Goi Eskola Politeknikoa Escuela Politécnica

	[MRA102] INDU						
			FORMATION				
Studies Master's Degree SYSTEMS	e in ROBOTICS AND CON	ITROL	Subject ?				
Semester 2 Character OPTIONAL	Course 1		Mention / Field of AL specialisation	ITOMATION			
Plan 2023	Modality Face-	to-face	Language CA	STELLANO			
Credits 3				nours + 45 non-class hours = <u>75 tot</u>			
		PROFE	SSORS				
FERNANDEZ ARRIETA, M VELEZ DE MENDIZABAL (
VELEZ DE MENDIZABAL C		PREVIC	DUS KNOWLEDGE				
Subjects			Knowledge				
	s subjects required)		(No	previous knov	-	iired)	
	LEA	RNING	RESULTS				
EARNING RESULTS					кс ѕк	AB	ECTS
1R202 - Demonstrate knowledge		l implemei	nt efficient and secure		x		2,4
ommunications infrastructures in 1R223 - Ability to work in multidis oth orally and in writing, knowled	ciplinary teams and in a m				x		0,2
aster's degree 1 R227 - Demonstrate the ability t dgments based on incomplete o					x		0,4
d fundamental rights				0			
						Total:	3
C: Knowledge or Content / SK: Skills / AE							
RA032 [!] Resuelve la proble industrial trabajando individua	SECONDAI	ón entre e	RNING RESULTS quipos y aplicaciones pares analizando de su	de un proce impacto soc	so de auto cial y ético	matizació	n
RA032 [!] Resuelve la proble ndustrial trabajando individua	SECONDAI	ón entre e	quipos y aplicaciones	de un proce impacto so	so de auto cial y ético	matizació	n
RA032 [!] Resuelve la proble ndustrial trabajando individua LEARNING ACTIVITIES	SECONDAI	ón entre e	quipos y aplicaciones	de un proce impacto sod CH	so de auto cial y ético NCH	matizació	
LEARNING ACTIVITIES Development and writing of rec projects/work experience/challe	SECONDAI mática de la comunicació Imente y en equipos mul	ón entre e tidisciplir s, audiovis	quipos y aplicaciones nares analizando de su sual material, etc. on	impacto so	cial y ético		
Industrial trabajando individua	SECONDAI mática de la comunicació Imente y en equipos mul ords, reports, presentations nges/case studies/experim	ón entre e tidisciplir s, audiovis iental inve	quipos y aplicaciones nares analizando de su sual material, etc. on	impacto so CH	cial y ético NCH	тн	h.
LEARNING ACTIVITIES Development and writing of rec projects/work experience/challe individually and/or in teams	SECONDAI	ón entre e tidisciplir s, audiovis iental inve	quipos y aplicaciones nares analizando de su sual material, etc. on estigations carried out	CH 7 h.	<i>NCH</i> 10 h.	TH 17	h. h.
Image: Additional system LEARNING ACTIVITIES Development and writing of recorrects/work experience/challe individually and/or in teams Computer simulation exercises, Presentation by the teacher in t procedures associated with the Carrying out exercises and solv	SECONDAI	in entre e tidisciplir s, audiovis ental inve s ory classe nd/or in te	quipos y aplicaciones nares analizando de su sual material, etc. on estigations carried out s, of concepts and eams	CH 7 h. 4 h. 4 h. 2 h.	NCH 10 h. 6 h. 4 h. 2 h.	7 TH 17 10 8 h 4 h	h. h.
Image: Additional system LEARNING ACTIVITIES Development and writing of recorrests/work experience/challe individually and/or in teams Computer simulation exercises, Presentation by the teacher in the procedures associated with the	SECONDAI	in entre e tidisciplir s, audiovis ental inve s ory classe nd/or in te	quipos y aplicaciones nares analizando de su sual material, etc. on estigations carried out s, of concepts and eams	<i>CH</i> 7 h. 4 h. 4 h.	NCH 10 h. 6 h. 4 h.	777 17 10 8 h	h. h.
Image: Additional system LEARNING ACTIVITIES Development and writing of recorrects/work experience/challe individually and/or in teams Computer simulation exercises, Presentation by the teacher in t procedures associated with the Carrying out exercises and solv	SECONDAI	in entre e tidisciplir s, audiovis ental inve s ory classe nd/or in te	quipos y aplicaciones nares analizando de su sual material, etc. on estigations carried out s, of concepts and eams	CH 7 h. 4 h. 4 h. 2 h. 4 h.	NCH 10 h. 6 h. 4 h. 2 h.	7 TH 17 10 8 h 4 h	h. h.
Industrial trabajando individual LEARNING ACTIVITIES Development and writing of rec projects/work experience/challe individually and/or in teams Computer simulation exercises, Presentation by the teacher in t procedures associated with the Carrying out exercises and solv Carrying out work experience in	SECONDAI	on entre e tidisciplir s, audiovis nental inve ory classe nd/or in te iting the co	quipos y aplicaciones hares analizando de su sual material, etc. on estigations carried out s, of concepts and eams orresponding report	CH 7 h. 4 h. 4 h. 4 h. 2 h. 4 h. ISMS letion of exercises, lai	<i>NCH</i> 10 h. 6 h. 4 h. 2 h. 2 h. cises, case boratory ex	777 17 10 8 h 6 h 5 tudies, cc	h. h. omputer
