Teaching Guide				
Identifying Data				2015/16
Subject (*)	FUNDAMENTOS DA ELECTRICIDADE		Code	730G04012
Study programme	Grao en enxeñaría en Tecnoloxías Industriais			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Second	Obligatoria	6
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Enxeñaría Industrial			
Coordinador	Menacho Garcia, Carlos Miguel	E-mail	miguel.menacho@udc.es	
Lecturers	Menacho Garcia, Carlos Miguel Santome Couto, Emilio	E-mail	miguel.menacho@udc.es emilio.santome@udc.es	
Web	https://campusvirtual.udc.es/moodle/			
General description	In this course, the analysis of electrical circuits and a brief introduction to the operation of electric machines is studied.			

Study programme competences	
Code	Study programme competences
A10	Coñecemento e utilización dos principios de teoría de circuítos e máquinas eléctricas.
B2	Que os estudantes saiban aplicar os seus coñecementos ao seu traballo ou vocación dunha forma profesional e posúan as competencias que adoitan demostrarse por medio da elaboración e defensa de argumentos e a resolución de problemas dentro da súa área de estudo
B3	Que os estudantes teñan a capacidade de reunir e interpretar datos relevantes (normalmente dentro da súa área de estudo) para emitiren xuízos que inclúan unha reflexión sobre temas relevantes de índole social, científica ou ética
B5	Que os estudantes desenvolvan aquelas habilidades de aprendizaxe necesarias para emprenderen estudos posteriores cun alto grao de autonomía
B7	Ser capaz de realizar unha análise crítica, avaliación e síntese de ideas novas e complexas
C1	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.
C5	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.

Learning outcomes			
Learning outcomes	Study programme competences		
Apply Ohm's law and Kirchhoff's laws. Use correct general methods of analysis of DC circuits. Analyze any direct current circuit using the most appropriate method.	A10	B2 B3 B5 B7	C1 C5
Interpret and differentiate between different types of ac power. Use correct general methods of analysis of alternating current circuits. Analyzing any AC circuit using the most appropriate method.	A10	B2 B3 B5 B7	C1 C5
To analyze the operation of the three-phase balanced and unbalanced circuits. Interpret, differentiate and measure various types of power present in three-phase circuits.	A10	B2 B3 B5 B7	C1 C5

Understanding the difference between the transitional regime and the steady or stationary state of a circuit. Learn to get the relevant initial conditions in an electrical circuit. Clearly identify the final steady state (elapsed long enough) expected of a circuit. Distinguish circuits first and second order. Get representative differential equation for each circuit transient.	A10	B2 B3 B5 B7	C1 C5
Know the basic principles of electromagnetic energy conversion system. Know the basics and general operating principles of electric machines.	A10	B2 B3 B5 B7	C1 C5

Contents	
Topic	**Sub-topic**
Analysis of DC circuits	Basics Circuit elements Association of elements Waveforms Mesh analysis Nodal analysis Circuit Theorems
Analysis of AC circuits	Basics Analysis of circuits in sinusoidal steady state Power and energy steady state sinusoidal Theorems steady state sinusoidal
Analysis three-phase circuits	Overview Balanced and unbalanced three-phase circuits Power in three-phase circuits Measurement of power in three-phase circuits
Circuit analysis transient	Basics First order circuits Second order circuits Laplace Transform
Introduction to the operation of electric machines	Magnetic circuits and energy conversion General principles of electrical machines

Planning				
Methodologies / tests	**Competencies**	**Ordinary class hours**	**Student?s personal work hours**	**Total hours**
Introductory activities	A10	1.5	0	1.5
Guest lecture / keynote speech	A10 B2 B3 B5 B7 C1 C5	24	38	62
Problem solving	A10 B2 B3 B5 B7 C1 C5	22	33	55
Laboratory practice	A10 B2 B3 B5 B7 C1 C5	9	5	14
Objective test	A10	2	12	14
Multiple-choice questions	A10	0.5	2	2.5
Personalized attention		1	0	1
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies

