		Teachin	g Guide			
Identifying Data					2020/21	
Subject (*)	Electrical engineering Code			730G05014		
Study programme	Grao en Enxeñaría Naval e Oceá	nica				
		Desci	riptors			
Cycle	Period	Ye	ear	Туре	Credits	
Graduate	1st four-month period	Sec	ond	Obligatory	6	
Language	Spanish					
Teaching method	Hybrid					
Prerequisites						
Department	Enxeñaría Industrial					
Coordinador	Gomollon Garcia, Jesus angel		E-mail	jesus.gomollon@	@udc.es	
Lecturers	Gomollon Garcia, Jesus angel		E-mail	jesus.gomollon@	Dudc.es	
	Menacho Garcia, Carlos Miguel			miguel.menacho	o@udc.es	
	Vazquez Rodriguez, Santiago			santiago.vazquez@udc.es		
Web	moodle.udc.es			'		
General description	In this course, the analysis of elec	ctrical circuits a	and a brief introducti	on to the operation of	electric machines is studied.	
Contingency plan	Modifications to the contents					
	 Modifications to the contents Methodologies *Teaching methodologies that are maintained *Teaching methodologies that are modified Mechanisms for personalized attention to students Modifications in the evaluation *Evaluation observations: Modifications to the bibliography or webgraphy 					

	Study programme competences / results
Code	Study programme competences / results
A9	Knowledge of the theory of circuits and of the characteristics of you hatch them electrical and ability to carry out calculations of systems
	that these elements take part in.
B2	That the students know how to apply its knowledge to its work or vocation in a professional way and possess the competences that tend to
	prove itself by the elaboration and defense of arguments and the resolution of problems in its area of study
В3	That the students have the ability to bring together and to interpret relevant data (normally in its area of study) to emit judgments that
	include a reflection on relevant subjects of social, scientific or ethical kind
B4	That the students can transmit information, ideas, problems and solutions to a public as much specialized as not specialized
B5	That the students developed those skills of learning necessary to start subsequent studies with a high degree of autonomy
В6	Be able to carrying out a critical analysis, evaluation and synthesis of new and complex ideas.
C1	Using the basic tools of the technologies of the information and the communications (TIC) necessary for the exercise of its profession and
	for the learning throughout its life.
C2	Coming across for the exercise of a, cultivated open citizenship, awkward, democratic and supportive criticism, capable of analyzing the
	reality, diagnosing problems, formulating and implanting solutions based on the knowledge and orientated to the common good.
C3	Understanding the importance of the enterprising culture and knowing the means within reach of the enterprising people.
C4	Recognizing critically the knowledge, the technology and the available information to solve the problems that they must face.



C5 Assuming the importance of the learning as professional and as citizen throughout the life.

Learning outcomes				
Learning outcomes		Study programme		
	cor	npetend	es/	
		results		
Apply Ohm's law and Kirchhoff's laws.	A9	B2	C1	
Use correct general methods of analysis of DC circuits.		В3	C2	
Analyze any direct current circuit using the most appropriate method.		B4	СЗ	
		B5	C4	
		B6	C5	
Interpret and differentiate between different types of AC power.	A9	B2	C1	
Use correctly general methods of analysis of alternating current circuits.		В3	C2	
Analyzing any AC circuit using the most appropriate method.		B4	СЗ	
		B5	C4	
		B6	C5	
To analyze the operation of the three-phase balanced and unbalanced circuits.	A9	B2	C1	
Interpret, differentiate and measure various types of power present in three-phase circuits.		В3	C2	
		B4	СЗ	
		B5	C4	
		В6	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 /	Teaching hours	Student?s personal	Total hours
	Results	(in-person & virtual)	work hours	
Introductory activities	A9 C5	1.5	2.5	4

Guest lecture / keynote speech	A9 B2 B3 B4 B5 B6	30	30	60	
	C1 C2 C3 C4 C5				
Problem solving	A9 B2 B3 B4 B5 B6	30	30	60	
	C1 C2 C3 C4 C5				
Laboratory practice	A9 B2 B3 B4 B5 B6	10	10	20	
	C1 C2 C3 C4 C5				
Mixed objective/subjective test	A9 B2	2.5	2.5	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					

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	Methodologies		
Mathadalania			
Methodologies	Description		
Introductory activities	Presentation of the subject, in large group (GG).		
Guest lecture /	Oral presentation complemented the use of media and the introduction of questions aimed at motivating students, in order to		
keynote speech	impart knowledge and facilitate learning.		
	Corresponds to the kind of theory, large group (GG).		
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 group (GM).		
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).		
Mixed	Esta proba consiste na resolución de problemas e/ou ítems.		
objective/subjective			
test			

Personalized attention			
Methodologies	Description		
Mixed	Tutorials review.		
objective/subjective			
test	In the case of part-time students, they will have exam sessions before each continuous assessment exam. In addition, they		
	will be given a collection of objective tests and problems to solve throughout the course.		

Assessment				
Methodologies	Competencies / Description		Qualification	
	Results			
Mixed	A9 B2	This test consists of solving problems and / or items, and will be valued between 10	80	
objective/subjective		points.		
test				
Laboratory practice	A9 B2 B3 B4 B5 B6	In the January call, the grade will be the sum of the mark corresponding to the	20	
	C1 C2 C3 C4 C5	attendance and evaluation of the workshop practices, which will be valued between 0		
		and 5 points, and the mark of a final exam (multiple-choice test), which it will also be		
		valued between 0 and 5 points.		
		In the July exam, the grade will coincide with the corresponding final exam grade		
		(multiple choice test), which will be valued between 0 and 10 points.		



Assessment comments

To pass the course it is necessary to pass the theory and problems part and the laboratory practices part. The course will also be approved if, by reaching a grade greater than or equal to 3.5 points in the laboratory practice grade, it will compensate with the theory and problems part. The final grade is the sum of the (theory and problems grade) * 0.80 and the (laboratory practice grade) * 0.20. In the presentation of the subject (first day of class), additional activities may be indicated, the assessment of which will be added to the objective test mark of the theory and problems part. In any case, the grade for this part may not exceed 10 points.

In the case of part-time students, there will be a periodic and continuous evaluation, with objective tests and problems, after teaching each subject of the subject. In the second opportunity, all the subjects will enter the exam. Attendance to theory and problem classes is not compulsory (100% waiver), although you will be offered full flexibility to attend the group of your choice; however, attendance at the workshop practice class is necessarily mandatory (0% waiver), although you will also be offered full assistance flexibility.

	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			
	- 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			
	- 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			
	- 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: Marco			
	- 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	
alculus /730G03001	
inear Algebra/730G03006	
hysics II/730G03009	
Subjects that are recommended to be taken simultaneously	
Subjects that continue the syllabus	
undamentals of Electronic Circuits/730G03016	
nstallations for Industrial Plants/730G03031	

Other comments

"To help achieve a sustained immediate environment and meet the goal of action number 5: "Healthy and sustainable environmental and social teaching and research" of the "Green Campus Ferrol Action Plan": The delivery of the documentary works that are made in this matter: &nb



(*)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.