Industrial trabajando individual LEARNING ACTIVITIES Development and writing of rec projects/work experience/challe individually and/or in teams Computer simulation exercises, Presentation by the teacher in t procedures associated with the Carrying out exercises and solv Carrying out work experience in EVALUATION SYSTEM Reports on the completion of ex- computer exercises, simulation	SECONDAI	fon entre e tidisciplir s, audiovis hental inve ory classe nd/or in te iting the co	quipos y aplicaciones hares analizando de su sual material, etc. on estigations carried out s, of concepts and eams orresponding report <u>MAKE-UP MECHAN</u> Reports on the comp exercises, simulation	CH 7 h. 7 h. 4 h. 4 h. 2 h. 4 h. 1SMS letion of exerc exercises, lai and problems ence of exerc tion practical	Image: cial y ético NCH 10 h. 6 h. 4 h. 2 h. 2 h. cises, case boratory ex ises, case s work, labo	TH 17 10 8 h 4 h 6 h studies, cc ercises, ter studies, co ratory prac	h.
Image: Notice of the system Notice of the system <	SECONDAI	on entre e tidisciplir s, audiovis nental inve ory classe nd/or in te iting the co <u>W</u> 50%	quipos y aplicaciones hares analizando de su sual material, etc. on estigations carried out s, of concepts and eams orresponding report MAKE-UP MECHAN Reports on the comp exercises, simulation projects, challenges a Presentation and def practical work, simula term projects, end of	CH 7 h. 7 h. 4 h. 4 h. 2 h. 4 h. 1SMS letion of exerc exercises, lai and problems ence of exerc tition practical degree project	<i>NCH</i> 10 h. 4 h. 2 h. 2 h. cises, case boratory ex ises, case s work, labo ct, master's	TH 17 10 8 h 4 h 6 h studies, cc ercises, tel studies, co ratory prac thesis, cha	h.
Implementation LEARNING ACTIVITIES Development and writing of recorrepiects/work experience/challe individually and/or in teams Computer simulation exercises, Presentation by the teacher in the procedures associated with the Carrying out exercises and solw Carrying out exercises and solw Carrying out work experience in the computer exercises, simulation exercises, term projects, challer Presentation and defence of excomputer practical work, term project, master's thesis, challer Individual written and/or oral test coding/programming tests Comments: All activities (contraction)	SECONDAI	in entre e tidisciplir s, audiovis iental inve is ory classe nd/or in te iting the co <u>w</u> 50% 10% 40% oup work, or	quipos y aplicaciones hares analizando de su sual material, etc. on estigations carried out s, of concepts and eams orresponding report MAKE-UP MECHAN Reports on the comp exercises, simulation projects, challenges a Presentation and def practical work, simula term projects, end of and problems	CH 7 h. 7 h. 4 h. 4 h. 4 h. 2 h. 4 h. 1SMS letion of exerc exercises, lai and problems ence of exerc tion practical degree project /or oral tests	<i>NCH</i> 10 h. 4 h. 2 h. 2 h. cises, case boratory ex ises, case s work, labo ct, master's	TH 17 10 8 h 4 h 6 h studies, cc ercises, tel studies, co ratory prac thesis, cha	h.
Development and writing of rec projects/work experience/challe individually and/or in teams Computer simulation exercises, Presentation by the teacher in t procedures associated with the Carrying out exercises and solv Carrying out work experience in EVALUATION SYSTEM Reports on the completion of ex- computer exercises, simulation exercises, term projects, challen Presentation and defence of ex- computer practical work, simular laboratory practical work, term project, master's thesis, challen Individual written and/or oral test coding/programming tests	SECONDAL mática de la comunicació Imente y en equipos mul ords, reports, presentations inges/case studies/experim individually and/or in team he classroom, in participato subjects ing problems individually a n real environments and wri exercises, case studies, exercises, laboratory nges and problems ercises, case studies, tion practical work, projects, end of degree ges and problems sts or individual ol points, individual and gro e of 5 and an opportunity fo approved training activities ry and the final grade will b n the activities carried out it nark of 4 to calculate the ar wise, the note of the learni	in entre e tidisciplir s, audiovis lental inve ls ory classe nd/or in te iting the co <u>w</u> 50% 10% 40% youp work, or (less e the t is verage ng result	quipos y aplicaciones hares analizando de su sual material, etc. on stigations carried out s, of concepts and eams orresponding report MAKE-UP MECHAN Reports on the comp exercises, simulation projects, challenges a Presentation and def practical work, simula term projects, end of and problems Individual written and	CH 7 h. 7 h. 4 h. 4 h. 4 h. 2 h. 4 h. 1SMS letion of exerc exercises, lai and problems ence of exerc tion practical degree project /or oral tests	<i>NCH</i> 10 h. 4 h. 2 h. 2 h. cises, case boratory ex ises, case s work, labo ct, master's	TH 17 10 8 h 4 h 6 h studies, cc ercises, tel studies, co ratory prac thesis, cha	h.

