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# 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 ELECTRICAL 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.

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## Learning objectives of the subject

To introduce the basic concepts involved in data communications and computer networks. Learning the possiblitices 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

| | | | |
|---|---|---|---|
| Total learning time: 150h | Hours large group: | 30h | 20.00% |
| | Hours medium group: | 0h | 0.00% |
| | Hours small group: | 30h | 20.00% |
| | Guided activities: | 0h | 0.00% |
| | Self study: | 90h | 60.00% |

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## 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: Telecommuncations 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
1. Configuration of a local area network. Switches and hubs. Cable building.

### - 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:
Features of a Local area network. Basic elements. Internet architecture. High-speed networks. Backbones. ATM and latest high output technologies

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.

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| - Wireless data networks. | Learning time: 18h 15m<br>Theory classes: 2h<br>Practical classes: 2h<br>Laboratory classes: 1h 15m<br>Self study (distance learning): 12h<br>Guided activities: 1h |
|---|---|

Description:
Chapter 9: Wireless data networks.
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<br>Theory classes: 1h<br>Practical classes: 1h<br>Guided activities: 2h<br>Self study : 3h |
|---|---|

Description:
Chapter 10: Social and economic implications related to these technologies.
Social and economic changes. Current trends and future outcomes.

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:

Kurose, James F.; Ross, Keith W. Computer networking : a top-down approach. 6th International ed. Harlow: Pearson Education, 2012. ISBN 9780273768968.

Stallings, William. Data and computer communications. 9th ed. Upper Saddle River, New Jersey: Prentice Hall, cop. 2011. ISBN 9780131392052.

Complementary:

Tanenbaum, Andrew S. Computer networks. 4th. ed. Upper Sadle River, NJ: Pearson Education, cop. 2003. ISBN 0130384887.

Caballero, José Manuel. Redes de banda ancha.  Barcelona: Marcombo, DL 1997. ISBN 8426711367.

Cisco Systems. Academia de networking de Cisco Systems : guía del primer año. 2ª ed. Madrid: Pearson Educación, cop. 2002. ISBN 8420532967.

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