[GMI301] ELECTRICAL DRIVE TECHNOLOGIES

GENERAL INFORMATION

Studies	DEGREE IN MECHANICAL ENGINEERING			**Subject**	?
Semester	1	**Course**	3	**Mention / Field of specialisation**	
Character	COMPULSORY				
Plan	2022	**Modality**	Face-to-face	**Language**	CASTELLANO/EUSKARA
Credits	3	**Hours/week**	2.22	**Total hours**	40 class hours + 35 non-class hours = **75 total hours**

PROFESSORS

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REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	Basic knowledge of Electrical Physics

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GMR301 - To know and use the principles of circuit theory and electrical machines		x		2,56
G-RTR1 - 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		0,2
G-RTR2 - 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		0,24
			Total:	3

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

ENAEE LEARNING RESULTS

ENA102 - Knowledge and comprehension: Knowledge and comprehension of the engineering disciplines of their speciality, at the level necessary to acquire the rest of the competencies of the degree, including notions of the latest advances.

ENA103 - Knowledge and comprehension: Awareness of the multidisciplinary context of engineering.

ENA104 - Analysis in engineering: The ability to analyse complex products, processes and systems in their field of study; choose and apply relevant analytical, calculation and experimental methods in a suitable way; and correctly interpret the results of such analyses.

ENA105 - Analysis in engineering: The ability to identify, formulate and solve engineering problems in their speciality; choose and apply adequately established analytical, calculation and experimental methods; and acknowledge the importance of social, health and safety, environmental, economic, and industrial restrictions.

ENA106 - Engineering projects: Ability to project, design and develop complex products (parts, components, finished products, etc.), processes and systems of their speciality, which meet the established requirements, including awareness of the social, health and safety, environmental, economic and industrial aspects, as well as selecting and applying appropriate project methods.

ENA107 - Engineering projects: Project capacity some state-of-the-art knowledge of their engineering speciality.

ENA108 - Research and innovation: Ability to carry out bibliographic searches and consult and use databases and other information sources with discretion, in order to carry out simulation and analysis with the aim of conducting research on technical topics of their speciality.

ENA111 - Practical application of engineering: Understanding of the applicable techniques and methods fr analysis, design and research and their limitations in the field of their speciality.

ENA113 - Practical application of engineering: Knowledge of application of materials, equipment and tools, engineering technology and processes, and their limitations in the field of their speciality.

ENA115 - Practical application of engineering: Knowledge of the social, health and safety, environmental, economic and industrial implications of engineering practice.

ENA118 - Preparation of judgements: Ability to manage complex technical or professional activities or projects of their speciality, taking responsibility for decision making.

ENA119 - Communication and Teamwork: Ability to effectively communicate information, ideas, problems and solutions in the field of engineering and with society in general.

ENA120 - Communication and Teamwork: Ability to operate effectively in domestic and international contexts, individually and as a team, and to cooperate with both engineers and people from other disciplines.

ENA121 - Continued training: Ability to acknowledge the need for their own continued training and to undertake this activity throughout their professional life independently.

ENA122 - Continued training: Ability to stay up to date on science and technology innovations.

CONTENTS

1. Presentation of the subject

1. AC and DC circuits. Electromagnetic interaction.

2. Electric actuators torque and rotation generation: DC motor principle.
3. Asynchronous motors

1. Main characteristics: rotary flow, sliding, connection terminals ...
2. Curves/graphs of work, problem of direct start.
3. Protection elements.
4. Basics on Power electronics: diodes and Thyristors. Rectifiers
5. Power schemes: direct start, change of direction, star-delta start
6. Modification of speed: Variable frequency drivers ...
7. Motor selection: exercises

4. Servo drives: AC servo motors.

1. General characteristics
2. Control loops
3. Motor selection: exercises

5. Analysis of various industrial applications and the selection of drives for them

6- European regulations to improve the efficiency of electric drives

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform	Accionamientos eléctricos. Tomo 1 y2 Merino Azcárraga, José María.
Slides of the subject	Industrial brushless servomotors Moreton, Peter, 2000
Topic related web quires	Control de motores eléctricos Enriquez Harper, Gilberto 1999
Lab practical training	Electrical machines, drives, and power systems;Theodore Wildi, Prentice Hall.
	Electric machinery and power system fundamentals”, S.J.Chapman, McGraw Hill,
	Electric Motors and Drives: fundamentals, types and applications; A.Hughes and B.Drury, Elsevier, 2013 4th edition