UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2017/18
Subject (*)	Fundamentals of Electricity		Code	730G03012
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	moodle.udc.es			
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

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	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 / Results**	**Description**	**Qualification**
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.	10
Objective test	A10	This test involves problem solving and / or items, and will be computed between 0 and 10 points.	80

Laboratory practice	A10 B1 B2 B3 B5 B7 C1 C4 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.	10

Assessment comments
To pass the subject it is necessary to approve the part of theory and problems and the part of laboratory practices. The subject will also be approved if it reaches a mark of more than or equal to 3'5 points in the note of laboratory practices, compensate with the part of theory and problems. The final grade is the sum of the (theory and problems note) * 0'80 and the (laboratory practice note) * 0'20. In the presentation of the subject (first day of class) may indicate additional activities whose assessment will add to the note of the objective test of the part of theory and problems. In any case, the note of this part can not be more than 10 points.

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

Recommendations
Subjects that it is recommended to have taken before
Calculus /730G03001 Linear Algebra/730G03006 Physics II/730G03009
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Fundamentals of Electronic Circuits/730G03016 Installations for Industrial Plants/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.