UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2023/24
Subject (*)	Quality of the Electric Service		Code	730547013d
Study programme	Máster Universitario en Eficiencia Enerxética e Sustentabilidade (a distancia)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	2nd four-month period	First	Optional	3
Language	SpanishGalician			
Teaching method	Non-attendance			
Prerequisites				
Department	Enxeñaría Industrial			
Coordinador	Méndez Sanmartín, Cristian	E-mail	cristian.mendez@udc.es	
Lecturers	Graña Lopez, Manuel angel Méndez Sanmartín, Cristian	E-mail	manuel.grana@udc.es cristian.mendez@udc.es	
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 valid.			

Study programme competences / results	
Code	Study programme competences / results
A1	CE1 - Apply methodologies and regulations for efficient energy management
B9	CG4 - Extract, interpret and process information, from different sources, for use in the study and analysis
B13	CG8 - Apply theoretical knowledge to practice
B15	CG10 - Know the current legislation and regulations applicable to the renewable energy and energy efficiency sector
C1	CT1 - Express themselves correctly, both orally and in writing, in the official languages of the autonomous community

Learning outcomes			
Learning outcomes	Study programme competences / results		
The student will know how to analyze the different disturbances (frequency, amplitude or symmetry) that occur in an Electrical System, recognizing their causes, effects, indicators, forms of measurement and regulations that affect them, as well as the possible corrective measures to take into account.	AC1	BC9 BC13 BC15	CC1

Contents	
Topic	Sub-topic
Summary according to the degree report	1. Quality of service. 2. Waveform distortion. 3. Impulses and oscillations. 4. Voltage dips and interruptions. 5. Temporary surges. 6. Prevention methods.
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.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Objective test	B9 B13	0	12	12
Workshop	B9 B15	0	10	10
Supervised projects	A1 B9 B13 B15 C1	0	50	50
Personalized attention		3	0	3
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Objective test	Evaluation test where the student must demonstrate their level of learning in an objective manner.
Workshop	The student will be provided with the necessary teaching material to be able to develop the contents of the subject.
Supervised projects	Methodology designed to promote students' autonomous learning, under the tutelage of the teacher and in varied settings (academic and professional). It refers primarily to learning "how to do things." It constitutes an option based on the assumption by students of responsibility for their own learning. This teaching system is based on two basic elements: the independent learning of the students and the monitoring of that learning by the teacher-tutor.

Personalized attention	
Methodologies	Description
Supervised projects Objective test	The teacher responds individually or in a group, to the questions or queries made by the students.

Assessment

Methodologies	Competencies / Results	Description	Qualification
Supervised projects	A1 B9 B13 B15 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. The works tutelados, are 50% 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 points on 10 points.	50
Objective test	B9 B13	The proof can alternate ask type problem or theoretical questions, and represents 50% of the final note of the matter.	50

Assessment comments
The evaluation of the subject will be carried out through the following tests: Activities that can be carried out during the school period: Supervised jobs: Several tutored works may be carried out throughout the course, their delivery being mandatory and dealing with problems or practical cases related to the subject. The supervised works are 50% of the final mark of the subject, which will be added to the mark obtained in the objective test, provided that it is qualified with at least 3 points out of 10 points. Final objective test: On the dates officially set by the center, this final test will be carried out. The test can alternate problem-type questions or theoretical questions, and represents 50% of the final grade for the subject. Note: the first opportunity and the second will be evaluated under the same criteria. Additional conditions: No Show Status: Students who do not take the first or second chance objective test will be given the status of not taking part, regardless of the assessment of the possible activities carried out during the school period. Early call: Students who make an early call will be evaluated with 100% assessment by means of the objective test. Academic exemption: Students with academic exemption must carry out 100% of the compulsory activities in one of two different available schedules. Fraudulent realization: Students who fraudulently carry out any type of evaluation activity (both carrying out activities during the academic period and in the objective test), once verified, will be automatically qualified as failed (numerical grade 0) in the corresponding call for the academic year. Not being able to take the subject until the next call in the next academic year.

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.
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Efficiency of Electric Systems/730547012d
Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus
Other comments
PTo help achieve a sustained immediate environment and meet the objective of action number 5: "Healthy and sustainable environmental and social teaching and research" of the "Green Campus Ferrol Action Plan" The delivery of documentary work carried out in this matter: 1.1. They will be requested in virtual format and/or computer support. 1.2. They will be done through Moodle, in digital format without the need to print them. 1.3. If done on paper: - Plastics will not be used. - Double-sided prints will be made. - Recycled paper will be used. - The printing of drafts will be avoided.It will facilitate the full integration of students who, for physical, sensory, mental or sociocultural reasons, experience difficulties in correct, equal and beneficial access to university life.

(*)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.