



## Teaching Guide

Identifying Data					2022/23
Subject (*)	Audit and Energy Services		Code	730547009	
Study programme	Máster Universitario en Eficiencia Enerxética e Sustentabilidade				
Descriptors					
Cycle	Period	Year	Type	Credits	
Official Master's Degree	2nd four-month period	First	Optional	3	
Language	SpanishGalician				
Teaching method	Face-to-face				
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					
General description	Los conocimientos que se pretenden con esta asignatura están alineados con los requisitos exigidos para ejercer la actividad profesional de auditor energético según el Real Decreto 56/2016 por el que se transpone de la Directiva 2012/27/UE de eficiencia energética, en lo referente a auditorías energéticas, proveedores de servicios energéticos y promoción de la eficiencia.				

## 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
A3	CE3 - Prepare Energy Audits
A4	CE4 - Apply data analysis methods for the creation of efficient energy systems
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
B4	CB9 - That students know how to communicate their conclusions and the knowledge and ultimate reasons that support them to specialized and non-specialized audiences in a clear and unambiguous way
B5	CB10 - That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous
B6	CG1 - Search and select alternatives considering the best possible solutions
B8	CG3 - Incorporate their own vocabulary to express themselves accurately in effective communication, both written and oral
B9	CG4 - Extract, interpret and process information, from different sources, for use in the study and analysis
B13	CG8 - Apply theoretical knowledge to practice
B15	CG10 - Know the current legislation and regulations applicable to the renewable energy and energy efficiency sector
B16	CG11 - Evaluate the application of emerging technologies in the field of energy and the environment
B17	CG12 - Develop the ability to advise and guide on the best way or channel to optimize energy resources in relation to renewable energies
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
C6	CT6 - Gain life skills and healthy habits, routines, and lifestyles
C7	CT7 - Develop the ability to work in interdisciplinary or transdisciplinary teams, to offer proposals that contribute to sustainable environmental, economic, political and social development



C8	CT8 - Value the importance of research, innovation and technological development in the socioeconomic and cultural progress of society
C9	CT9 - Have the ability to manage time and resources: develop plans, prioritize activities, identify criticism, set deadlines and meet them

Learning outcomes			
Learning outcomes	Study programme competences / results		
Knowledge of the regulations and legislation necessary to carry out Energy Audits	AC1	BC2 BC9 BC15	CC5
Obtain real knowledge of energy consumption and its associated costs	AC3 AC5	BC4 BC17	
Identify and characterize the factors that affect energy consumption in facilities	AC5	BC6 BC16	
Detect and evaluate the different savings opportunities by contracting Energy Services and their impact on energy and maintenance costs, as well as other benefits and associated costs	AC1 AC2	BC13 BC17	
Know, design, manage and maintain the different Services that an Energy Service Provider can provide	AC1 AC4 AC5 AC9	BC4 BC5	CC1 CC2 CC3 CC4 CC5 CC6 CC7 CC8 CC9
Quantification and verification of savings of the Energy Service Companies (ESC)	AC1 AC2 AC5	BC1 BC2 BC8	
Apply methodologies and programs for efficient energy management, through the implementation of Energy Management Systems (EMS)	AC1 AC2 AC4	BC2	CC5

Contents	
Topic	Sub-topic
Legislative framework and rules involved. Energy Audits: Structure, design and methodologies for their preparation. Energy Management Systems (EMS) and their implementation. Energy Service Providers.	Marco Legislativo, estrutura. Directivas Europeas. Legislación Nacional. Real Decreto 56/2016. Normas Aplicadas. Instalaciones consumidoras de energía.
Auditorías Enerxéticas: Estrutura, deseño e metodoloxías para a súa elaboración.	Requisitos Generales. Estrutura de una Auditoria. Diseño, Equipos y metodoloxías. Auditorias en Edificios, Procesos y Transporte.
Sistemas de Xestión da Enerxía (SXEn) e a súa implantación.	Evolución y Alcance actual. Sistemas SGE. Desarrollo e Implantación.
Servizos Enerxéticos.	Clasificación y categorías. Creación de Servicios Energéticos Proveedores de Servicios Energéticos.



## Planning

Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Case study	B2 B4 B5 B6 B8 C1 C2 C3 C4 C6 C7 C8 C9	3	0	3
Objective test	A1 A3 A4 A5 B4	2	0	2
ICT practicals	A2 A5 A9 B1 B13 B16 C5	9	10	19
Guest lecture / keynote speech	A1 A2 A3 A4 A5 A9 B9 B13 B15 B16 B17	30	20	50
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
Case study	Comprende el estudio, análisis de soluciones e implantación de las mismas.
Objective test	Se realizará un examen a la finalización del curso.
ICT practicals	Comprende la elaboración de las prácticas que serán tanto en laboratorio o equipos especializados de registro o medición de consumos, como con asistencia de T.I.C.
Guest lecture / keynote speech	Exposición mediante sesión magistral y apoyo de T.I.C.

## Personalized attention

Methodologies	Description
Case study	Tanto en el estudio de casos como en las prácticas se realizará una atención y seguimiento personalizado que podrá ser, no solo en la parte presencial sino también mediante el uso de las TIC o el correo electrónico.

## Assessment

Methodologies	Competencies / Results	Description	Qualification
Case study	B2 B4 B5 B6 B8 C1 C2 C3 C4 C6 C7 C8 C9	Se proponen durante el curso diversos casos prácticos tanto en grupo como de análisis individual que serán tutorizados y supervisados por el profesor, evaluando el trabajo , esfuerzo y resultados alcanzados.	30
Objective test	A1 A3 A4 A5 B4	Comprende la elaboración del examen final de la asignatura.	40
ICT practicals	A2 A5 A9 B1 B13 B16 C5	El alumno deberá elaborar unas prácticas obligatorias, además de los trabajos o casos planteados. Las prácticas serán obligatorias para la superación de la asignatura.	30

## Assessment comments

--

## Sources of information

Basic	
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.