



Teaching Guide

| Identifying Data | | | | 2018/19 |
|--------------------------|--|--------|------------------------|---------|
| 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 | 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 | 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. | | | |

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. |
| A3 | Capacidad para la elaboración de Auditorías 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 |
|-------------------|-----------------------------|
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|---|------------|----------------------------------|------------|
| 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 | |
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| 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 | Ordinary class hours | 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 | 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 |
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| 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 |
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| Subjects that it is recommended to have taken before |
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| Subjects that are recommended to be taken simultaneously |
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| Subjects that continue the syllabus |
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| Other comments |
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(*)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.