300048 - XT - Transport Networks

Coordinating unit: 300 - EETAC - Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit: 744 - ENTEL - Department of Network Engineering
Academic year: 2017
Degree: BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING/BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2015). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 4
Teaching languages: English

Degree competences to which the subject contributes

Specific:
5. 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.)
6. 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.)

General:
3. 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.
4. 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.

Consultation schedule will be published each semester.
Advise note: Previously make an appointment by e-mail.
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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.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 100h</th>
<th>Hours large group: 23h</th>
<th>23.00%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Hours small group: 18h</td>
<td>18.00%</td>
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<tr>
<td></td>
<td>Guided activities: 3h</td>
<td>3.00%</td>
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<tr>
<td></td>
<td>Self study: 56h</td>
<td>56.00%</td>
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</tbody>
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## Content

| (ENG) Introduction to Transport Networks | **Learning time:** 4h  
Theory classes: 2h  
Self study: 2h |
|----------------------------------------|--------------------------------------------------|
| **Description:**  
Introduction to transport networks technologies. | |

| (ENG) Synchronous Digital Hierarchy | **Learning time:** 13h 30m  
Theory classes: 4h  
Guided activities: 1h 30m  
Self study: 8h |
|----------------------------------------|--------------------------------------------------|
| **Description:**  
Functional Architecture: network elements and topology  
SDH Basics  
SDH Transport Services  
Protection Mechanisms  
Synchronization  
Next Generation SDH  
Transport Network evolution: from SDH to OTN  
(ENG) Transport Network evolution: from SDH to OTN | |
| **Related activities:**  
Control | |
### (ENG) MPLS-based Transport Technologies

<table>
<thead>
<tr>
<th>Learning time: 82h 30m</th>
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<tbody>
<tr>
<td>Theory classes: 17h</td>
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<tr>
<td>Laboratory classes: 18h</td>
</tr>
<tr>
<td>Guided activities: 1h 30m</td>
</tr>
<tr>
<td>Self study : 46h</td>
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</tbody>
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### 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:
Control
Laboratory sessions
Implementation of a project

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### Qualification system
Criteria defined in the infoweb subject will be applied.

### Regulations for carrying out activities
Controls and laboratory practices are mandatory to pass the subject.
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Bibliography

Basic:


Complementary:


Others resources: