



Teaching Guide

| Teaching Guide | | | | |
|--------------------------|--|--------|------------------------|-----------|
| Identifying Data | | | | 2022/23 |
| Subject (*) | Distributed Generation, Polygeneration and Micropower-Nets. Smartgrid | | Code | 730547011 |
| 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 | pcmasdias.cdf.udc.es | | | |
| General description | | | | |

Study programme competences

| Code | Study programme competences |
|------|---|
| 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 |
| A16 | CE16 - Search, analyze, identify and apply new sources of electrical energy or new electricity management techniques under criteria such as efficiency, sustainability or cooperation, as well as the use of these on new 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 |
| 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 |
| B10 | CG5 - Boost creativity |
| B15 | CG10 - Know the current legislation and regulations applicable to the renewable energy and energy efficiency sector |
| 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 |
| C5 | CT5 - Understand the importance of entrepreneurial culture and know the means available to entrepreneurs |
| 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 |

Learning outcomes

| Learning outcomes | Study programme competences | | |
|--|-----------------------------|------|-----|
| You will learn concepts and terms of generation, cogeneration and polygeneration, as well as the different elements in electrical networks and micro-grids | AC1 | BC1 | CC2 |
| | AC2 | BC2 | CC3 |
| | AC16 | BC3 | CC5 |
| | | BC5 | CC7 |
| | | BC10 | |
| | | BC15 | |



| | | | |
|---|--------------------|---------------------|--------------------------|
| Will have knowledge about elements used in micro-grids, generation elements with or without renewable energy, as well as energy storage elements and elements of energy consumption or supply to specific loads | AC1 AC2 AC16 | BC2 BC5 BC15 | CC3 CC7 |
| Know the basic methods and processes related to the elements that are part of micro-grids that are notable from an energy efficiency point of view | AC1 AC2 AC16 | | |
| Have knowledge to understand the fundamentals of intelligent micro-grids, as well as the management of the interconnection between micro-grids within an energy efficient analysis | AC1 AC2 AC16 | BC5 BC10 BC15 | CC2 CC3 CC5 CC7 |

| Contents | |
|---|-----------|
| Topic | Sub-topic |
| Distributed generation, opportunity and development needs. Regulatory Framework Integration of Generation (Self-consumption and Net balance) Deployment of Meters and Network Management Teams Participation of Clients in the Electricity Market. Polygeneration, New Technologies of generation, storage and distribution. Management of Smart Grid and Smart Metering Energy Networks. Infrastructure and Control Technologies Smart Network Devices Advanced Metering Infrastructure (AMI) Application and management of Distributed Energy Resources (DER) Advanced Network Management. (DMS). EMS systems (Energy Management System). | |
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| Planning | | | | |
|---|---|----------------------|-------------------------------|-------------|
| Methodologies / tests | Competencies | Ordinary class hours | Student?s personal work hours | Total hours |
| ICT practicals | A1 A2 A16 B1 B2 B3 B5 B10 B15 C2 C3 C5 C7 | 13 | 0 | 13 |
| Case study | A1 A2 A16 B1 B3 B5 B10 B15 C2 C3 C5 C7 | 0 | 47 | 47 |
| Objective test | A1 A2 A16 B1 B2 B3 B5 B10 B15 C2 C3 C5 C7 | 1 | 0 | 1 |
| Guest lecture / keynote speech | A1 A2 A16 B1 B2 B3 B5 B10 B15 C2 C3 C5 C7 | 13 | 0 | 13 |
| 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 | |
| Case study | |



| | |
|-----------------------------------|--|
| Objective test | |
| Guest lecture / keynote speech | |

| Personalized attention | |
|------------------------|-------------|
| Methodologies | Description |
| Case study | |

| Assessment | | | |
|----------------|---|--|---------------|
| Methodologies | Competencies | Description | Qualification |
| ICT practicals | A1 A2 A16 B1 B2 B3 B5 B10 B15 C2 C3 C5 C7 | Comprende la elaboración de practicas tanto asistidas como de laboratorio que podrán realizarse con datos obtenidos tanto con instrumentación real como virtual. | 25 |
| Case study | A1 A2 A16 B1 B3 B5 B10 B15 C2 C3 C5 C7 | Mediante el estudio de casos se analizarán diferentes casos prácticos que serán evaluados por el profesor. | 25 |
| Objective test | A1 A2 A16 B1 B2 B3 B5 B10 B15 C2 C3 C5 C7 | Prueba teorico-práctica que deberá ser superada por el alumno y que tiene por objetivo cuantificar los conocimientos y habilidades adquiridas. | 50 |

| Assessment comments |
|---------------------|
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| Sources of information | |
|------------------------|--|
| Basic | |
| 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 |
| |
| Subjects that continue the syllabus |
| |
| 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.