230636 - ON - Optical Networks

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications
Academic year: 2017
Degree: MASTER’S DEGREE IN INFORMATION AND COMMUNICATION TECHNOLOGIES (Syllabus 2009).
(Master degree Optional)
MASTER’S DEGREE IN NETWORK ENGINEERING (Syllabus 2009). (Teaching unit Optional)
MASTER’S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Teaching unit Optional)
ECTS credits: 2.5
Teaching languages: English

Teaching staff
Coordinator: JAUME COMELLAS
Others: GABRIEL JUNYENT, SALVatore SPADARO

Degree competences to which the subject contributes

Specific:
1. Ability to implement wired/wireless systems, in both fix and mobile communication environments.
2. Ability to design and dimension transport, broadcast and distribution networks for multimedia signals

Transversal:
3. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.
4. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

Teaching methodology
- Lectures
- Individual work (distance)
- Exercises
- Oral presentations
- Extended answer test (Final Exam)

Learning objectives of the subject

Learning objectives of the subject:
The aim of this course is to give insight of modern techniques used in broadband optical communications networks. Main concepts about key devices involved, traffic engineering, control and management of optical networks, as well as resiliency, will be given considering both, backbone and access networks.

Learning results of the subject:
- Ability to specify, design networks, services, processes and applications of telecommunications in optical access or backbone networks.
- Ability to apply traffic engineering tools as well as planning tools, dimensioning and network analysis.
230636 - ON - Optical Networks

- Ability to understand future trends in network architectures, services and applications.
- Ability to analyse all-optical networks, both circuit and packet switched.

<table>
<thead>
<tr>
<th>Study load</th>
<th>Total learning time: 62h 30m</th>
<th>Hours large group:</th>
<th>26h</th>
<th>41.60%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self study:</td>
<td></td>
<td>36h 30m</td>
<td>58.40%</td>
</tr>
</tbody>
</table>
### 230636 - ON - Optical Networks

#### Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Learning time:</th>
<th>Description:</th>
</tr>
</thead>
</table>
| **1. Introduction: Optical networks evolution** | 10h            | - Optical networks enabling technologies  
- Traffic engineering basics |
| **2. Control and Management of Optical Networks** | 14h            | - ASON fundamentals  
- GMPLS controlled networks |
| **3. Metro and Access Optical Networks**      | 14h            | - Access networks evolution  
- Passive optical networks  
- Future Trends |
| **4. Packet Switched Optical Networks**       | 14h            | - Optical Burst Switching  
- Optical Packet Switching |
Planning of activities

**EXERCISES**

**Description:**
Exercises to strengthen the theoretical knowledge.

**ORAL PRESENTATION**

**Description:**
Presentation of a personal work on a research topic.

**SHORT ANSWER TEST (TEST)**

**Description:**
Final examination.

Qualification system

Final examination: from 40% to 60%
Exercises: from 10% to 30%
Individual assessments: from 20% to 40%

5. Current and Future Trends

**Description:**
- Energy Efficiency
- Elastic Optical Networks
- Optical Network Virtualization

**Learning time:** 10h 30m
- Theory classes: 4h
- Self study: 6h 30m
230636 - ON - Optical Networks

Bibliography

Basic:


Complementary: