

## [GIC302] FUNDAMENTALS OF COMMUNICATION NETWORKS

### GENERAL INFORMATION

<b>Studies</b>	DEGREE IN COMPUTER ENGINEERING		<b>Subject</b>	COMPUTING
<b>Semester</b>	1	<b>Course</b>	1	<b>Mention / Field of specialisation</b>
<b>Character</b>	BASIC TRAINING		<b>Language</b>	EUSKARA
<b>Plan</b>	2022	<b>Modality</b>	Face-to-face	<b>Total hours</b>
<b>Credits</b>	6	<b>Hours/week</b>	5.44	98 class hours + 52 non-class hours = <b>150 total hours</b>

### PROFESSORS

GOMEZ DIEZ, CARLOS PEDRO  
 DOK-ETXEZARRETA ARGARATE, XABIER

### REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	(No previous knowledge required)

### LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
<b>GIR102</b> - To know the structure, organization, operation and interconnection of computer systems, the fundamentals of their configuration, and their application to solve engineering problems.		x		5,4
<b>G-RTR1</b> - To develop interdisciplinary projects specific to their specialty and of gradual complexity, - becoming aware of respect for human rights and fundamental rights, and analyzing and assessing the impact of the proposed solutions on the SDGs - to acquire and/or apply basic, advanced and /or avant-garde, demonstrating the ability to work in multidisciplinary teams and/or undertake further studies with a high degree of autonomy		x		0,28
<b>G-RTR2</b> - To express information, ideas and the arguments that support them in an orderly, clear and coherent manner, orally and in writing, based on quality information, self-made or obtained from different sources, using inclusive and non-discriminatory language		x		0,32
<b>Total:</b>				<b>6</b>

KC: Knowledge or Content / SK: Skills / AB: Abilities

### SECONDARY LEARNING RESULTS

**RG190** [!] *Conocer y aplicar las fases para desarrollar de forma guiada, con los objetivos y la planificación previamente definidos, un proyecto de complejidad técnica acorde con los conocimientos de formación básica de la ingeniería. Reflexiona sobre los cono*

#### LEARNING ACTIVITIES

	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	3 h.	1 h.	4 h.

#### EVALUATION SYSTEM

	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	20%
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	50%
Prototype / Product	30%

**Comments:** Continuous assessment.

#### MAKE-UP MECHANISMS

(No mechanisms)

**CH - Class hours:** 3 h.  
**NCH - Non-class hours:** 1 h.  
**TH - Total hours:** 4 h.

**RG191** [!] *Contribuir en la estrategia de funcionamiento del equipo priorizando los objetivos comunes, fomentando y valorando la participación de todas las personas y responsabilizándose de las tareas individuales, así como del cumplimiento de plazos*

<b>LEARNING ACTIVITIES</b>		<b>CH</b>	<b>NCH</b>	<b>TH</b>
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams		2 h.	1 h.	3 h.
<b>EVALUATION SYSTEM</b>	<b>W</b>	<b>MAKE-UP MECHANISMS</b>		
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	20%	(No mechanisms)		
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	50%			
Prototype / Product	30%			
<b>Comments:</b> Continuous assessment.				
<b>CH - Class hours:</b> 2 h.				
<b>NCH - Non-class hours:</b> 1 h.				
<b>TH - Total hours:</b> 3 h.				

<b>RG193</b> [!] <i>Redacta una memoria de proyecto clara y concisa utilizando las fuentes de información y estructura de memoria facilitadas, y haciendo un uso correcto, inclusivo y no discriminatorio del lenguaje</i>				
<b>LEARNING ACTIVITIES</b>		<b>CH</b>	<b>NCH</b>	<b>TH</b>
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams		3 h.	1 h.	4 h.
<b>EVALUATION SYSTEM</b>	<b>W</b>	<b>MAKE-UP MECHANISMS</b>		
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	20%	(No mechanisms)		
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	50%			
Prototype / Product	30%			
<b>Comments:</b> Continuous assessment. It may be asked to redo the document.				
<b>CH - Class hours:</b> 3 h.				
<b>NCH - Non-class hours:</b> 1 h.				
<b>TH - Total hours:</b> 4 h.				

<b>RG194</b> [!] <i>Realiza una presentación oral y defensa del proyecto clara y concisa, haciendo uso correcto, inclusivo y no discriminatorio del lenguaje</i>				
<b>LEARNING ACTIVITIES</b>		<b>CH</b>	<b>NCH</b>	<b>TH</b>
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams		3 h.	1 h.	4 h.
<b>EVALUATION SYSTEM</b>	<b>W</b>	<b>MAKE-UP MECHANISMS</b>		
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	20%	(No mechanisms)		
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	50%			
Prototype / Product	30%			

**Comments:** Continuous assessment.

**CH - Class hours:** 3 h.

**NCH - Non-class hours:** 1 h.

**TH - Total hours:** 4 h.

**RG126** [!] *Reconoce la estructura de las redes de datos identificando sus elementos y principios de funcionamiento*

**LEARNING ACTIVITIES**

	<b>CH</b>	<b>NCH</b>	<b>TH</b>
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	1 h.		1 h.
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	6 h.	4 h.	10 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	3 h.	1 h.	4 h.
Computer simulation exercises, individually and/or in teams	12 h.	7 h.	19 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	3 h.	1 h.	4 h.
Carrying out exercises and solving problems individually and/or in teams	24 h.	16 h.	40 h.

**EVALUATION SYSTEM**

**W**

**MAKE-UP MECHANISMS**

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	2%
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	5%
Individual written and/or oral tests or individual coding/programming tests	90%
Prototype / Product	3%

Individual written and/or oral tests or individual coding/programming tests

**Comments:** Students with less than 5 in the Control point must retake the exam. Control point value will be 25% and retake 75%. Project: There will not be any retake of the individual defense.

**Comments:** Minimum grade: 5 Project evaluation based on technical rubric

**CH - Class hours:** 51 h.

**NCH - Non-class hours:** 29 h.

**TH - Total hours:** 80 h.

**RG127** [!] *Diseña, implementa y prueba redes de área local, configurando los servicios y dispositivos de red (routers, switches) y probando su funcionamiento*

**LEARNING ACTIVITIES**

	<b>CH</b>	<b>NCH</b>	<b>TH</b>
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	2 h.		2 h.
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	5 h.	2 h.	7 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	5 h.	3 h.	8 h.
Computer simulation exercises, individually and/or in teams	8 h.	5 h.	13 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	2 h.	1 h.	3 h.
Carrying out exercises and solving problems individually and/or in teams	12 h.	8 h.	20 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	2%	Individual written and/or oral tests or individual coding/programming tests
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	5%	<b>Comments:</b> Students with less than 5 in the Control point must retake the exam. Control point value will be 25% and retake 75%. Project: There will not be any retake of the individual defense.
Individual written and/or oral tests or individual coding/programming tests	90%	
Prototype / Product	3%	
<b>Comments:</b> Minimum grade: 5 Project evaluation based on technical rubric		
<b>CH - Class hours:</b> 36 h.		
<b>NCH - Non-class hours:</b> 19 h.		
<b>TH - Total hours:</b> 55 h.		

## CONTENTS

1. Fundamentals of communications networks    1.1 Networks structure and elements (ICT infrastructure: equipment, servers, software, LAN and WAN networks, media, etc.).    1.2 Communication modes (Unicast, Broadcast, etc.)  
 2. Network models    2.1 OSI model    2.2 TCP/IP model    2.3 Internet Protocol (v4, v6)    2.4 Masks    2.5 Encapsulation  
 3. Network services    3.1 DNS    3.2 DHCP    3.3 NAT    3.4 VPN    3.5 Proxy  
 4. Internet Connectivity    4.1 Media (Cable, Fiber, ADSL, etc.)    4.2 Wifi    4.3 Mobile phone networks  
 5. Troubleshooting    5.1 Tools 1 (ping, tracrt, test ports, etc.)    5.2 Tools 2 (DNS tools, DNS public services, etc.)

## LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Subject notes	<a href="https://labur.eus/biblio-GIC302">https://labur.eus/biblio-GIC302</a>
Moodle Platform	
Specific Master Software	
Lab practical training	