		Teaching Guide			
	Identifying D	Pata		2022/23	
Subject (*)	Quality of the Electric Service	Quality of the Electric Service Code			
Study programme	Mestrado Universitario en Eficiencia	Mestrado Universitario en Eficiencia e Aproveitamento Enerxético			
	·	Descriptors			
Cycle	Period	Year	Туре	Credits	
Official Master's Degre	ee 2nd four-month period	First	Optional	3	
Language	Spanish				
Teaching method	Face-to-face	Face-to-face			
Prerequisites					
Department	Enxeñaría Industrial				
Coordinador		E-mail			
Lecturers		E-mail	E-mail		
Web	https://moodle.udc.es/				
General description	In this subject studies the quality of the electrical service from the point of view of the legislation and rule at present val				
	1				

	Study programme competences
Code	Study programme competences
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	Stud	y progra	amme
	СО	mpeten	ces
Know the legislation and the at present valid rule on quality of the electrical service.	AJ1	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.			

Contents		
Topic	Sub-topic	
Introduction	Presentation of the subject	
	Previous knowledges	
Continuity of the supply	Definition	
	Types of interruptions	
	TIEPI	
	NIEPI	

Frequency
Overvoltages/Undervoltages
Flicker
Voltage unbalance
Harmonic distortion
Interharmonics
Noise
Interruptions
Sags (dips)/Swells
Transients
Definition
Indexes of individual quality
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.

Plannin	g		
Competencies	Ordinary class	Student?s personal	Total hours
	hours	work hours	
A1 B15 C1	9	18	27
B13	12	6	18
B9 C1	0	12	12
A1 B13 B15 C1	3	12	15
	3	0	3
	A1 B15 C1 B13 B9 C1	hours A1 B15 C1 9 B13 12 B9 C1 0	Competencies Ordinary class hours Student?s personal work hours A1 B15 C1 9 18 B13 12 6 B9 C1 0 12

	Methodologies
Methodologies	Description
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).
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		
Laboratory practice	Tutorials of review of examinations.		
Supervised projects			
Objective test			

		Assessment	
Methodologies	Competencies	Description	Qualification
Laboratory practice	B13	The practical are compulsory, and is necessary to have them realised to be able to surpass the asignatura.	30
		The practices represent 30% of the final note of the matter, and added to the note	
		obtained in the theoretical proof whenever this was upper to 3.0 points on 10.0 points.	
Supervised projects	B9 C1	Will be able to realise to varied cape works tutelados along the course, being his compulsory delivery and that treated on problems or practical suppositions related with the matter.	30
		The works tutelados, are 30% of the final note of the matter, that will be added to the note obtained in the objective proof, whenever this was described with at least 3.0 points on 10.0 points.	
Objective test	A1 B13 B15 C1	In the dates fixed officially by the centre, realised this final proof.	40
		The proof can alternate ask type problem or theoretical questions, and represents 40% of the final note of the matter.	

Assessment comments

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All the activities that contribute to the final note of the student, will be qualified on 10.0 points.

	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=pPMcIZbHCpMhttps://www.youtube.co
	m/watch?v=Pv5ximOmE2o&t=218s
Complementary	

	Recommendations
	Subjects that it is recommended to have taken before
Efficiency of Electric Systems/	770523013
	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.