Course guides
820057 - TI - Telecommunications and Internet

Last modified: 21/06/2021

Unit in charge: Barcelona East School of Engineering
Teaching unit: 723 - CS - Department of Computer Science.

Degree: BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2021 **ECTS Credits:** 6.0 **Languages:** English

LECTURER

Coordinating lecturer: Antoni Perez-Poch

Others: Antoni Perez-Poch

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 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

Type	Hours	Percentage
Hours large group	30,0	20.00
Hours small group	30,0	20.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Basic concepts

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

Specific objectives:
Acquire the basic concepts of communications.

Related activities:
Laboratory sessions 1 and 2
1, 2. Configuration of a local area network. Switches and hubs. Cable building.

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

Full-or-part-time: 20h
Theory classes: 4h
Laboratory classes: 4h
Guided activities: 4h
Self study : 8h

Local area networks and Wide area Networks.

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

Specific objectives:
Acquire the fuctioning mechanisms of data networks.
Be able to design and build an Local Area Network (LAN).

Related activities:
Laboratory sessions:
3, 4 y 5. Network simulations
6, 7 8. Routers configuration. Internet connexion of a local area network.
9. Technical visit.
10, 11, 12, 13, 14 y 15. Design of a local area network.

Non Presential Project:
1. Design and implementation of a local area network for a specified company.

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

Full-or-part-time: 110h
Theory classes: 22h
Laboratory classes: 26h
Guided activities: 26h
Self study : 36h

- Wireless data networks.

Description:
Chapter 9: Wireless data networks.
Description of the main wireless data communication technologies. Bluetooth, Infrared, IR, WiFi, Wimax and applications development. Security issues

Specific objectives:
Acquire the principles of wireless networks.

Related activities:
Theory and problems

Full-or-part-time: 10h
Theory classes: 2h
Self study : 8h

Social and economic implications related to these technologies

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

Specific objectives:
Be able to debate on the social and economic outcomes of these technologies.

Related activities:
Seminars and article analysis.

Full-or-part-time: 10h
Theory classes: 2h
Self study : 8h

GRADING SYSTEM

Partial controls: 25% Exercises: 25%
Non presential (Project-based):25% Laboratory: 20% English: 5%
There is no final exam. There is no reevaluation.

EXAMINATION RULES.

All activities should be conducted in English.

BIBLIOGRAPHY

Basic:
- Stallings, William. Data and computer communications. 9th ed. Upper Saddle River, New Jersey: Prentice Hall, cop. 2011. ISBN 9780131392052.
- Kurose, James F.; Ross, Keith W. Computer networking : a top-down approach [on line]. Seventh edition. Harlow: Pearson Education, 2017 [Consultation: 21/04/2020]. Available on: https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=5187270. ISBN 9781292153605.

Complementary:
- Tanenbaum, Andrew S.; Wetherall, David J. Computer networks. 5th. ed., new international edition. Harlow: Pearson Education, cop. 2013. ISBN 9781292024226.
- 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.

RESOURCES

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

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

Other resources:
Notes and audiovisual material published in Atenea.