



Teaching Guide

| Identifying Data | | | | 2023/24 |
|----------------------------|---|---------------|----------------|---------|
| Subject (*) | Efficiency Lighting Systems | Code | 730547008 | |
| Study programme | Máster Universitario en Eficiencia Enerxética e Sustentabilidade | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Official Master's Degree | 1st four-month period | First | Optional | 3 |
| Language | SpanishGalicianEnglish | | | |
| Teaching method | Face-to-face | | | |
| Prerequisites | | | | |
| Department | Enxeñaría Industrial | | | |
| Coordinador | Rivas Rodriguez, Juan Manuel | E-mail | m.rivas@udc.es | |
| Lecturers | Rivas Rodriguez, Juan Manuel | E-mail | m.rivas@udc.es | |
| Web | moodle.udc.es/ | | | |
| General description | Being able to learn , use and design artificial lighting systems optimizing their energy consumption. | | | |

Study programme competences / results

| Code | Study programme competences / results |
|------|---|
| A1 | CE1 - Apply methodologies and regulations for efficient energy management |
| A2 | CE2 - Analyze and implement energy saving and efficiency measures in the industrial, tertiary and residential sectors |
| A5 | CE5 - Analyze energy consumption and its associated costs |
| A9 | CE9 - Make decisions in a technological environment where materials are used in efficiency applications |
| 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 |
| B2 | CB7 - That students know how to apply the knowledge acquired and their ability to solve problems in new or little-known environments within broader (or multidisciplinary) contexts related to their area of study |
| B3 | CB8 - That students are able to integrate knowledge and face the complexity of formulating judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments |
| 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 |
| B8 | CG3 - Incorporate their own vocabulary to express themselves accurately in effective communication, both written and oral |
| B11 | CG6 - Acquire new knowledge and skills related to the professional field of the master's degree |
| B13 | CG8 - Apply theoretical knowledge to practice |
| B14 | CG9 - Apply knowledge of advanced sciences and technologies to professional or research practice of efficiency |
| B16 | CG11 - Evaluate the application of emerging technologies in the field of energy and the environment |
| B18 | CG13 - Pose and solve problems, interpret a set of data and analyze the results obtained; in the field of energy efficiency and sustainability |
| C1 | CT1 - Express themselves correctly, both orally and in writing, in the official languages of the autonomous community |
| C2 | CT2 - Master the oral and written expression and comprehension of a foreign language |
| 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 |
| C4 | CT4 - Develop for the exercise of a respectful citizenship with the democratic culture, human rights and the gender perspective |
| C5 | CT5 - Understand the importance of entrepreneurial culture and know the means available to entrepreneurs |

Learning outcomes

| Learning outcomes | Study programme competences / results |
|-------------------|---------------------------------------|
| | |



| | | | |
|--|--------------------------|---|-------------------|
| It is able to design LED lamps | AC5 AC9 | BC16 BC18 | CC4 CC5 |
| Know and can handle the characteristics of LED lighting devices | AC1 AC2 AC5 AC9 | BC6 BC7 | CC2 CC3 |
| Knows and can interpret the quantitative parameters of lighting process. | AC1 AC5 AC9 | BC1 BC2 BC11 | |
| Known lighting technologies and their energy efficiency . | AC5 AC9 | BC3 BC6 BC7 BC13 BC14 | CC1 CC2 CC4 |
| Is able to design control circuits for LED lighting devices | AC1 AC5 AC9 | BC1 BC2 BC3 BC6 BC8 BC13 BC16 BC18 | CC2 |

| Contents | |
|-----------------------|---|
| Topic | Sub-topic |
| Lighting Basics | - Basic concepts - Units - Normative |
| Lighting Technologies | - Lamps. - Auxiliary electrical equipment . - Luminaries . |
| LED lighting devices | - Light-emitting semiconductor junction features. - Types of LED light. - Parameters of operation and efficiency. - Lifetime |
| LED control circuits | - Protections. - Power Management . - Smart lighting . |
| LED lamp design | - Directionality and geometry. - Reliability . - Electromagnetic compatibility (EMC). |

| Planning | | | | |
|-----------------------|---|--------------------------------------|-------------------------------|-------------|
| Methodologies / tests | Competencies / Results | Teaching hours (in-person & virtual) | Student?s personal work hours | Total hours |
| Case study | A1 A2 A5 A9 B1 B2 B6 B7 B11 B13 B18 C2 C3 | 3 | 0 | 3 |
| Laboratory practice | A2 A9 B2 B6 B13 B14 C5 | 7 | 27 | 34 |



| | | | | |
|---|---|---|----|----|
| Objective test | B3 B8 C1 C4 | 2 | 0 | 2 |
| Supervised projects | A2 A9 B2 B3 B6 B7 B8 B13 B16 B18 C1 C2 C3 C4 C5 | 2 | 20 | 22 |
| Guest lecture / keynote speech | A2 B1 B7 B16 C1 C4 | 8 | 0 | 8 |
| Directed discussion | B1 B2 B3 B6 B7 B8 B11 C1 | 3 | 0 | 3 |
| 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 |
| Case study | They will take place in the classroom. Solutions from different brands will be analyzed. |
| Laboratory practice | The student will have to deliver a report. This will be graded by the teacher and represents 30 % of the total evaluation. You can do it both in person and by simulation via telematics. |
| Objective test | Written test which represents 40 % of the total mark |
| Supervised projects | They can be one or more . They represent the remaining 30 % of the grade. |
| Guest lecture / keynote speech | By the teacher in the classroom. |
| Directed discussion | The teacher may grant extra score and will be added to 100 % of the grade . |

| Personalized attention | |
|--|---|
| Methodologies | Description |
| Supervised projects Laboratory practice | It will take place in class during laboratory practices . The work will be individual and supervised by the teacher. In supervised projects will be done in the teacher's office. |

| Assessment | | | |
|---------------------|---|--|---------------|
| Methodologies | Competencies / Results | Description | Qualification |
| Supervised projects | A2 A9 B2 B3 B6 B7 B8 B13 B16 B18 C1 C2 C3 C4 C5 | One or more . They will be qualified by the teacher of the subject | 30 |
| Laboratory practice | A2 A9 B2 B6 B13 B14 C5 | At the end of each practice the student must send a report to be qualified | 30 |
| Objective test | B3 B8 C1 C4 | Final written test | 40 |

| Assessment comments |
|---|
| <p>You must be obtained at least 40 % of the mark in each of the parts (objective test , homework and practices) to average between them and to pass the subject .</p> <p>Students who take part in the partial enrollment may agree with the teacher the possibility of doing alternative activities to the face-to-face ones.</p> <p>The criteria for passing the subject on the second opportunity and early December call are the same as for passing on the first.</p> |



Sources of information

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|----------------------|---|
| Basic | - Alfonso Gago Calderón (2012). Iluminación con tecnología LED. Paraninfo - IDAE (2001). Guía Técnica de Eficiencia Energética en Iluminación. Madrid - IDAE |
| Complementary | |

Recommendations

Subjects that it is recommended to have taken before

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.