

## SUBJECT TEACHING GUIDE

### G1008 - Machines and Electric Drives

Degree in Industrial Electronic Engineering and Automatic Control Systems  
 First Degree in Industrial Electronic Engineering and Automatic Control Systems

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Industrial Electronic Engineering and Automatic Control Systems First Degree in Industrial Electronic Engineering and Automatic Control Systems			Type and Year	Compulsory. Year 4 Compulsory. Year 4
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Machines and Electric Drives Module: Further Specific Technology				
Course unit title and code	G1008 - Machines and Electric Drives				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA ELECTRICA Y ENERGETICA				
Name of lecturer	JUAN ANTONIO CARDONA PARDO				
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Other lecturers	CARMELA ORIA ALONSO				

3.1 LEARNING OUTCOMES	
- Know how to choose the appropriate method for the analysis of electric machines	
- Compare the advantages and disadvantages of different electric machines in industrial applications , identifying key points for each option	
- Select the right electric machine for industrial applications, specially in electric drives	
- Understand the operation of electric drives	

#### 4. OBJECTIVES

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| Identify the components of an electric drive                           |
| Show the principles of operation and analysis of the electric machines |
| Know the protection and speed control systems of the electric machines |

#### 6. SUBJECT PROGRAM

##### CONTENTS

1	General principles of electric machines
1.1	Materials and magnetic circuits
1.2	Electric machine construction. Operating principle . Classification
1.3	Magnetic field in the airgap. Electro-motive forces. Power and losses
2	Transformers
2.1	Operating principle
2.2	Methods of analysis
2.3	Transformer operation . Special transformers
3	Induction machines
3.1	Assembly and operating principle
3.2	Equivalent circuit. Torque-speed curve
3.3	Operating and control of induction motors
4	Synchronous machines
4.1	General description and operating principle
4.2	Methods of analysis of synchronous machines
4.3	Synchronous motor operation
5	DC and special machines
5.1	Construction and operating principle
5.2	Armature reaction, Commutation. DC motors operation. Characteristic curves
5.3	Operation and control of dc machines. Special dc motors
6	Electric drives
6.1	Introduction to electric drives. Command and control devices
6.2	Electric machines protection
6.3	Control of electric machines

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Experimental practices in laboratory	Laboratory evaluation	No	No	10,00
Partial written exams	Written exam	No	Yes	40,00
Written final exam	Written exam	Yes	Yes	40,00
Practices in laboratory with computer	Others	No	No	10,00
TOTAL				100,00
Observations				
Final qualification = 40% of partial written exams + 40% of final written exam + 10% of laboratory practices + 10% of practices in laboratory with computer In case of a COVID-19 health alarm make impossible to carry out evaluation on site, a distance evaluation will be planned				
Observations for part-time students				
Part-time students will take only one final exam with 100% of the qualification				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Material docente suministrado al alumno en el Aula Virtual de la asignatura
FRAILE MORA, J. "Máquinas Eléctricas". Mc Graw-Hill/Interamericana de España. Madrid.
FRAILE MORA, J. "Problemas de máquinas eléctricas". Mc Graw-Hill /Interamericana de España. Madrid.
J. FRAILE MORA, J. FRAILE ARDANUY, "Accionamientos Eléctricos " 2ª Edición, Ed Garceta, , Madrid 2019