Methodologies	Description
Introductory activities	Presentation of the subject, in large group (GG). Teachers: Miguel Menacho (theory and problems) and Emilio Santomé (Workshop Practice).
Guest lecture / keynote speech	Oral presentation complemented the use of media and the introduction of questions aimed at motivating students, in order to impart knowledge and facilitate learning. Corresponds to the kind of theory, large group (GG). Professor Miguel Menacho.
Problem solving	Technique by to be solved a particular problem situation, from the knowledge and procedures that have been studied and worked. Corresponds to the class of problems, medium (GM) group. Professor Miguel Menacho.
Laboratory practice	Methodology that allows students to apply the knowledge acquired through the completion of practical activities. It is for the workshop exercises, small group (GP). Instructor: Emilio Santomé.
Objective test	Written test used for the assessment of learning. In order to more rigorously assess the achievement of the objectives, the test consists of two parts: multiple choice questions (items) and problem solving. Multiple choice questions (items) is a measuring instrument, whose distinctive feature is that it allows the answers qualify as correct or not; and to assess the knowledge acquired. Troubleshooting: part that is intended to evaluate conceptual, procedural and attitudinal. It is for the consideration of theory and problems. Instructor: Miguel Menacho
Multiple-choice questions	Objective test consisting raise a question as direct question or incomplete statement with several response options or alternatives that provide possible solutions, of which only one is valid. Corresponds to practice exam workshop. Instructor: Emilio Santomé.

Personalized attention	
Methodologies	**Description**
Objective test	Tutorials review.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Objective test	A10	This test involves problem solving and / or items, and will be computed between 0 and 10 points. Instructor: Miguel Menacho.	82

Multiple-choice questions	A10	In the January announcement, the grade will be the sum of the amount of the assistance and assessment practices workshop note, which is valued between 0 and 5 points, and the note of a final exam (multiple choice test), which was also assessed from 0 to 5 points. In the July, qualifying match corresponding note final exam (multiple choice test), which is valued between 0 and 10 points. Instructor: Emilio Santomé.	9
Laboratory practice	A10 B2 B3 B5 B7 C1 C5	In the January announcement, the grade will be the sum of the amount of the assistance and assessment practices workshop note, which is valued between 0 and 5 points, and the note of a final exam (multiple choice test), which was also assessed from 0 to 5 points. In the July, qualifying match corresponding note final exam (multiple choice test), which is valued between 0 and 10 points. Instructor: Emilio Santomé.	9

Assessment comments
Para aprobar a asignatura é necesario aprobar a parte de teoría e problemas e a parte de prácticas de laboratorio. A calificación final é a suma da (nota de teoría e problemas)*5/6 e a (nota de prácticas de laboratoria)*1/6 . Na presentación da asignatura (primeiro día de clase) poderanse indicar actividades adicionáis cuia valoración sumarase á nota da prueba obxetiva da parte de teoría e problemas. En cualquera caso, a nota desta parte (teoría e problemas) no poderá ser superior a 10 puntos.

Sources of information	
Basic	- Paul, C.R. (2001). Fundamentals of electric circuits analysis. USA: John Willey and Sons - Alexander, C.K. y Sadiku, M.N.O. (2013). Fundamentos de circuitos eléctricos. Méjico: McGraw-Hill - Sánchez Barrios, P. et al. (2007). Teoría de circuitos: problemas y pruebas objetivas orientadas al aprendizaje.. Madrid: Pearson/Prentice Hall - Humet, L., Alabern, X. y García, A. (1997). Tests de Electrotecnia. Fundamentos de circuitos. Barcelona: Marcombo - Eguiluz Morán, L.I. et al. (2001). Pruebas objetivas de circuitos eléctricos. Barañáin (Navarra): EUNSA - Eguiluz Morán, L.I. y Sánchez Barrios, P. (1989). Pruebas de examen de teoría de circuitos. Santander: Universidad de Cantabria - Parra, V. et al. (1976). Unidades didácticas de teoría de circuitos (2 vols.). Madrid: UNED - Fraile Mora, J. (2008). Máquinas eléctricas. Madrid: McGraw-Hill - Eguiluz Morán, L.I. (1986). Pruebas objetivas de ingeniería eléctrica. Madrid: Alhambra - Fraile Mora, J. (2012). Circuitos eléctricos. Madrid: Pearson
Complementary	

Recommendations
Subjects that it is recommended to have taken before
CÁLCULO/730G03001 ÁLXEBRA/730G03006 FÍSICA II/730G03009

Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
FUNDAMENTOS DE ELECTRÓNICA/730G03016 INSTALACIÓNS INDUSTRIAIS /730G03031
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.