Course: 2024 / 2025 - Course planning

CH - Class hours: 21 h. NCH - Non-class hours: 24 h. TH - Total hours: 45 h.

LEARNING ACTIVITIES			СН	NCH	ТН
Presentation by the teacher in the classroom, in participa procedures associated with the subjects	atory classe	s, of concepts and	4 h.	8 h.	12 h.
Practical work in workshops and/or laboratories, individu	ally and/or	in teams	5 h.	13 h.	18 h.
EVALUATION SYSTEM	W	MAKE-UP MECHAN	NISMS		
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	60%	Reports on the completion of exercises, case studies, compurexercises, simulation exercises, laboratory exercises, term projects, challenges and problems			
Individual written and/or oral tests or individual	40%	Individual writton and	d/or oral tests	or individual	
coding/programming tests Comments: All activities (control points, individual and g etc.) must have a minimum grade of 5 and an opportunity recovery (except the PBL). In unapproved training activitie han 5) the recovery is compulsory and the final grade will grade obtained in the recovery. In the activities carried ou necessary to obtain a minimum mark of 4 to calculate the mark of the learning result. Otherwise, the note of the lear will be that of the suspended activity. The system will calc	for es (less be the t it is average ning result	coding/programming	tests		

CONTENTS

- 1. Communications architecture. TCP/IP.
- 2. Industrial Ethernet. Fieldbuses
- 1. PROFINET. POWERLINK. EtherCAT.
- 2. Redundancy in industrial networks. MRP.
- 3. Industrial WiFi.
- 3. Network integration. OPC-UA, MQTT, HTTP.
- 4. Cybersecurity in industrial networks

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform	(No bibliography)

Moodle Platform Class presentations Lab practical training Computer practical training Specific Master Software Presentations by external Lecturers