

[MRA101] ELECTROMECHANICAL DRIVES

GENERAL INFORMATION

Studies	Master's Degree in ROBOTICS AND CONTROL SYSTEMS		Subject	?
Semester	2	Course	1	Mention / Field of specialisation
Character	COMPULSORY		Language	CASTELLANO/EUSKARA
Plan	2023	Modality	Face-to-face	Total hours
Credits	3	Hours/week	0	32 class hours + 43 non-class hours = 75 total hours

PROFESSORS

UGALDE ROSILLO, GAIZKA

ZARATE BARRIGA, SERGIO

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	Mechanical system modelling Basic operation principles of electrical machines Basic control theory

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
M1R200 - [!] <i>Identificar las necesidad de un proceso industrial o un sistema autónomo en en ámbito de los accionamientos electromecánicos y seleccionar el más adecuado</i>	x			2,4
M1R223 - [!] <i>Capacidad de trabajar en equipos multidisciplinares y en un entorno multilingüe y de comunicar, tanto de forma oral como escrita, conocimientos, procedimientos, resultados e ideas relacionadas con los temas afines al máster</i>		x		0,2
M1R226 - To apply the knowledge acquired and your problem-solving skills in new, little-known or changing environments within broader (or multidisciplinary) contexts related to your area of study		x		0,4
Total:				3

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

SECONDARY LEARNING RESULTS

RA011 [!] *Identifica la necesidad de accionamientos electromecánicos en procesos industriales y sistemas autónomos y los relaciona con las características técnicas de los diferentes tipos de accionamientos electromecánicos comunicando sus conclusiones de maner*

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		4 h.	4 h.
Computer simulation exercises, individually and/or in teams	1 h.	7 h.	8 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	12 h.		12 h.
Carrying out exercises and solving problems individually and/or in teams	1 h.	10 h.	11 h.

EVALUATION SYSTEM

	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, 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	30%
Individual written and/or oral tests or individual coding/programming tests	60%

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

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: 14 h.

NCH - Non-class hours: 21 h.

TH - Total hours: 35 h.

RA012 [!] *Selecciona e integra los accionamientos electromecánicos necesarios dentro del proceso a automatizar o del sistema autónomo resolviendo los problemas asociados a la aplicación*

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
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		15 h.	15 h.
Computer simulation exercises, individually and/or in teams	4 h.	7 h.	11 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	14 h.		14 h.

EVALUATION SYSTEM

W

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, 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	30%
Individual written and/or oral tests or individual coding/programming tests	60%

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

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: 18 h.

NCH - Non-class hours: 22 h.

TH - Total hours: 40 h.

CONTENTS

1. DRIVE COMPONENT SELECTION

2. SENSORS FOR ELECTRIC DRIVES

Current sensors

Position and velocity sensors

CW: drive component selection

3. CONTROL OF ELECTRIC MACHINES

1. Torque control

+ DC machine

+ Brushless AC (vector control)

2. Speed control

3. Position control

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Subject notes
Moodle Platform

Bibliography

Mohan, Ned. Electric Machines and Drives, A First Course. John Wiley & Sons. USA. 2012. ISBN: 978-1-118-07481-7