230651 - OVNET - Overlay Networks

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit: 744 - ENTEL - Department of Network Engineering
Academic year: 2015
Degree: MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Teaching unit Compulsory)
MASTER'S DEGREE IN INFORMATION AND COMMUNICATION TECHNOLOGIES (Syllabus 2009). (Teaching unit Optional)
MASTER'S DEGREE IN NETWORK ENGINEERING (Syllabus 2009). (Teaching unit Optional)
DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 1992). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: English

Teaching staff
Coordinator: OSCAR ESPARZA
Others: JUANJO ALINS, JORGE MATA, JOSÉ LUIS MELÚS, JOSÉ LUIS MUÑOZ

Degree competences to which the subject contributes

Specific:
1. Ability to deal with the convergence, interoperability and design of heterogeneous networks with local, access and core networks, as well as with service integration (telephony, data, television and interactive services).
2. Ability to design and dimension transport, broadcast and distribution networks for multimedia signals
3. Ability to model, design, implement, manage, operate, administrate and maintain networks, services and contents
4. Ability to plan networks and decision-making about services and applications taking into account: quality of service, operational and direct costs, implementation plan, supervision, security processes, scalability and maintenance. Ability to manage and assure the quality during the development process
5. Ability to understand and to know how to apply the functioning and organization of the Internet, new generation Internet technologies and protocols, component models, middleware and services

Transversal:
6. 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.
7. 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
- Laboratory classes
- Individual work (distance)
- Short answer test (Control)
- Extended answer test (Final Exam)

Learning objectives of the subject

Learning objectives of the subject:
The aim of this course is to train students in the mechanisms and protocols needed to design and deploy overlay networks, emphasizing in those related to multimedia services. We will summarize the main concepts related to multimedia services and Quality of Service (QoS). We will introduce the basics of tunneling and multicast techniques, which are essential to the proper deployment of multimedia services over the Internet. Next we will introduce the main characteristics of multimedia transport protocols and applications. Finally, we will introduce the concepts related to advanced techniques, like Digital Fountain Codes and Network Coding.

Learning results of the subject:

- Ability to design and deploy overlay networks and more specifically, those that provide multimedia services over the Internet.
- Ability to use a network protocol analyzer to properly manage multimedia transport protocols and services.
- Ability to understand and use advanced techniques such as Digital Fountain Codes and Network Coding.

### Study load

<table>
<thead>
<tr>
<th>Study load</th>
<th>Total learning time: 125h</th>
<th>Hours large group: 26h</th>
<th>20.80%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td></td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group: 13h</td>
<td></td>
<td>10.40%</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
<td></td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 86h</td>
<td></td>
<td>68.80%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>1. Introduction</th>
<th>Learning time: 20h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td></td>
<td>Self study : 14h</td>
</tr>
</tbody>
</table>

**Description:**
- Introduction to transport, diffusion and distribution of multimedia services.
- Description of video and audio services over IP.
- Multimedia services in the Internet.
- Techniques to manage and deploy Quality of Service (QoS) in multimedia services in the Internet.

<table>
<thead>
<tr>
<th>2. Networks for multimedia services</th>
<th>Learning time: 23h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 4h</td>
</tr>
<tr>
<td></td>
<td>Self study : 16h</td>
</tr>
</tbody>
</table>

**Description:**
- Design and planning of multimedia networks.
- Techniques to deploy multimedia networks: tunneling and multicast.

<table>
<thead>
<tr>
<th>3. Transport protocols for multimedia</th>
<th>Learning time: 23h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 4h</td>
</tr>
<tr>
<td></td>
<td>Self study : 16h</td>
</tr>
</tbody>
</table>

**Description:**
- Multimedia characteristics.
- Multimedia transport, control and encapsulation protocols.

<table>
<thead>
<tr>
<th>4. Services in IP networks.</th>
<th>Learning time: 23h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 4h</td>
</tr>
<tr>
<td></td>
<td>Self study : 16h</td>
</tr>
</tbody>
</table>

**Description:**
- VoIP.
- Telephony and videoconferencing.
- Video and TV distribution services.
- Overlay multicast networks.
- P2P streaming.
## Planning of activities

<table>
<thead>
<tr>
<th>LABORATORY</th>
<th>EXERCISES</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHORT ANSWER TEST (CONTROL)</td>
<td>SHORT ANSWER TEST (TEST)</td>
</tr>
<tr>
<td>EXTENDED ANSWER TEST (FINAL EXAMINATION)</td>
<td></td>
</tr>
</tbody>
</table>
230651 - OVNET - Overlay Networks

Qualification system

Final examination: 50%
Partial examinations and controls: 20%
Laboratory assessments: 30%

Bibliography

Basic:


Complementary:


