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 MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
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- 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 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.
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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: 30h</th>
<th>20.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group: 30h</td>
<td>20.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
### Content

#### Basic concepts

**Learning time:** 28h 15m
- Theory classes: 5h
- Practical classes: 5h
- Guided activities: 2h
- Self study: 16h 15m

**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 access 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

**Learning time:** 96h 30m
- Theory classes: 7h
- Practical classes: 7h
- Laboratory classes: 22h 30m
- Self study (distance learning): 25h
- Group work (distance learning): 25h
- Guided activities: 10h

**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 presencial (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