820057 - TI - Telecommunications and Internet

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering
Teaching unit: 723 - CS - Department of Computer Science
Academic year: 2019
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 ENERGY ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN ELECTICAL 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 BIOENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN INDUSTRY ELECTRICAL 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.
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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>
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<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
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<tr>
<td></td>
<td>Hours small group: 30h</td>
<td>20.00%</td>
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<tr>
<td></td>
<td>Guided activities: 0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
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## Content

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

<table>
<thead>
<tr>
<th>- Local area networks and Wide area Networks.</th>
<th>Learning time: 96h 30m</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 7h</td>
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<tr>
<td></td>
<td>Practical classes: 7h</td>
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<tr>
<td></td>
<td>Laboratory classes: 22h 30m</td>
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<tr>
<td></td>
<td>Self study (distance learning): 25h</td>
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<td></td>
<td>Group work (distance learning): 25h</td>
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<tr>
<td></td>
<td>Guided activities: 10h</td>
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**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:**  
Chapter 10: Social and economic implications related to these technologies.  

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

### Qualification system

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

There is no final exam. There is no reevaluation.

### Regulations for carrying out activities

All 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