



Teaching Guide

Identifying Data					2020/21
Subject (*)	Quality of the Electric Service	Code	770523014		
Study programme	Mestrado Universitario en Eficiencia e Aproveitamento Enerxético				
Descriptors					
Cycle	Period	Year	Type	Credits	
Official Master's Degree	2nd four-month period	First	Optional	3	
Language	Spanish				
Teaching method	Face-to-face				
Prerequisites					
Department	Enxeñaría Industrial				
Coordinador	Graña Lopez, Manuel angel	E-mail	manuel.grana@udc.es		
Lecturers	Graña Lopez, Manuel angel	E-mail	manuel.grana@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.				
Contingency plan	<p>1. Changes in content</p> <p>The contents are not modified.</p> <p>2. Methodologies</p> <p>All teaching methodologies are maintained, modifying only their face-to-face character.</p> <p>3. Mechanisms for personalized attention to students</p> <p>Tools: Moodle, Teams, email. With the tutoring schedule published.</p> <p>4. Modifications in the evaluation</p> <p>The evaluation methodologies and their weighting are maintained, except for their face-to-face character.</p> <p>5. Modifications of the bibliography or webgraphy.</p> <p>There are no modifications.</p>				

Study programme competences / results

Code	Study programme competences / results
A1	Análise e aplicación de metodoloxías e normativa para unha xestión eficiente da enerxía.
B9	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 competences / results		
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, effects and measures of correction.		BC13	CC1
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.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Introductory activities	A1	1	1	2
Guest lecture / keynote speech	A1 B15 C1	9	9	18
Problem solving	B13	8	8	16
Laboratory practice	B13	3	3	6
Supervised projects	B9 C1	3	15	18
Objective test	A1 B13 B15 C1	2	12	14
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.

Methodologies



Methodologies	Description
Introductory activities	Presentation of the subject, in big group (GG).
Guest lecture / keynote speech	Oral exhibition complemented with the use of audiovisual means and the introduction of motivating questions headed to the 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 (items) and resolution of problems. Questions of multiple answer (items): 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 / Results	Description	Qualification
Laboratory practice	B13	The qualification will be the sum of the corresponding note to the assistance and 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.	25

