Identifying	ı Data			
ality of the Electric Sonico	,		2020/21	
anty of the Electric Service	Quality of the Electric Service Code			
strado Universitario en Eficienci	ia e Aproveitamento Ene	erxético		
	Descriptors			
Period	Year	Туре	Credits	
2nd four-month period	First	Optional	3	
anish				
Face-to-face				
xeñaría Industrial				
aña Lopez, Manuel angel	E	-mail manuel.grana	a@udc.es	
aña Lopez, Manuel angel	E	-mail manuel.grana	a@udc.es	
os://moodle.udc.es/	-	'		
his subject studies the quality c	of the electrical service f	rom the point of view of the	legislation and rule at present valid	
1. Changes in content  The contents are not modified.  2. Methodologies  All teaching methodologies are maintained, modifying only their face-to-face character.  3. Mechanisms for personalized attention to students  Tools: Moodle, Teams, email. With the tutoring schedule published.  4. Modifications in the evaluation  The evaluation methodologies and their weighting are maintained, except for their face-to-face character.				
	aluation methodologies and	aluation methodologies and their weighting are main		

	Study programme competences / results
Code	Study programme competences / results
A1	Análise e aplicación de metodoloxías e normativa para unha xestión eficiente da enerxía.
В9	Extraer, interpretar y procesar información, procedente de diferentes fuentes, para su empleo en el estudio y análisis.
B13	Aplicar los conocimientos teóricos a la práctica
B15	Conocer la legislación vigente y reglamentación aplicable al sector de las energías renovables y de la eficiencia energética.
C1	Adquirir la terminología y nomenclatura científico-técnica para exponer argumentos y fundamentar conclusiones.

Learning outcomes				
Learning outcomes		Study programme		
	con	npetenc	es/	
		results		
now the legislation and the at present valid rule on quality of the electrical service.		BC9		
		BC15		



Know the main types of perturbations and events that affect to the quality of the electrical service, as well as his causes,	BC13	CC1
effects and measures of correction.		
Know the main characteristic of an analyser of power to select the most suitable.	BC9	

	Contents
Topic	Sub-topic
Introduction	Presentation of the subject
	Previous knowledges
Continuity of the supply	Definition
	Types of interruptions
	TIEPI
	NIEPI
Quality of the product	Frequency
	Overvoltages/Undervoltages
	Flicker
	Voltage unbalance
	Harmonic distortion
	Interharmonics
	Noise
	Interruptions
	Sags (dips)/Swells
	Transients
Quality of the attention to the consumer	Definition
	Indexes of individual quality
ANNEXES	Basic regulations
	Electromagnetic compatibility.
	Measurement of the quality of supply.
	The Spanish electricity market.
	Contracting of the electricity supply.
	Measurement and billing of electric power.
	Claims.
	Connection systems for the neutral and the earth ground.
	Electrotechnical regulations.
	NOTE: The annexes are not subject of examination.

Teaching hours in-person & virtual) 1 9	Student?s personal work hours 1 9	Total hours  2 18
1 9	1	
-	1 9	
-	9	18
0		
8	8	16
3	3	6
3	15	18
2	12	14
1	0	1
_		2 12

Methodologies

Methodologies	Description
Introductory activities	Presentation of the subject, in big group (GG).
Guest lecture /	Oral exhibition complemented with the use of audiovisual means and the introduction of motivating questions headed to the
keynote speech	students, with the purpose to transmit knowledges and facilitate the learning.
	It corresponds to the class of theory, in big group (GG).
Problem solving	Technician by means of which has to resolve a concrete problematic situation, from the knowledges and procedures that have studied and worked.
	It corresponds to the class of problems, in average group (GM).
Laboratory practice	Methodology that allows that the students apply the knowledges purchased, through the realisation of activities of practical character.
	It corresponds to the practices of workshop, in small group (GP).
Supervised projects	Methodology designed to promote the autonomous learning of the students, under the tutela of the professor and in a
	professional stage. It is referred prioritariamente to the learning of the "cómo do the things". It constitutes an option
	based in the assumption by the students of the responsibility by his own learning.
	This system of education bases in two basic elements: the independent learning of the students and the follow-up of this learning by the professor.
	With this methodology pretends that the student can know the characteristics of the analysers of power to be able to select
	the most adapted of between the commercial offer that offers the market.
	It is a complementary activity of the practices of workshop, in small group (GP).
Objective test	Proof written used for the evaluation of the learning.
	With the end to value with greater rigour the achievement of the aims, the proof consists of two parts differentiated: questions
	of multiple answer (ítems) and resolution of problems.
	Questions of multiple answer (ítems): it constitutes an instrument of measure, whose distinctive shot is that it allows to
	describe the answers given like correct or no; in addition to valuing the knowledges purchased.
	Resolution of problems: part in which it pretends evaluate conceptual contents, procedimentales and actitudinales.
	It corresponds to the examination of theory and problems.

Personalized attention		
Methodologies	Description	
Objective test	Tutorials of review of examinations.	

Assessment				
Methodologies	Competencies /	Description	Qualification	
	Results			
Laboratory practice	B13	The qualification will be the sum of the corresponding note to the assistance and	25	
		evaluation of the practices of workshop, that will value between 0 and 5 points, and		
		the note of a final examination (proof of multiple answer), that will value also between		
		0 and 5 points.		

Supervised projects	B9 C1	The qualification will correspond to the evaluation of the extension and quality of the	50
		works presented, that will value them between 0 and 10 points.	
Objective test	A1 B13 B15 C1	This proof consists in the resolution of problems and/or ítems, and will compute	25
		between 0 and 10 points.	

## **Assessment comments**

Rating of subject = [Objective Proof (theory and problems) \* 0'25] + [Practices of laboratory \* 0'25] + [Mentored work nº 1 \* 0'25] + [Mentored work nº 2 \* 0'25]. In the presentation of the subject (first day of class), additional and voluntary activities can be indicated, whose evaluation will be added to the grade of the subject. In any case, the qualification of the subject can not exceed 10 points. To surpass the matter is necessary to obtain, at least, five points in the note of the matter.

	Sources of information
Basic	- ()
	Real Decreto 1955/2000, de 1 de diciembre, por el que se regulan las actividades de transporte, distribución,
	comercialización, suministro y procedimientos de autorización de instalaciones de energía eléctrica. (BOE nº 310, de
	27 de diciembre de 2000).Orden ECO/797/2002, de 22 de marzo, por la que se aprueba el procedimiento de medida y
	control de la continuidad del suministro eléctrico. (BOE nº 89, de 13 de abril de 2002).Norma UNE-EN 50160: 2011,
	Características de la tensión suministrada por las redes generales de distribución.Norma UNE-EN 61000-4-30: 2015,
	Compatibilidad Electromagnética (CEM). Parte 4-30: Técnicas de ensayo y de medida. Métodos de medida de la
	calidad del suministro. Vídeos
	descritivos:https://www.youtube.com/watch?v=iPxK9yt1XVYhttps://www.youtube.com/watch?v=CoySYBHXqBkhttps://
	www.youtube.com/watch?v=WoxIENO-M1Uhttps://www.youtube.com/watch?v=pPMclZbHCpMhttps://www.youtube.co
	m/watch?v=Pv5ximOmE2o&t=218s
Complementary	

	Recommendations	
	Subjects that it is recommended to have taken before	
Efficiency of Electric Systems/770	523013	
	Subjects that are recommended to be taken simultaneously	
	Subjects that continue the syllabus	
	Other comments	

Prior knowledge of circuit analysis in DC, AC and three-phase circuits as well as symmetrical components is required. In another order of things, 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": &nbs

(\*)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.