

[MRA105] SYNCHRONISED AXES CONTROL

GENERAL INFORMATION

Studies	Master's Degree in ROBOTICS AND CONTROL SYSTEMS	Subject	?
Semester	2	Course	1
Character	OPTIONAL	Mention / Field of specialisation	AUTOMATION
Plan	2023	Modality	Face-to-face
Credits	6	Hours/week	0
		Language	CASTELLANO
		Total hours	59 class hours + 91 non-class hours = 150 total hours

PROFESSORS

ARRATIBEL GARCIA, ANDONI

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
BASIC INDUSTRIAL AUTOMATION [!] PROGRAMACIÓN BÁSICA	(No previous knowledge required)

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
M1R203 - Apply multi-axis drive solutions for synchronized and interpolated axis movements according to specified requirements			x	5,2
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
M1R224 - To be able to do their job in cooperative, participatory environments, with awareness of social responsibility.		x		0,2
M1R225 - Having and understanding knowledge providing a basis or opportunity to be original in developing and/or applying ideas, often in a research context.		x		0,4

Total: 6

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

SECONDARY LEARNING RESULTS

RA041 [!] *Diseña, desarrolla y valida el programa de control de posición de un eje mediante funciones estándares predefinidas*

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	5 h.	9 h.	14 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	8 h.	11 h.	19 h.
Practical work in workshops and/or laboratories, individually and/or in teams	1 h.	6 h.	7 h.

EVALUATION SYSTEM

	W
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	20%
Individual written and/or oral tests or individual coding/programming tests	80%

MAKE-UP MECHANISMS

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

Comments: Laboratory practices are mandatory to carry out the evaluation of the PBL project. All activities (control points, individual and group work, etc.) must have a minimum grade of 5 and an opportunity for recovery (except the PBL). If a control point is not passed (less than a 5), the retake is mandatory and the final grade will be the grade obtained in the retake. If an individual or group work is not passed (less than 5), the retake is mandatory and the final grade will be a maximum of 5. 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: 14 h.
NCH - Non-class hours: 26 h.
TH - Total hours: 40 h.

RA042 [!] *Diseña, desarrolla y valida el programa de control de sincronismo multi-ejes utilizando funciones estándares predefinidas trabajando individualmente y en equipos multidisciplinares*

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	9 h.	10 h.	19 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	10 h.	15 h.	25 h.
Practical work in workshops and/or laboratories, individually and/or in teams	1 h.	5 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			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	20%		
Individual written and/or oral tests or individual coding/programming tests		80%	

Comments: Laboratory practices are mandatory to carry out the evaluation of the PBL project. All activities (control points, individual and group work, etc.) must have a minimum grade of 5 and an opportunity for recovery (except the PBL). If a control point is not passed (less than a 5), the retake is mandatory and the final grade will be the grade obtained in the retake. If an individual or group work is not passed (less than 5), the retake is mandatory and the final grade will be a maximum of 5. 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: 20 h.
NCH - Non-class hours: 30 h.
TH - Total hours: 50 h.

RA043 [!] *Diseña, desarrolla y valida el programa de control de interpolación de ejes lineal, circular, etc. utilizando las funciones estándares predefinidas buscando la originalidad de la propuesta y colaborando de manera activa para evaluar y asumir la respo*

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	10 h.	10 h.	20 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	10 h.	15 h.	25 h.
Practical work in workshops and/or laboratories, individually and/or in teams	5 h.	10 h.	15 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			Individual written and/or oral tests or individual coding/programming tests
Presentation and defence of exercises, case studies, computer practical work, simulation practical work,	20%		

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 80%

Comments: Laboratory practices are mandatory to carry out the evaluation of the PBL project. All activities (control points, individual and group work, etc.) must have a minimum grade of 5 and an opportunity for recovery (except the PBL). If a control point is not passed (less than a 5), the retake is mandatory and the final grade will be the grade obtained in the retake. If an individual or group work is not passed (less than 5), the retake is mandatory and the final grade will be a maximum of 5. 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: 25 h.
NCH - Non-class hours: 35 h.
TH - Total hours: 60 h.

CONTENTS

[!]

Introducción a los Controladores Lógicos Programables (PLC) para el control de movimientos

- Operación básica de PLCs (B&R)
- Uso y configuración del entorno de desarrollo (Automation Studio)

Manipulación de un eje

- Fundamentos teóricos y configuración de un eje
- Diagnóstico de los problemas en el movimiento de un eje
- Análisis y validación de diferentes tipos de movimientos

Manipulación de múltiples ejes

- Sincronismo y diferentes tipos de sincronizaciones
- Configuración de ejes síncronos
- Diagnóstico de los problemas en el movimiento de ejes síncronos
- Análisis y validación de diferentes tipos de movimientos de ejes síncronos
- Análisis de la interpolación entre ejes

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

- [!] *Plataforma Moodle*
- [!] *Software específico de la titulación*
- [!] <https://www.br-automation.com/en/academy/>

Bibliography

- Brunner Hubert (2013). "Motion". Bernecler & Rainer
 Markus Ritchter (2013). "TA417TRN.433_ENG_CrossCutter". Bernecler & Rainer
 Markus Ritchter (2013). "TA417TRN.433_ENG_Flying Saw". Bernecler & Rainer
 Radak Alexander (2013). "TA417TRN.433-ENG_Labeller". Bernecler & Rainer