820057 - TI - Telecommunications and Internet

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering
Teaching unit: 723 - CS - Department of Computer Science
Academic year: 2017
Degree:
- BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
- BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
- BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
- BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
- BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Teaching unit Optional)
- BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
- BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
- BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
- BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
- BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
- BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Teaching unit Optional)

ECTS credits: 6
Teaching languages: English

Teaching staff
Coordinator: Antoni Pérez Poch
Others: Antoni Pérez Poch

Opening hours
Timetable: See timetable and Atenea.

Prior skills
None

Requirements
The subject is taught in English.

Degree competences to which the subject contributes

Specific:
- CEB-03. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.

Transversal:
- 1. 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.

Teaching methodology
Active methodologies account for a 60% of the total workload, including project-based learning and cooperative learning.
Learning objectives of the subject

To introduce the basic concepts involved in data communications and computer networks. Learning the possibilities of networking and long-haul communications. Getting to know the social and economic main issues related to the Information and Communication Technologies. Being able to design, build and configure a local area network.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>30h</th>
<th>20.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group:</td>
<td>30h</td>
<td>20.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
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## Content

<table>
<thead>
<tr>
<th>Basic concepts</th>
<th>Learning time: 28h 15m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 5h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 5h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 2h</td>
</tr>
<tr>
<td></td>
<td>Self study: 16h 15m</td>
</tr>
</tbody>
</table>

### Description:
- Chapter 1: History of telecommunications.
- Chapter 2: Telecommunications Fundamentals.
- Sources and data consumers. Data transfer. Modulations. Shannon equation.
- Chapter 3: General concepts of Telecommunications.
- Terminology. Basic concepts.
- Chapter 4: Transmission Media and Access Protocols.
- Features of cables and data transmission media. Medium accesss mechanisms.
- Chapter 5: Transmission systems.
- Coding systems. Modulation.
- Chapter 6: Mobile communications.
- GSM, GPRS, UMTS. Latest technologies.
- Chapter 7: Computer networks.
- OSI and Internet protocols. TCP/IP. Packet analysis

### Related activities:
- Laboratory session 1

## Local area networks and Wide area Networks

<table>
<thead>
<tr>
<th>Learning time: 96h 30m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 7h</td>
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<tr>
<td>Practical classes: 7h</td>
</tr>
<tr>
<td>Laboratory classes: 22h 30m</td>
</tr>
<tr>
<td>Self study (distance learning): 25h</td>
</tr>
<tr>
<td>Group work (distance learning): 25h</td>
</tr>
<tr>
<td>Guided activities: 10h</td>
</tr>
</tbody>
</table>

### Description:

### Related activities:
- Laboratory sessions:
  2. Network simulations
- 3. Routers configuration. Internet connexion of a local area network.
- 4. Technical visit.
- 5. Design of a local area network.

### Non Presential Project:
1. Design and implementation of a local area network for a specified company.
- **Wireless data networks.**
  
  **Learning time:** 18h 15m  
  Theory classes: 2h  
  Practical classes: 2h  
  Laboratory classes: 1h 15m  
  Self study (distance learning): 12h  
  Guided activities: 1h

  **Description:**  
  Description of the main wireless data communication technologies. Bluetooth, Infrared, IR, WiFi, Wimax and applications development. Security issues

  **Related activities:**  
  Laboratory session:  
  6. Laboratory wireless data network building

- **Social and economic implications related to these technologies**
  
  **Learning time:** 7h  
  Theory classes: 1h  
  Practical classes: 1h  
  Guided activities: 2h  
  Self study: 3h

  **Description:**  

  **Related activities:**  
  Seminars and article analysis.

**Qualification system**

Partial controls: 25%  
Exercises: 25%  
Final control: 0%  
Non presential (Project-based): 25%  
Laboratory: 20%  
English: 5%

**Regulations for carrying out activities**

Should be written in English.
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Bibliography

Basic:


Complementary:


Others resources:

Hyperlink

Material suplementari de Kurose-Ross
http://www-net.cs.umass.edu/kurose-ross-ppt-6e/

Audiovisual material

Videos playlist for TI
https://www.youtube.com/playlist?list=PLA45B36BC9C6880CE