UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2018/19
Subject (*)	Electric Drive		Code	770523011
Study programme	Mestrado Universitario en Eficiencia e Aproveitamento Enerxético			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	2nd four-month period	First	Optional	3
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Enxeñaría Industrial			
Coordinador	Chouza Gestoso, Jesus Diego	E-mail	jesus.chouza@udc.es	
Lecturers	Chouza Gestoso, Jesus Diego	E-mail	jesus.chouza@udc.es	
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General description	In this course the different drives of electrical machines , fundamentally different technologies to be used in AC machines are studied , identifying the advantages according to the processes and analyzing the necessary control systems , which are used in renewable energy , mainly in wind energy.			

Study programme competences	
Code	Study programme competences
A1	Análise e aplicación de metodoloxías e normativa para unha xestión eficiente da enerxía.
A2	Análisis e implantación de medidas de ahorro y eficiencia energética en los sectores industrial, terciario y residencial.
A4	Análisis de consumos energéticos y de su costes asociados.
A16	Capacidad para buscar, analizar, identificar y aplicar nuevas fuentes de energía eléctrica o nuevas técnicas de gestión de la electricidad bajo criterios como eficiencia, sostenibilidad o cooperación, así como el empleo de éstas sobre nuevas aplicaciones.
B9	Extraer, interpretar y procesar información, procedente de diferentes fuentes, para su empleo en el estudio y análisis.
B11	Adquirir nuevos conocimientos y capacidades relacionados con el ámbito profesional del máster.
B12	Analizar de forma crítica la propia experiencia de prácticas.
B13	Aplicar los conocimientos teóricos a la práctica
B16	Valorar la aplicación de tecnologías emergentes en el ámbito de la energía y el medio ambiente.
B17	Desarrollar la capacidad para asesorar y orientar sobre la mejor forma o cauce para optimizar los recursos energéticos en relación con las energías renovables.
B18	Plantear y resolver problemas, interpretar un conjunto de datos y analizar los resultados obtenidos; en el ámbito de la eficiencia energética y la sostenibilidad.
C2	Fomentar la sensibilidad hacia temas medioambientales.
C4	Desarrollar el pensamiento crítico
C5	Adquirir la capacidad para elaborar un trabajo multidisciplinar

Learning outcomes			
Learning outcomes	Study programme competences		
Apply quantitative methods and computer programs to simulate and analyze control systems required for the design of electrical machines drives to solve engineering problems .	AJ1 AJ2 AJ4 AJ16	BC9 BC11 BC12 BC13 BC16 BC17 BC18	CC2 CC4 CC5

Investigate and define problems and identify possible restrictions in the analysis and design of electrical drives , using different technologies.	AJ2 AJ4 AJ16		CC4
Understanding the needs of user and consumer in the selection of drives required for different types of electrical machines.	AJ16	BC9 BC12 BC13	CC5
Use creativity to establish innovative solutions in the analysis and design of electrical machines drives , according to the different requirements .	AJ16	BC12 BC13	CC4 CC5
Knowing the different processes, products and services related to the design of electrical machines drives of computers. It is able to use technical literature and other sources of information.	AJ16	BC9 BC12 BC13 BC16 BC17 BC18	CC4
Have job skills laboratory and workshops.		BC11 BC12 BC13	CC4

Contents	
Topic	**Sub-topic**
1. Introduction to industrial drives.	-Functions of the drives. -Criteria for choosing a variable speed drive . -Interacciones between different parts of the drive.
2. Industrial Drives with DC machines .	- Single-phase converters . - Three-Phase converters . - Four-Quadrant DC motor Drive.
3. Industrial Drives with asynchronous AC machines .	-Regulation by controlling the stator. -Regulation for recovery of slip power . -Vector-control.
4. Industrial Drives with AC synchronous machines .	- Open loop Operation. - Closed loop Operation .

Planning				
Methodologies / tests	**Competencies**	**Ordinary class hours**	**Student?s personal work hours**	**Total hours**
Guest lecture / keynote speech	A1 A2 A4 A16 B9 B11 B12 B13 B16 B17 B18 C2 C4 C5	9	30	39
Laboratory practice	A16 B12 B13 C5	12	7	19
Problem solving	A1 A2 A4 A16 B9 B11 B12 B13 B16 B17 B18 C2 C4 C5	0	12	12
Objective test	A1 A2 A4 A16 B11 C4 C5	3	0	3
Personalized attention		2	0	2
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**

Guest lecture / keynote speech	It is done in the classroom, the fundamentals of the subject are explained . Using multimedia means to facilitate learning.
Laboratory practice	They consist of case studies where the student must demonstrate the acquired theoretical knowledge. You perform necessary to pass the subject .
Problem solving	The teacher makes standard problems , proposing solutions and providing resources to students.
Objective test	Evaluation test to be held at the end of the course, in the corresponding official announcements, where the student must demonstrate the degree of learning in an objective manner . They consist of a number between 15 and 20 multiple choice questions , accompanied by 6 possible answers , where only one is correct , students must always justify the answer , this being an indispensable condition for the answer to be accepted as correct.

Personalized attention	
Methodologies	**Description**
Problem solving Laboratory practice	The work done both in the laboratory and in the proposed problems is analyzed in order to focus on key points, proposed by the teacher. The students are required to explain or resolve any problems that may arise.be requirirá. Students doubts are resolved.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Problem solving	A1 A2 A4 A16 B9 B11 B12 B13 B16 B17 B18 C2 C4 C5	Performs a test when the subject reaches the middle, which will represent 25% of the final grade, provided that the student obtains 4.5 points of 10 in the objective test. This test is voluntary.	25
Laboratory practice	A16 B12 B13 C5	The successful completion of laboratory practices are essential to pass the subject. The test laboratory practices account for 15 % of the final grade for the subject ,the student must exceed 4.5 points to 10 points in the objective test to pass the course.	15
Objective test	A1 A2 A4 A16 B11 C4 C5	The objective test to be performed at the end in the corresponding official announcements, where the student must demonstrate the degree of learning in an objective manner. They consist of a number between 15 and 20 multiple choice questions, accompanied by 6 possible answers, where only one is correct, students must always justify the answer, this being an indispensable condition for the answer to be accepted as correct. To pass the course the student must obtain 4.5 points of 10 in this test, will represent 60% of the final qualification.	60

Assessment comments

Sources of information	
Basic	KRAUSE,P.C. ; WASYNCZUK, O.; SUDHOFF, S.D. Analysis of Electric Machinery and Drive Systems. Wiley-IEEE Press. March 5th 2002.KRISHNAN, R. Electric Motor Drives Modeling, Analysis, And Control. Prentice Hall,2001. WILDI, T. Máquinas Eléctricas y Sistemas de Potencia. México. Pearson Prentice Hall,2007. BOLDEA, I.; NASAR, S.A. Electric Drives, USA, CRC Press, 1999.
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.