



## Teaching Guide

| Teaching Guide           |                                                                                                                                                                                                                                                                            |       |          |                       |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------|-----------------------|
| Identifying Data         |                                                                                                                                                                                                                                                                            |       |          | 2018/19               |
| Subject (*)              | Thermal Instalations                                                                                                                                                                                                                                                       |       | Code     | 770523018             |
| 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                 | Spanish                                                                                                                                                                                                                                                                    |       |          |                       |
| Teaching method          | Face-to-face                                                                                                                                                                                                                                                               |       |          |                       |
| Prerequisites            |                                                                                                                                                                                                                                                                            |       |          |                       |
| Department               | Enxeñaría Industrial                                                                                                                                                                                                                                                       |       |          |                       |
| Coordinador              | Lopez Vazquez, Jose Antonio                                                                                                                                                                                                                                                |       | E-mail   | jose.lopez@udc.es     |
| Lecturers                | Fernandez Ibañez, Maria Isabel                                                                                                                                                                                                                                             |       | E-mail   | isabel.fibanez@udc.es |
|                          | Lopez Vazquez, Jose Antonio                                                                                                                                                                                                                                                |       |          | jose.lopez@udc.es     |
| Web                      | moodle.udc.es                                                                                                                                                                                                                                                              |       |          |                       |
| General description      | Thermal Installations are fixed installations for climatization (ventilation, refrigeration and heating) and sanitary hot water production installations in order to attend people welfare and hygiene demands in any type of building, even buildings for industrial use. |       |          |                       |

## Study programme competences

| Code | Study programme competences                                                                                                                                         |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A10  | Capacidad para analizar e incluír enerxías renovables en diferentes instalacións.                                                                                   |
| A13  | Capacidad para analizar, aplicar y optimizar los sistemas de aprovechamiento energético.                                                                            |
| 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. |
| B7   | Desarrollar las capacidades de análisis y síntesis; fomentar la discusión crítica, la defensa de argumentos y la toma de conclusiones.                              |
| B9   | Extraer, interpretar y procesar información, procedente de diferentes fuentes, para su empleo en el estudio y análisis.                                             |
| B12  | Analizar de forma crítica la propia experiencia de prácticas.                                                                                                       |
| C2   | Fomentar la sensibilidad hacia temas medioambientales.                                                                                                              |
| C3   | Aplicar una metodología que fomente el aprendizaje y el trabajo autónomo.                                                                                           |
| C5   | Adquirir la capacidad para elaborar un trabajo multidisciplinar                                                                                                     |

## Learning outcomes

| Learning outcomes                                                       | Study programme competences |                           |                   |
|-------------------------------------------------------------------------|-----------------------------|---------------------------|-------------------|
| Know air conditioning systems. (ventilation, refrigeration and heating) | AJ10<br>AJ13                | BC4<br>BC7<br>BC9<br>BC12 | CC2<br>CC3<br>CC5 |
| Know sanitary hot water installations.                                  | AJ10<br>AJ13                | BC4<br>BC7<br>BC9<br>BC12 | CC2<br>CC3<br>CC5 |

## Contents

| Topic                                                                        | Sub-topic                                 |
|------------------------------------------------------------------------------|-------------------------------------------|
| Unit 1.<br>Air conditioning systems (ventilation, refrigeration and heating) | Regulations.<br>Design and configuration. |



|                                   |                           |
|-----------------------------------|---------------------------|
| Unit 2.                           | Regulations.              |
| Sanitary hot water installations. | Design and configuration. |

| Planning                                                                                                                        |                                  |                      |                               |             |
|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------|-------------------------------|-------------|
| Methodologies / tests                                                                                                           | Competencies                     | Ordinary class hours | Student's personal work hours | Total hours |
| Supervised projects                                                                                                             | A10 A13 B4 B7 B9<br>B12 C2 C3 C5 | 14                   | 45                            | 59          |
| Oral presentation                                                                                                               | A10 A13 B9 C2                    | 7                    | 7                             | 14          |
| Personalized attention                                                                                                          |                                  | 2                    | 0                             | 2           |
| (*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students. |                                  |                      |                               |             |

| Methodologies       |                                                                                                                                                                                |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Methodologies       | Description                                                                                                                                                                    |
| Supervised projects | The practical works of design and dimensionado of the installations will realize applying the methodology BIM (Building Information Modeling).                                 |
| Oral presentation   | The matter will be developed in theoretical-practical modules. Basic concepts of each subject will be present with the purpose to transmit knowledges and ensure the learning. |

| Personalized attention |                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------|
| Methodologies          | Description                                                                                 |
| Supervised projects    | Periodic controls will be realized aiming to avoid possible detours in non-attendance time. |

| Assessment          |                                  |                                                                                                    |               |
|---------------------|----------------------------------|----------------------------------------------------------------------------------------------------|---------------|
| Methodologies       | Competencies                     | Description                                                                                        | Qualification |
| Supervised projects | A10 A13 B4 B7 B9<br>B12 C2 C3 C5 | Practical works realized by the students both on-site or by non-attendance time will be evaluated. | 100           |

| Assessment comments |
|---------------------|
|                     |

| Sources of information |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic                  | <ul style="list-style-type: none"> <li>- Asociación Técnica Española de Climatización y Refrigeración - ATECYR (). Comentarios al Reglamento de instalaciones térmicas en los edificios - RITE. Instituto para la Diversificación y Ahorro de la Energía</li> <li>- Francesc Buqué (). Manual básico para el cálculo de instalaciones de calefacción. Marcombo</li> <li>- Carlos González Sierra (). Diseño y Cálculo de Instalaciones de Climatización. Cano Pina</li> <li>- Asociación Técnica Española de Climatización y Refrigeración - ATECYR (). Fundamentos de Climatización. Asociación Técnica Española de Climatización y Refrigeración - ATECYR</li> <li>- Ministerio de Fomento (). Código Técnico de la Edificación. <a href="http://www.codigotecnico.org/">http://www.codigotecnico.org/</a></li> </ul> |
| 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                                           |



Recomendacións Sostenibilidade Medio Ambiente, Persoa e Igualdade de Xénero:

1.- A entrega dos traballos documentais que se realicen nesta materia:

1.1. Solicitarse en formato virtual e/ou soporte informático

1.2. Realizarse a través de Moodle, en formato dixital sen necesidade de imprimilos

1.3. De se realizar en papel:

- Non se empregarán plásticos.
- Realizaranse impresións a dobre cara.
- Empregarase papel reciclado.
- Evitarase a impresión de borradores.

(\*)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.