



Universitat de Lleida

DEGREE CURRICULUM  
**COMMUNICATION NETWORKS**

Coordination: MARTINEZ RODRIGUEZ, SANTIAGO

Academic year 2023-24

Subject's general information

<b>Subject name</b>	COMMUNICATION NETWORKS			
<b>Code</b>	102379			
<b>Semester</b>	2nd Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Character</b>	<b>Modality</b>
	Bachelor's degree in Digital Interaction and Computing Techniques	2	COMPULSORY	Attendance-based
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	Only examination			
<b>Coordination</b>	MARTINEZ RODRIGUEZ, SANTIAGO			
<b>Department</b>	COMPUTER ENGINEERING AND DIGITAL DESIGN			
<b>Teaching load distribution between lectures and independent student work</b>	6 ECTS = 25x6 = 150 working hours: There are no lectures for this subject.			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Catalan.			
<b>Distribution of credits</b>	There are no lectures for this subject.			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
MARTINEZ RODRIGUEZ, SANTIAGO	santi.martinez@udl.cat	0	

## Subject's extra information

Office hours need to be appointed beforehand by e-mail with the teacher.

To properly follow this course, previous skills on programming and operating systems are recommended.

## Learning objectives

- Knowledge of current standard mechanisms and institutions.
- Learning data link protocols basics, as well as their weaknesses and capacities.
- Designing a physical and data-link level solution for a given scenario.
- Learning current network level protocol basics.
- Understanding network level protocol weaknesses and limitations and their solutions.
- Designing and addressing and routing solution for a given and basic scenario.
- Knowledge and ability to optimize transport protocols.
- Studying current data encoding and compression mechanisms.
- Knowledge and understanding encapsulation and abstraction models between network levels.
- Knowledge and understanding physical level data transmission mechanisms.
- Designing transport level protocols.
- Understanding performance factors and congestion control procedures.
- Knowledge and understanding of application level protocols, particularly those with multimedia containers.

## Competences

### Basic Competences

- **B03.** That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific or ethical issues.

### Transversal Competences

- **CT3.** Acquire training in the use of new technologies and information and communication technologies.

### General Competences

- **CG2.** Design, develop, evaluate and guarantee the accessibility, ergonomics, usability and security of computer systems.
- **CG3.** Use adequate hardware and software platforms to develop and execute interactive digital applications.

### Specific Competences

- **CE7.** Know, manage and maintain systems, services and interactive applications.
- **CE12.** Knowledge and ability to apply the characteristics, functionalities and structure of computer networks and internet, and design and implement interactive applications based on them.

## Subject contents

Standards and organizations.

OSI and TCP/IP models.

Physical level: Introduction to data transmission.

Data-link level:

- Medium access.
- Direct access networks: Ethernet (802.3), Wireless (802.11).
- Switching.

Network level:

- IP protocol.
- IP addressing.
- Basic routing: static and vector-distance.
- Advanced routing: link-state.

Transport level:

- End-to-end protocols: TCP and UDP.
- Another end-to-end protocols.

Congestion control and resource management.

Application level: Application protocols.

## Methodology

There are no lectures for this subject.

However, the student who wishes may attend, as an auditor, a similar subject (Communication Networks) of the Degree in Computer Engineering that is taught on the same Igualada campus.

## Development plan

There are no lectures for this subject.

## Evaluation

### Continuous evaluation

Block	Evaluation Activity	Weight	Minimum Score	Group	Compulsory	Recoverable
P1	Project 1	20%	No	Yes	No	No
P2	Project 2	20%	No	Yes	No	No

Block	Evaluation Activity	Weight	Minimum Score	Group	Compulsory	Recoverable
P3	Project 3	20%	No	Yes	No	No
E1	1st Midterm Exam	20%	No	No	No	Yes
E2	2nd Midterm Exam	20%	No	No	No	Yes
To pass the subject the final score must be $\geq 5$ .						
<b>Final Score</b> = $0,2 \cdot P1 + 0,2 \cdot P2 + 0,2 \cdot P3 + 0,2 \cdot E1 + 0,2 \cdot E2$						

## Remarks:

If the final score  $< 5$ , the student can recover the midterm exams (the student can choose one exam or both).

## Alternative evaluation (students who waive continuous evaluation):

Students who have the approval to be evaluated by alternative evaluation (see requirements and procedure in the evaluation regulations) will have to do the following activities.

- **Single exam** (100%): It can be improved. Date of the exam: the date of the realization of the 2nd Midterm Exam, defined by the EPS. This exam consists of a written test of the entire subject matter.
- **Improvement of Single exam** (100%): Date of the exam: the date of the realization of the Improvement Exam, defined by the EPS. The realization of the improvement exam **limits to 8** the maximum grade achieved in the subject.

## Bibliography

- Larry L. Peterson, Bruce S. Davie: Computer Networks: A Systems Approach, Fifth Edition. Morgan Kaufmann, 2011.
- Andrew S. Tanenbaum, David J. Wetherall: Computer Networks (5th Edition). Pearson, 2010.
- James F. Kurose, Keith W. Ross: Computer Networking: A Top-Down Approach (5th Edition). Addison-Wesley, 2010.
- W. Richard Stevens: TCP/IP Illustrated, Volumes 1 & 2. Addison-Wesley.
- Jeffrey S. Beasley: Networking. Pearson, 2008.