS with Traffic Engineering (MPLS-TE) recovery mechanisms
- Local and global restoration techniques
- Fast Rerouting
MPLS Services
MPLS Evolution
Segment routing

**Related activities:**
Controls
Laboratory sessions
Implementation of a project

**Full-or-part-time:** 82h
Theory classes: 20h
Laboratory classes: 13h
Guided activities: 3h
Self study: 46h

Programming and Automating Transport Networks

**Description:**
Introduction. Goal of networks automation and programmability
Methodologies
Network Automation tools

**Related activities:**
Laboratory sessions

**Full-or-part-time:** 14h
Theory classes: 2h
Laboratory classes: 4h
Self study: 8h

GRADING SYSTEM

Criteria defined in the infoweb subject will be applied.

EXAMINATION RULES.

Controls and laboratory practices are mandatory to pass the subject.
BIBLIOGRAPHY

Basic:

Complementary: