Teaching Guide				
Identifying Data				2020/21
Subject (*)	Audit and Energy Services		Code	770523010
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	SpanishGalicianEnglish			
Teaching method	Hybrid			
Prerequisites				
Department	Enxeñaría Industrial			
Coordinador	Masdias y Bonome, Antonio	E-mail	antonio.masdias@udc.es	
Lecturers	Masdias y Bonome, Antonio	E-mail	antonio.masdias@udc.es	
Web	pcmasdias.cdf.udc.es			
General description	The knowledge aim with this course are aligned with the requirements to pursue the professional activity energy auditor according to Royal Decree 56/2016 by which transposes Directive 2012/27 / EU energy efficiency, in terms energy audits, energy service providers and promoting efficiency.			
Contingency plan	1. Modifications to the contents 2. Methodologies *Teaching methodologies that are maintained *Teaching methodologies that are modified 3. Mechanisms for personalized attention to students 4. Modifications in the evaluation *Evaluation observations: 5. Modifications to the bibliography or webgraphy			

Study programme competences / results	
Code	Study programme competences / results
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.
A3	Capacidad para la elaboración de Auditorias Energéticas.
A4	Análisis de consumos energéticos y de su costes asociados.
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.
B4	Que los estudiantes posean las habilidades de aprendizaje que les permitan continuar estudiando de un modo que habrá de ser en gran medida autodirigido o autónomo.
B5	Que los estudiantes sepan comunicar sus conclusiones y los conocimientos y razones últimas que las sustentan a públicos especializados y no especializados de un modo claro y sin ambigüedades.
B6	Buscar y seleccionar alternativas considerando las mejores soluciones posibles.
B8	Incorporar el vocabulario propio para expresarse con precisión en una comunicación efectiva, tanto escrita como oral.
B9	Extraer, interpretar y procesar información, procedente de diferentes fuentes, para su empleo en el estudio y análisis.
B15	Conocer la legislación vigente y reglamentación aplicable al sector de las energías renovables y de la eficiencia energética.
B16	Valorar la aplicación de tecnologías emergentes en el ámbito de la energía y el medio ambiente.

B17	Desarrollar la capacidad para asesorar y orientar sobre la mejor forma o cauce para optimizar los recursos energéticos en relación con las energías renovables.
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.
C4	Desarrollar el pensamiento crítico
C5	Adquirir la capacidad para elaborar un trabajo multidisciplinar

Learning outcomes			
Learning outcomes	Study programme competences / results		
Knowledge of regulations and legislation necessary to elaborate energy audits.	AJ3	BC4 BC6 BC8 BC9 BC15	CC1
Get real knowledge of energy consumption and associated costs.	AJ1 AJ4	BC1 BC17	
Identify and characterize the factors that affect energy consumption on the premises.	AJ4	BC1 BC9	
Detect and evaluate different savings opportunities by hiring Energy Services and its impact on energy costs and maintenance and other benefits and associated costs.	AJ4	BC16 BC18	CC5
Knowing, design, manage and maintain the different services that can provide Energy Services Provider.	AJ2	BC5	CC2
Quantification and verification of savings from Energy Service Companies (ESCOs).	AJ4	BC9	CC4
Apply methodologies and programs for efficient energy management through the implementation of Management Systems Energy.	AJ1 AJ4	BC1 BC6	CC4 CC5

Contents	
Topic	Sub-topic
Legislative framework and rules involved	Legislative framework structure. European directives. 2012/27 / EU National legislation. Royal Decree 56/2016. Applied standards.
Energy audits.	General requirements. Structure of an audit. Design, equipment and methodologies. Audits in Buildings, Processes and Transport.
Energy Management Systems	Evolution and current range. SGE systems. Development and Implementation.

Energy Service Providers	Classification and categories. Certifications Energy Service Providers.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
ICT practicals	A1 A2 A3 B4 B6 B8 B9 B18 C5	9	10	19
Objective test	A4 B1 B5 B16	3	0	3
Case study	B15 B16 C1 C4 C5	3	20	23
Guest lecture / keynote speech	A3 B1 B8 B15 B16 B17 C1 C2 C4	9	20	29
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
ICT practicals	It includes the development of practices that are both laboratory and with the assistance of T.I.C.
Objective test	A review will take place at the end of the course.
Case study	It includes the study, analysis of solutions and implementing them.
Guest lecture / keynote speech	Lecture and exhibition by support T.I.C.

Personalized attention	
Methodologies	Description
ICT practicals Case study	In both case studies and practical care and personalized follow-up that may be not only in the face part but also by using ICT or e-mail will be held.

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
ICT practicals	A1 A2 A3 B4 B6 B8 B9 B18 C5	The student must develop a mandatory practices, in addition to work or cases raised. The laboratory practices will be compulsory for passing the subject.	10
Objective test	A4 B1 B5 B16	It includes the preparation of the final exam of the subject.	50
Case study	B15 B16 C1 C4 C5	Several case studies both group and individual analyzes to be tutored and supervised by the teacher, evaluating the work, effort and results achieved during the course proposed.	40

Assessment comments

Sources of information	
Basic	- AENOR (2016). Especificación AE0055 sobre eficiencia energética. Madrid - AENOR (2011). Sistemas de Gestión de la Energía ISO 50001:2011. - AENOR (2014). Auditorias Energéticas Parte 1 a 4 UNE 16247.
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.