



**Teaching Guide**

Identifying Data					2022/23
<b>Subject (*)</b>	Efficiency Lighting Systems	<b>Code</b>	730547008d		
<b>Study programme</b>	Máster Universitario en Eficiencia Enerxética e Sustentabilidade (a distancia)				
Descriptors					
<b>Cycle</b>	<b>Period</b>	<b>Year</b>	<b>Type</b>	<b>Credits</b>	
Official Master's Degree	1st four-month period	First	Optional	3	
<b>Language</b>	SpanishGalicianEnglish				
<b>Teaching method</b>	Non-attendance				
<b>Prerequisites</b>					
<b>Department</b>	Enxeñaría Industrial				
<b>Coordinador</b>	Rivas Rodriguez, Juan Manuel	<b>E-mail</b>	m.rivas@udc.es		
<b>Lecturers</b>	Rivas Rodriguez, Juan Manuel	<b>E-mail</b>	m.rivas@udc.es		
<b>Web</b>	moodle.udc.es/				
<b>General description</b>	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	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	CC3

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 are the same as for passing on the first.</p>

Sources of information



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

### 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.