SUBJECT TEACHING GUIDE

G875 - Electrical Drives

Degree in Electrical Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Electrical Engineering			Type and Year	Compulsory. Year 4
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Machines and Electrical Switches Module: Electrical Technology				
Course unit title and code	G875 - Electrical Drives				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web					
Language of instruction	English	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA ELECTRICA Y ENERGETICA
Name of lecturer	MARIO MAÑANA CANTELI
E-mail	mario.manana@unican.es
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 2. DESPACHO PROFESOR (S2055)
Other lecturers	ALBERTO LASO PEREZ RAQUEL MARTINEZ TORRE

3.1 LEARNING OUTCOMES
- The student will be able to analyze and/or design an electric drive taking into account not only technical and economical aspects but also the application and the standards.
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4. OBJECTIVES

The main aim of this subject is providing the students with the basic principles of electrical drives. The students will gain the skills needed in order to select, analyze and design adjustable speed drives (ASD). The subject focuses on practical implementation of several types of ASD taking into account the standards , the available commercial-degree technology and the final application. The topics covered by the subjects are defined in the context of the sustainability objectives defined by the 2030 Agenda for Sustainable Development of United Nations and the SDGs, especially with regard to SDG 7.

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6. SUBJECT PROGRAM

CONTENTS	
1	Introduction to Electrical Drives: History. Definition of and Electrical-Motor Drive. State of the Art. Typical Applications. The Multi-Disciplinary Nature of Drive Systems.
2	Electronic Power Converter for Electrical Drives: Introduction. Power Semiconductor Devices. Overview of Power Processing Units. Converters for DC Motor Drives. Converters for AC Motor Drives.
3	DC-Motor Drives: Introduction. Operating Principles of DC Machines. Equivalent Models of DC-Motor Drives. Operating Modes in DC-Motor Drives. Feedback Controllers for Motor Drives.
4	AC-Motor Drives: Introduction. Space-Vector Representation. Permanent-Magnet Synchronous AC Drives. Induction Motor-Drives. Steady-State Operation. Speed and Torque Control of AC-Motor Drives.
5	Reluctance Drives: Introduction. Stepper-Motor Drives. Switched-Reluctance Motor Drives.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Virtual Evaluation. Activities using on-line tools.	Activity evaluation with Virtual Media	No	No	20,00
Evaluation Part I. Written exams during the class period.	Written exam	No	Yes	40,00
Evaluation Part II. Written exams during the class period.	Written exam	No	Yes	40,00
TOTAL				100,00

Observations

In general, the rules governing the evaluation system module will be in accordance with the current legislation in the University of Cantabria.
The evaluation system will have as main benchmark the continuous assessment . It will be performed through activities planned throughout during the semester .
Continuous assessment may be supplemented by a final test to be held at the end of the semester. In any case, the percentages corresponding to the continuous assessment and the final grade test shall comply with the following restrictions:
• Continuous assessment: 75% of the final score.
• On-line assessment: 15% of the final score.
• Final project: 10% of the final score.
Students who refuse to do the continuous evaluation or fail the final exam will be required to re-sit the exam period at the end of each semester.
For reference, the ongoing evaluation activities will be:
• Laboratory.
• Oral presentations.
• Individual or group work.
• Written tests.
• Online tests.

All the evaluation can be carried out in both face to face or online mode.

At the discretion of the faculty, this evaluation can be conducted either in person or remotely.

Observations for part-time students

The evaluation of partial-time students will be performed with the same criteria that the full-time students.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Mohan, N.; Electric Machines and Drives. A First Course. Wiley.
Hart, D.; Power Electronics. McGraw-Hill Science.