Course guide
820057 - TI - Telecommunications and Internet

Last modified: 14/06/2023

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

Degree: **Academic year:** 2023 **ECTS Credits:** 6.0
Languages: English

LECTURER

Coordinating lecturer: Antoni Perez-Poch

Others: Antoni Perez-Poch

PRIOR SKILLS

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

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.