[MRA102] INDUSTRIAL COMMUNICATIONS

GENERAL INFORMATION

Studies	Master's Degree in ROBOTICS AND CONTROL SYSTEMS			**Subject**	?
Semester	2	**Course**	1	**Mention / Field of specialisation**	AUTOMATION
Character	OPTIONAL				
Plan	2023	**Modality**	Face-to-face	**Language**	CASTELLANO
Credits	3	**Hours/week**	0	**Total hours**	30 class hours + 45 non-class hours = **75 total hours**

PROFESSORS

FERNANDEZ ARRIETA, MIGUEL
VELEZ DE MENDIZABAL GONZALEZ, IÑAKI

REQUIRED PREVIOUS KNOWLEDGE

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

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
M1R202 - Demonstrate knowledge to select, design, plan and implement efficient and secure communications infrastructures in industrial applications.	x			2,4
M1R223 - Ability to work in multidisciplinary teams and in a multilingual environment and to communicate, both orally and in writing, knowledge, procedures, results and ideas related to subjects related to the Master's degree		x		0,2
M1R227 - Demonstrate the ability to integrate knowledge and deal with the complexity of making judgments based on incomplete or limited information that includes reflections on the SDGs, human rights and fundamental rights		x		0,4
			Total:	3

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

SECONDARY LEARNING RESULTS

RA032 **[!]** ***Resuelve la problemática de la comunicación entre equipos y aplicaciones de un proceso de automatización industrial trabajando individualmente y en equipos multidisciplinares analizando de su impacto social y ético***

LEARNING ACTIVITIES	CH	NCH	TH
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	7 h.	10 h.	17 h.
Computer simulation exercises, individually and/or in teams	4 h.	6 h.	10 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	4 h.	4 h.	8 h.
Carrying out exercises and solving problems individually and/or in teams	2 h.	2 h.	4 h.
Carrying out work experience in real environments and writing the corresponding report	4 h.	2 h.	6 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	50%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
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	10%	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
Individual written and/or oral tests or individual coding/programming tests	40%	Individual written and/or oral tests or individual coding/programming tests

Comments: All activities (control points, individual and group work, etc.) must have a minimum grade of 5 and an opportunity for recovery (except the PBL). In unapproved training activities (less than 5) the recovery is compulsory and the final grade will be the grade obtained in the recovery. In the activities carried out it is necessary to obtain a minimum mark of 4 to calculate the average mark of the learning result. Otherwise, the note of the learning result will be that of the suspended activity. The system will calculate the final grade with the RA, applying the percentages defined in IKOF.

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

RA031 **[!]** ***Identifica las principales tecnologías y protocolos existentes en las redes industriales***

LEARNING ACTIVITIES	CH	NCH	TH
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	4 h.	8 h.	12 h.
Practical work in workshops and/or laboratories, individually and/or in teams	5 h.	13 h.	18 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	60%
Individual written and/or oral tests or individual coding/programming tests	40%

Comments: All activities (control points, individual and group work, etc.) must have a minimum grade of 5 and an opportunity for recovery (except the PBL). In unapproved training activities (less than 5) the recovery is compulsory and the final grade will be the grade obtained in the recovery. In the activities carried out it is necessary to obtain a minimum mark of 4 to calculate the average mark of the learning result. Otherwise, the note of the learning result will be that of the suspended activity. The system will calculate the final grade with the RA, applying the percentages defined in IKOF.

MAKE-UP MECHANISMS

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

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

CH - Class hours: 9 h.
NCH - Non-class hours: 21 h.
TH - Total hours: 30 h.

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)*
Class presentations	
Lab practical training	
Computer practical training	
Specific Master Software	
Presentations by external Lecturers	