



Teaching Guide

| Identifying Data | | | | | 2023/24 |
|--------------------------|---|--------|---------------------|---------|---------|
| Subject (*) | Efficiency of Electric Systems | Code | 730547012d | | |
| 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 | | | | |
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| Lecturers | Graña Lopez, Manuel angel | E-mail | manuel.grana@udc.es | | |
| Web | moodle.udc.es | | | | |
| General description | To achieve that the electrical installations and the receptors that constitute them, work of a correct way and that work of an efficient way from an electrical point of view, have to firstly identify and afterwards quantify of a correct way the ineficiencias that can find us presents in any electrical system, such as the desfases between the tension and the current, the fault of symmetry and the fault of linealidad in his circuits, once established these ineficiencias, showed the devices that allow us correct them, so that it attain an improvement in the efficiency of the installation or circuit. | | | | |

Study programme competences / results

| Code | Study programme competences / results |
|------|---|
| A1 | CE1 - Apply methodologies and regulations for efficient energy management |
| B1 | CB6 - Possess and understand knowledge that provides a foundation or opportunity to be original in the development and/or application of ideas, often in a research context |
| B6 | CG1 - Search and select alternatives considering the best possible solutions |
| B7 | CG2 - Develop analysis and synthesis skills; encourage critical discussion, defending arguments, and drawing conclusions |
| B11 | CG6 - Acquire new knowledge and skills related to the professional field of the master's degree |
| B15 | CG10 - Know the current legislation and regulations applicable to the renewable energy and energy efficiency sector |
| C3 | CT3 - Use the basic tools of information and communication technologies (ICT) necessary for the exercise of their profession and for learning throughout their lives |

Learning outcomes

| Learning outcomes | Study programme competences / results | | |
|--|---------------------------------------|-----------------------------------|-----|
| The student will identify the various phenomena (reactive, imbalances and harmonics) that can be found in an electrical system or installation, which reduce its efficiency, will know how to quantify their importance and proceed to propose the best solution for them, so that the system is as efficient as possible from the electrical point of view, in accordance with current standards and regulations. | AC1 | BC1 BC6 BC7 BC11 BC15 | CC3 |

Contents

| Topic | Sub-topic |
|--|---|
| Introduction to the ineficiencias in the electrical systems. | Introduction. The Unified Theory of Electrical Power. |
| Compensation of the reactive power. | Introduction. Characterisation and measure of the reactive energy. Devices of compensation of the cos fi. |



| | |
|---|--|
| Balanced three- and four-wire electrical systems. | <p>Introducción. Theorem of Stokvis-Fortescue.</p> <p>Characterization and measurement of power imbalances</p> <p>Equivalent circuits of receptors and installations.</p> <p>Elimination of imbalances. Filters of sequence.</p> |
| Non linear loads. | <p>Introduction.</p> <p>Origin of non-sinusoidal periodic waves.</p> <p>Factors periodic signals.</p> <p>Limits of harmonics.</p> <p>Distortion power.</p> |
| Correction disturbances. | <p>Introduction.</p> <p>UNE-EN-61642. Filters of harmonic.</p> <p>Filters of Rejection.</p> <p>Filters of Absorption.</p> |

| Planning | | | | |
|------------------------|------------------------|--------------------------------------|-------------------------------|-------------|
| Methodologies / tests | Competencies / Results | Teaching hours (in-person & virtual) | Student?s personal work hours | Total hours |
| Workshop | A1 B11 | 0 | 10 | 10 |
| Supervised projects | A1 B1 B6 C3 | 0 | 50 | 50 |
| Objective test | B6 B7 B15 | 0 | 12 | 12 |
| 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 |
| Workshop | The student will be provided with the necessary teaching material to be able to develop the contents of the subject. |
| Supervised projects | <p>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.</p> <p>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.</p> |
| Objective test | Evaluation test where the student must demonstrate their level of learning in an objective manner. |

| Personalized attention | |
|---------------------------------------|--|
| Methodologies | Description |
| Objective test Supervised projects | They realise in the corresponding tutorías, where to initiative of the student resolve , or clear the possible doubts. |

| Assessment | | | |
|---------------------|------------------------|---|---------------|
| Methodologies | Competencies / Results | Description | Qualification |
| Objective test | B6 B7 B15 | The proof can alternate ask type problem or theoretical questions, and represents 50% of the final note of the matter. | 50 |
| Supervised projects | A1 B1 B6 C3 | <p>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.</p> <p>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.</p> | 50 |

