



Teaching Guide

Identifying Data				2015/16
Subject (*)	FUNDAMENTOS DA ELECTRICIDADE	Code	730G03012	
Study programme	Grao en Enxeñaría Mecánica			
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 / results

Code	Study programme competences / results
A10	Coñecemento e utilización dos principios de teoría de circuítos e máquinas eléctricas.
B1	Que os estudantes demostren posuír e comprender coñecementos nunha área de estudo que parte da base da educación secundaria xeral e adoita encontrarse a un nivel que, aínda que se apoia en libros de texto avanzados, inclúe tamén algúns aspectos que implican coñecementos procedentes da vangarda do seu campo de estudo
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.
C4	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C5	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.

Learning outcomes

Learning outcomes	Study programme competences / results		
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	B1 B2 B3 B5 B7	C1 C4 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	B1 B2 B3 B5 B7	C1 C4 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	B1 B2 B3 B5 B7	C1 C4 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	B1 B2 B3 B5 B7	C1 C4 C5
Know the basic principles of electromagnetic energy conversion system. Know the basics and general operating principles of electric machines.	A10	B1 B2 B3 B5 B7	C1 C4 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 / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Introductory activities	A10	1.5	0	1.5
Guest lecture / keynote speech	A10 B1 B2 B3 B5 B7 C1 C4 C5	24	38	62
Problem solving	A10 B1 B2 B3 B5 B7 C1 C4 C5	22	33	55
Laboratory practice	A10 B1 B2 B3 B5 B7 C1 C4 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	<p>Presentation of the subject, in large group (GG). Teachers: Miguel Menacho (theory and problems) and Emilio Santomé (Workshop Practice).</p>
Guest lecture / keynote speech	<p>Oral presentation complemented the use of media and the introduction of questions aimed at motivating students, in order to impart knowledge and facilitate learning.</p> <p>Corresponds to the kind of theory, large group (GG). Professor Miguel Menacho.</p>
Problem solving	<p>Technique by to be solved a particular problem situation, from the knowledge and procedures that have been studied and worked.</p> <p>Corresponds to the class of problems, medium (GM) group. Professor Miguel Menacho.</p>
Laboratory practice	<p>Methodology that allows students to apply the knowledge acquired through the completion of practical activities.</p> <p>It is for the workshop exercises, small group (GP). Instructor: Emilio Santomé.</p>
Objective test	<p>Written test used for the assessment of learning.</p> <p>In order to more rigorously assess the achievement of the objectives, the test consists of two parts: multiple choice questions (items) and problem solving.</p> <p>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.</p> <p>Troubleshooting: part that is intended to evaluate conceptual, procedural and attitudinal.</p> <p>It is for the consideration of theory and problems. Instructor: Miguel Menacho</p>
Multiple-choice questions	<p>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.</p> <p>Corresponds to practice exam workshop. Instructor: Emilio Santomé.</p>

Personalized attention	
Methodologies	Description
Objective test	Tutorials review.

Assessment			
Methodologies	Competencies / Results	Description	Qualification



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.