



## Teaching Guide

Teaching Guide				
Identifying Data				2022/23
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	Graña Lopez, Manuel angel		E-mail	manuel.grana@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

Code	Study programme competences
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		
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
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	Ordinary class hours	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 &quot;how to do things.&quot; 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	

Assessment			
Methodologies	Competencies	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 3.0 points on 10.0 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

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

## Sources of information

<b>Basic</b>	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.
<b>Complementary</b>	

## 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

(\*)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.