



## Teaching Guide

Identifying Data				2022/23
Subject (*)	Efficiency Lighting Systems	Code	770523007	
Study programme	Mestrado Universitario en Eficiencia e Aproveitamento Enerxético			
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	
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General description	Being able to learn , use and design artificial lighting systems optimizing their energy consumption.			

## Study programme competences

Code	Study programme competences
A1	Análise e aplicación de metodoloxías e normativa para unha xestión eficiente da enerxía.
A2	Análisis e implantación de medidas de ahorro y eficiencia energética en los sectores industrial, terciario y residencial.
A4	Análisis de consumos energéticos y de su costes asociados.
A5	Capacidad para la elaboración certificaciones Energéticas de Edificios.
A9	Tener conocimiento de los fundamentos, potencial, tecnología, aplicaciones y normativa de fuentes de energía renovables.
A12	Capacidad para la toma de decisiones en un entorno tecnológico donde los materiales se utilicen en aplicaciones de eficiencia
B1	Que los estudiantes sepan aplicar los conocimientos adquiridos y su capacidad de resolución de problemas en entornos nuevos o poco conocidos dentro de contextos más amplios (o multidisciplinares) relacionados con su área de estudio.
B2	Que los estudiantes sean capaces de integrar conocimientos y enfrentarse a la complejidad de formular juicios a partir de una información que, siendo incompleta o limitada, incluya reflexiones sobre las responsabilidades sociales y éticas vinculadas a la aplicación de sus conocimientos y juicios.
B3	Poseer y comprender conocimientos que aporten una base u oportunidad de ser originales en el desarrollo y/o aplicación de ideas, a menudo en un contexto de investigación.
B6	Buscar y seleccionar alternativas considerando las mejores soluciones posibles.
B7	Desarrollar las capacidades de análisis y síntesis; fomentar la discusión crítica, la defensa de argumentos y la toma de conclusiones.
B8	Incorporar el vocabulario propio para expresarse con precisión en una comunicación efectiva, tanto escrita como oral.
B11	Adquirir nuevos conocimientos y capacidades relacionados con el ámbito profesional del máster.
B13	Aplicar los conocimientos teóricos a la práctica
B14	Aplicar conocimientos de ciencias y tecnologías avanzadas a la práctica profesional o investigadora de la eficiencia
B16	Valorar la aplicación de tecnologías emergentes en el ámbito de la energía y el medio ambiente.
B18	Plantear y resolver problemas, interpretar un conjunto de datos y analizar los resultados obtenidos; en el ámbito de la eficiencia energética y la sostenibilidad.
C1	Adquirir la terminología y nomenclatura científico-técnica para exponer argumentos y fundamentar conclusiones.
C2	Fomentar la sensibilidad hacia temas medioambientales.
C3	Aplicar una metodología que fomente el aprendizaje y el trabajo autónomo.
C4	Desarrollar el pensamiento crítico
C5	Adquirir la capacidad para elaborar un trabajo multidisciplinar

## Learning outcomes

Learning outcomes	Study programme competences



It is able to design LED lamps	AJ5 AJ9	BC16 BC18	CC4 CC5
Know and can handle the characteristics of LED lighting devices	AJ1 AJ2 AJ5	BC6 BC7	CC2 CC3
Knows and can interpret the quantitative parameters of lighting process.	AJ1 AJ4 AJ5 AJ9	BC1 BC2 BC11	
Known lighting technologies and their energy efficiency .	AJ5 AJ9	BC3 BC6 BC7 BC13 BC14	CC1 CC2 CC4
Is able to design control circuits for LED lighting devices	AJ1 AJ5 AJ9 AJ12	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 A12 B2 B6 B7 B13 B14 C5	7	27	34



Objective test	B3 B8 C1 C4	2	0	2
Supervised projects	A2 A4 A9 A12 B3 B2 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	B3 B1 B2 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 A4 A9 A12 B3 B2 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 A12 B2 B6 B7 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
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 .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.The criteria for passing the subject on the second opportunity are the same as for passing on the first.

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