Course guide
310402 - 310402 - Advanced Facilities

Unit in charge:  Barcelona School of Building Construction
Teaching unit:   724 - MMT - Department of Heat Engines.
                 753 - TA - Department of Architectural Technology.
Degree:         MASTER'S DEGREE IN ADVANCED BUILDING CONSTRUCTION (Syllabus 2014). (Compulsory subject).
Academic year:  2022
ECTS Credits:   5.0
Languages:      Spanish

LECTURER

Coordinating lecturer:  Ruiz Mansilla, Rafael
Others:                 Fernández García-Escudero, Luís
                        Ribé Torijano, Òscar
                        Ruiz Mansilla, Rafael

REQUIREMENTS

No additional prerequisites are required besides the access degree's.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
6. Carry out the modelization of physic processes and the resolution according to numeric methods.
7. Define the characteristics of the sismic action and apply the present regulations to the sismic calculation of structures in building construction.

Generical:
8. Develop and/or apply ideas with originality in a context of investigation, identifying and formulating hypothesis or innovative ideas and submit them to a objectivity, coherence, and viability test.
9. Provide to the student the capacity to apply the knowledge acquired in the resolution of complex problems in any sector of the building construction.

Transversal:
10. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.
11. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

Basic:
2. Possess and understand knowledge which provide a basis or opportunity to be original in the development and/or application of ideas, usually in a context of research.
3. The students must be able to apply the acquired knowledges and their ability of resolution of problems in new or little known environments inside more wide environments (or multidisciplinary) related with their study field.
4. The students must be able to integrate knowledges and front to the complexity to formulate opinions from an information which, being incomplete or limited, includes reflections about the social and ethethical responsibilities linked to the application of their knowledges and opinions.
5. The students must be able to communicate their conclusions and the knowledges and ultimate reasons which support to specialised and non-specialised audiences in a clear mode and without ambiguities.
1. The students must possess the learning abilities which allow them to continue studying in a way which should be to a large extent self-directed and autonomous.
TEACHING METHODOLOGY

MD1 Exposition participatory class.
MD2 Master class.
MD4 Tutorials and questions.
MD5 Orientation of works and autonomous practices.
MD6 Tests.

LEARNING OBJECTIVES OF THE SUBJECT

Learning Outcomes:
- Global knowledge of installations in buildings, whether residential, and commercial, sports, hotels, etc.
- Ability to design the most suitable type of installation based on its use and its ability to save energy.
- Be able to develop draft facilities, pre-sized and evaluating them.
- Be able to send work to implement facilities in new buildings and in rehabilitation and upgrading standards of existing buildings.
- Be able to develop plans for facilities maintenance management.
- Global Knowledge installations in buildings, whether residential, and commercial, sports, hotels, etc.
- Ability to design the most suitable type of installation based on its use and its ability to save energy.
- Be able to develop draft facilities, pre-sized and evaluating them.
- Be able to send work to implement facilities in new buildings and in rehabilitation and upgrading standards of existing buildings.
- Be able to develop management plans for facilities maintenance.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hours large group</td>
<td>17,5</td>
<td>14.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>5,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>5,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>72.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>7,5</td>
<td>6.00</td>
</tr>
</tbody>
</table>

Total learning time: 125 h

CONTENTS

1. Installation typology, depending on the building’s use.

Description:
There will be classified the different types of facilities depending on the use demands of the building, like its functioning reliability, available space, etc. as well as the energetic saving and efficiency.

Full-or-part-time: 2h
Theory classes: 2h

2. Advanced air conditioning systems

Description:
The objective of this topic is to know the main aspects related with the air conditioning of a building. Know which are the technologies in the generation of heat and cold, as well as the distribution of air and water. Know the basic parameters which must be considered in an air conditioning system to be energetically efficient.

Full-or-part-time: 8h
Theory classes: 8h
3. Advanced exterior and interior lighting systems.

**Description:**
Know the light typologies according to their energetic efficiency, the calculation of the energetic efficiency value of the facilities system and the control and regulation systems.

**Full-or-part-time:** 4h
Theory classes: 4h

4. Low Carbon or Zero Carbon Technologies.

**Description:**
The objective of this topic is to know the possibilities which the new technologies of low carbon or carbon-zero offer to reduce the emissions associated to the energetic consumption of the building by means of the local generation of energy by renewable sources.

**Full-or-part-time:** 6h
Theory classes: 6h

5. The energy management of the building. BMS (BMS Building Management Systems)

**Description:**
In this topic there will be explained how the Energetic Management Systems of Buildings allow to control, monitor and optimize the facilities and systems of the building like the ventilation, the production of sanitary hot water, the air conditioning, the illumination and the fire protection systems.

**Full-or-part-time:** 6h
Theory classes: 6h


**Description:**

**Full-or-part-time:** 4h
Theory classes: 4h

**ACTIVITIES**

**AF1 Lab practice**

**Full-or-part-time:** 20h
Theory classes: 20h

**AF2 Group projects**

**Full-or-part-time:** 60h
Theory classes: 60h
AF4 Problems / exercices

**Full-or-part-time:** 40h
Theory classes: 40h

AF8 Evaluation tests

**Full-or-part-time:** 5h
Theory classes: 5h

**GRADING SYSTEM**

EV4: Works, presented in writing or orally 100%